PREVALENCE OF CARDIOVASCULAR RISK FACTORS AMONG AUSTRALIAN-LEBANESE IN MELBOURNE

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DECLARATION

I certify that this thesis does not incorporate without acknowledgment any material submitted previously, in whole or in part, to qualify for any other academic award in any institution of higher education. I also certify, that to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where due reference is made in the text. In addition, the content of this thesis is the result of work which has been carried out since the commencement date of the approved program.

Signed: ………………………………….

Date: ………………………….

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Last but not least I would like to acknowledge the support of my mother. Her never ending love, her words of encouragement and constant prayers from across the miles gave me the strength and inspiration to continue in this long journey. To her I am forever grateful. I am also indebted to my loving husband Fouad and my gorgeous son Christian, who were so understanding, loving and supportive throughout the stages of this project.

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SYNOPSIS

In modern industrialized countries coronary heart disease is the single most important cause of death and disability as well as the biggest cause of premature death. There are known global geographical variations in the incidence of coronary heart disease with currently the Eastern European countries having the highest mortality rates, Australia in the middle of the range and Spain, France and Japan having the lowest.

Coronary heart disease still remains to be a leading cause of death in Australia, despite its decline in the past 25 years, which is mainly attributed to the improvements in medical management and to the lower prevalence of behaviours which increase the risk of heart disease.

Australia is a multicultural society and a country where one person in five is born overseas thus, its national health profile is significantly determined by the health of its immigrants.

It is evident from the literature that the mortality rate from CHD amongst immigrant groups in Australia is lower than that of the Australian-born. This is explained by the stringent selection processes involved in migration approvals where only healthy strong immigrants are selected to come to Australia. However, there is increasing incidence of coronary heart disease amongst migrant Australians. Some of the identified factors that may be influencing this increase are mainly those associated with the stress of migration and settlement, loss of status and socioeconomic disadvantage, limited access to health information as well as changes of life style

which occur with increased acculturation as the duration of residence in Australia increases.

This study was designed to examine the cardiovascular health profile, health knowledge, attitudes, beliefs, and health behaviours, perceptions and barriers to behavioural change of an adult sample of a non-English speaking background community in Melbourne namely, the Australian-Lebanese. The health practices of this migrant group had never been studied and to date there is a paucity of literature regarding their health needs.

This study provided information on the demographic and physical characteristics, life style factors, health and associated behaviours in relation to cardiovascular risk factors. The summary of findings below highlights a number of points of interest, and where possible comparisons were made with national figures derived from the 1989 National Heart Foundation Risk Factor Prevalence Study (NHF, 1990).

The main findings were:

Blood pressure and hypertension: The proportion of men and women who were hypertensive in this study increased steadily with age. 12.5% men and 7% of the women were found to have a diastolic blood pressure above 95mmHg. This is higher than the national figures of the 1989 NHFRFPS that were 11% of Australian men and 5% of Australian women had a diastolic blood pressure above 95 mmHg.

High blood cholesterol: The proportion of men and women who had high blood cholesterol levels increased steadily with age. 8% of the men and 10% of the women

reported having blood cholesterol levels greater than 6.5mmol/L. This is lower than the 1989 national figures where 16% of the men and 14% of the women had cholesterol levels greater than 6.5mmol/L (NHF, 1990).

Smoking behaviour: 44% of the Australian-Lebanese men and 25% of Australia-Lebanese women in this study were smokers compared with 24% of men and 21% of women of the 1989 NHFRFPS (NHF, 1990). All the Australian-Lebanese women smokers were in the middle and younger age groups (<44 years).

Exercise for recreation sport or health fitness: Lack of exercise for recreation was prevalent among the Australian-Lebanese, about 55% of the men and 47% of the women had no exercise of any kind during leisure time in the preceding fortnight, as compared with 27% of Australian men and women according to the national figures (NHF, 1990).

Overweight and obesity: Overweight and obesity were prevalent among the Australian-Lebanese. 71% of the men and 67% of the women were found to be either overweight or obese. This ratio is much higher than the national figures (NHF, 1990) with 60% of the men and 50% of the women being overweight or obese.

The prevalence of overweight and obesity in this study increased with age for both sexes. 48% of the total Australian-Lebanese sample were overweight and 24% were obese. 41% of men and 38% of women were overweight and 21% of men and 37% of women were obese.

Alcohol intake: Drinking alcohol was not a major risk factor among the Australian-Lebanese sample since most were occasional drinkers. 43% of men and 77% of women said they never drank any alcoholic beverages. This is quite a low ratio compared with the national figures where 87% of the men and 75% of the women drank alcohol.

Dietary behaviour: 96% of men and 90% of women did not follow any kind of special diet. A fat-modified diet to lower blood fat was followed by one man and 3 women. One man and one woman reported following a diabetic diet. Five women followed a weight-reduction diet. 61% of men and 68% of women rarely ate fat on meat. 80% of men and 86% of women rarely added salt to cooked food compared to 49% of Australian men and 58% of Australian women who rarely or never added salt to their food (NHF, 1990).

Major risk factors: A multiple forward logistic regression was conducted to assess which demographic factors predicted having a major risk factor or not. The strongest predictor was gender, with males more likely to have a major risk factor. The second strongest predictor was age with those in the older age group (45-69 years) being more likely to have a major risk factor and the next strongest predictor was education with those who have no formal education or primary school education only, being more likely to have a major risk factor.

These cross-sectional observations provide the basis for interventional-type studies and should lead to appropriate recommendations regarding health promotion and

education programs that can contribute to reducing the risks of cardiovascular disease

in this non-English speaking background community.

CHAPTER 1 CONTENTS

CHAPTER ONE

IMMIGRATION TO AUSTRALIA AND THE

HEALTH OF IMMIGRANTS

1.1   Introduction

Wars, political upheavals, and economic disparity throughout the centuries have caused

massive movements of population between nations. Migration is the term used to refer

to the movement of populations between as well as within nations. Immigrants, as

defined by the Collins English Dictionary (1998), are those who come to a country of

which they are not natives to settle there. The second half of the twentieth century

witnessed massive movement of immigrants and refugees from non-Western nations,

particularly Africa, Asia, and Latin America, to Western nations such as America,

Canada, and Australia (Al-Issa, 1997; Rice, 1999; Schofield, 1995).

Australia has a long history of migration from the British Isles and Europe and the

experience with immigration has involved a high degree of state action and control.

This controlled immigration started with the convict settlements in 1788 and continued

to 1947 to boost the depleted population that had been caused by the losses sustained

during the First and Second World Wars, as well as the persistent decline in fertility that

had begun in the 1920s (Schofield, 1995). Only in the middle of the nineteenth century,

and then for a very short period of time, was there free and uncontrolled immigration to

Australia. This was in response to the discovery of gold and the consequent economic

expansion that came to an end with the economic depression of the 1890s (Jupp, 1984).

While the first wave of migrants to Australia came from English-speaking countries, by

the early 1960s immigrants from non-English-speaking countries comprised the greater

proportion of all new settlers. These immigrants made enormous contributions to the socio-cultural diversification as well as to the economic growth of Australia. There is little doubt that this new life has offered the new immigrants opportunities for considerable prosperity. However, it also entailed considerable sacrifice for immigrants, particularly the loss of their superior health status that was a major criterion for their selection and acceptance into their new country in the first instance (Schofield, 1995).

Migrants range from rich professionals, who are highly educated and qualified in their own country, to peasants with little or no formal education. With few exceptions, the migrants enter working-class or lower middle-class professions that require hard labour in their new country (Bottomley and de Lapervanche, 1990). Very often professional qualifications from their home countries are not recognized in Australia. Thus, because they need to obtain employment for the survival of their families, many of the highly educated immigrants are working in factories and other low-paying and labour intensive jobs.

The non-English-speaking background immigrants share many health concerns with their counterparts from English-speaking backgrounds. Although the rate of illness and disability among non-English-speaking immigrants is lower at entry than the Australian-born, illness and disability increase with the length of duration of residence in the host country (Young, 1986; d'Espaignet and van Ommeren, 1992). Over time, non-English-speaking immigrants develop a high rate of work-related chronic illnesses and disability that corresponds with their location in the more exploited sections of the labour market (Schofield, 1995). High prevalence of work-related injury and disability

among immigrants has led to the myth of 'the lazy, accident-prone and malingering immigrant worker' (Julian, 1998:85). Adverse health consequences seem more common among immigrants due to the stresses associated with migration and the lengthy acculturation process, especially in those with added language and cultural barriers, those without family or social support (Eisenbruch, 1989:577) and those who have suffered psychologically by moving downwards in their class position (Rice, 1999:4).

It should be noted, however, that immigrants are not a homogeneous group, but diverse in many dimensions (Julian, 1998; Vivani, 1996; Ferguson and Browne, 1991). Although many of the health patterns of immigrants to Australia resemble those of the lower classes of the Australian-born population, the literature shows that immigrants also have health patterns that are different.

The first chapter of this thesis will provide a review of the history of immigration to Australia in general and the immigration of a particular ethnic group, the Lebanese. It will provide a brief historical background of Lebanon, and a review of the settlement of the Lebanese in Australia and the effects of immigration on the health of immigrants. This chapter will also outline the background, the purpose, the aims and objectives of the study. It will set the scene as to why this study is important and how its findings might help to fill a gap in the Australian health literature about the state of health in general, and cardiovascular health in particular, of a sample of a specific ethnic group, the Australian-Lebanese in the city of Melbourne.

1.2 History of Immigration to Australia

In 1788, Australia had a population of about 300,000. This population was exclusively Aborigines and Torres Strait Islanders who had regular contact with the Papuans, Indonesians and Chinese in the northern part of Australia. The Aborigines, being hunters and gatherers, did not construct towns and villages but they had semi-settlements in parts of Tasmania and along the major river systems in the country (Robson, 1966). Australia now has a population of around 19,000,000. Twenty percent were born overseas and an additional thirty per cent were born in families where at least one parent was born overseas and only one percent being descendants from the Aboriginal people. Most of the Australian population lives in towns and cities (ABS, 1997).

The complete transformation of Australia took place in less than two hundred years and was due to the mass immigration of the British, Europeans (especially those from Mediterranean countries), Americans, and more recently the Asians. Political upheavals, wars and economic hardships were mainly responsible for the massive movement of populations. Settlements in Australia took place in various waves related to economic cycles in Australia and in the countries of origin of the immigrants (Jupp, 1984).

Between 1788 and 1867 the British government used Australia as a penal colony and sent a total of 145,470 convicts, who were mainly men, to Eastern Australia. In the 1840s the proportion of convicts dropped steadily but it is not improbable that anyone claiming to be an Australian of "fifth generation" or beyond has a convict ancestor (Robson, 1966). After seven years of imprisonment the convicts were released and restricted to live in Australia although some returned to Britain. Female migration from

Ireland was encouraged to stabilise the population and to breed new settlers. The British government transported the convicts to Australia and also assisted with passage money for the new settlers who changed Australia by 1851 from a convict settlement to a free colony (Blainey, 1963). In the 1790s early free settlers started arriving from America and the South Pacific and they created important industries such as whaling, the coal industry and agriculture.

In the nineteenth century it became possible for anyone who could raise the passage money to travel freely to Australia from the American continent and the British Empire. This freedom to travel to Australia coincided with the development of fast sailing ships and the British government's active encouragement of its population to immigrate to Australia to reduce its population pressure back home. However, this freedom did not apply to people from countries such as Japan, China, Russia and Turkey who needed special permission and passports to enter Australia. In 1851 with the discovery of the largest gold field mines in central Victoria, the Australian population increased to 525,000 and of those, only 85,000 were descendants of the Aboriginal people (Blainey, 1963). The population was predominantly white British and settlement was restricted to the coastal cities of Adelaide, Hobart, Melbourne, Perth and Sydney. It was only in Queensland and Western Australia that the Aborigines outnumbered the white Australians.

The gold rush of 1851 brought immigrants from America, Canada, China, Germany, Italy, Scandinavia and Switzerland. By 1861 there were over one million people in Australia. The mass influx of immigrants resulted in the establishment of inland towns such as Ballarat and Bendigo in Victoria and dramatically increased the population in

Australia, especially in Victoria. By this time, one in seven of the adult male Victorian population was Chinese. Thus, a movement emerged to restrict the number of Chinese settlers marked this period. A new legislation in 1855 for taxes was introduced mainly to discourage the Chinese gold miners (Cronin, 1982) most Chinese men came without their families and the majority of them intended to return to China after making their wealth rather than stay in Australia. Thus they left behind a very small Chinese-Australian population. However, their arrival in short periods of time and in large numbers raised the concern of the white settlers. This period started the movement known by 1880s as "White Australia". Restriction of non-white immigrants became a central concern of the Australian Labour Party in the 1890s, when the majority of the population was white Australian-born (Jupp, 1984).

During the economic depression of the 1890s immigration was markedly reduced. Prejudicial attitudes towards the Chinese turned towards the Pacific Islanders and other Asians. Those involved in trade unions and labour movements feared that migrants were taking jobs from locals (Willard, 1967). This attitude remained until the late 1940s and persists even now during milder down turns in the economy. Apart from the assisted immigration from Britain in the 1920s, a steady but lesser level of immigration and population expansion continued for over fifty years between 1890-1945 in Australia.

In 1901, Australia became a Federation. The creation of the Commonwealth occurred but the domination of public affairs, positions of importance and the economy of the Australian Commonwealth continued to be held by white Anglo-Saxon immigrants until 1914 although by then there was a considerably large Australian-born population. A

'White Australia" policy was the one policy which almost all Australians accepted. Thus, after 1901 non-whites were permitted to enter on temporary permits only.

Most of the period between 1890 and 1945 was characterised by low levels of immigration, slow economic growth and increased domination by the Australian-born in Australia. The economic depression of the 1930s made the situation worse and by 1947, Australia had the lowest level of overseas-born population (9.8%) compared with the large number of immigrants who had arrived in Australia during the previous century.

Among the first Acts of the new Commonwealth were the Immigration Restriction Act, the Pacific Islanders Act and the Naturalisation Act. Thus for the next sixty years, it became impossible for anyone who was not of European descent and appearance to be admitted to Australia. This policy was therefore based on racial grounds rather than economic competition. During this period a strong sense of Australian nationhood grew. Immigrants became a minority group throughout the Australian society and particularly in positions of influence. It was during this period that attitudes and symbols that are now regarded as peculiarly Australian were adopted. Opposition to non-European migrants increased. Suspicion of non-British migrants dominated, largely because of the common belief that Australia was altogether better than Britain and that the British migrants should feel privileged to have had the opportunity to migrate to Australia (Jupp, 1984). This created great fear among migrants who came from the Mediterranean area in the 1920's.

After the Second World War, Australia was faced with a dilemma. It had been threatened by the Japanese Empire who had swept Britain away from Southeast Asia, resulting in a reluctant reliance by Australia on aid from the United States of America (Price, 1945). At that time, Australia had a population of only seven million people. It was recognised that Australia must "*populate or perish*" and that it must create a defence industry. In November 1947 migration started again when the first shipload of post World War II European Displaced Persons arrived and migrant camps were established. This introduced many ethnic groups who had had no previous presence in Australia, such as the Czechs, Estonians, Latvians, Poles and Ukranians, all non-English-speaking Europeans. It is important to mention that Western non-English-speaking Europeans, such as the Dutch, Greeks and Italians, had been present in Australia from the convict period but in very small numbers, with the exception of Germans who had largely settled in South Australia (Price, 1945).

After World War Two the White Australia policy and the preference for British immigrants continued. The Displaced Persons migration lasted for six years and was an important turning point. Refugees became regarded as basic labourers who could play a major part in the workforce and were allocated to sectors which had the greatest difficulty in attracting Australian-born labourers.

In the mid 1950s another wave of immigrants, who were not sponsored by the Australian government, started arriving from Italy, Greece, Malta, Egypt, the Mediterranean and Yugoslavia. Their labour was essential for the prosperity and expansion of many industries such as the steel, motor, clothing, textiles and footwear industries.

By the mid 1960s the vigour of the white Australia policy was starting to fade and the doors were opened for well-qualified Asians. Eastern Europeans were not allowed to emigrate under their communist government rule. Simultaneously, Britain and Western Europe became more prosperous and joined the European Common Market, which decreased the immigration of people from these nations to Australia. To maintain the White Australia policy, Australia realised it would have had to subsidise more British migrants. Many migrants of British origin started to arrive from New Zealand. New Zealanders now constitute the third largest overseas-born group in Australia after those born in Britain and Ireland (Jupp. 1984).

In 1972, a major shift in immigration policy occurred with the election of the Labor government. The Labor Party committed itself to ethnic equality which went hand-in - hand with their intention to reduce immigration markedly. A high rate of population growth was no longer the objective of this government. The economic costs and the benefits of immigration started to be assessed carefully, with pressure rising on demands for social welfare, education, housing and other social services. Access to Australia therefore became more selective and was tied to labour demand and family reunions. Preference was given to migrants with superior qualifications, skills, experience and ability to communicate well in the English language (Jupp, 1984).

Australia began to expand its economic and political links with Asia. As a result, it became difficult to bar well-qualified Asians from immigrating (Rivett, 1975). The Australian government actively sought to assure Asian governments that the White Australia policy was over. From the mid 1970s until the early 1980s, Australia opened

its doors to many Vietnamese and Indo-Chinese refugees. They brought with them tensions and conflicts of almost three decades of war and psychological scars from their past. However, they lacked the educational and occupational attributes which the carefully selected immigrants preceding the Asian influx had been required to have.

The arrival of the Southeast Asian refugees prompted some concern that the immigration intake was no longer 'balanced'. Suggestions of a return to the open discrimination policy were voiced and hostility towards the immigrants started to re-emerge. At this time, immigrants were also arriving from Latin America and the Middle East. With the beginning of the civil war in Lebanon between 1976-1977, 12,000 people fled from Lebanon to Australia. Unlike the predominantly Christian Lebanese who migrated prior to 1970, many of these new arrivals were Muslims who settled in Sydney and Melbourne and added to the growing cultural and ethnic diversity of late twentieth century Australian life (Sherington, 1990).

In 1982 the government created a more powerful Department of Immigration and Ethnic Affairs, which was committed to non-discriminatory selection procedures for immigration. An increasing acceptance of cultural pluralism and ethnic diversity emerged. Multiculturalism started to be seen as a positive force and the image of the 'melting-pot' was replaced by that of assimilation and integration. Although there was a reduction in immigration in general in the 1970s, there was also an increase in migration to Australia from Asia, Indo-China, Central and South America, Lebanon and Turkey. A rapid increase in immigration occurred in the 1980s and new source countries emerged such as the Philippines, Malaysia, Hong Kong and South Africa (ABS, 1990).

Today, Australia remains one of the most multicultural countries on earth, with more than 20 per cent of the population having been born overseas and more than 30 per cent having parents born overseas. Currently, the number of migrants arriving fluctuates according to Australia's need for skilled workers and business people. Immigrants also continue to be admitted under the categories of family reunion and refugees (Ferguson & Browne, 1991; Minas et al., 1996). Thus the present immigration policy is based, not only on the state of the Australian economy but also upon social and humanitarian criteria.

1.3   Historical Background of Lebanon and the Lebanese

Lebanon has a rich historical and religious heritage. The earliest historical inhabitants of Lebanon, Syria and Palestine were the Biblical Cana'anites. The Cana'anites traded with the Greeks and were called the Phoenicians. This name evolved from the industry they developed using the sea murex and the Kermes insect which was abundant on the Mediterranean sea and used in dyeing cloths purple red. The Phoenicians explored and colonized the Mediterranean Sea over 3000 years ago. The Lebanese are the descendants of the Phoenicians (Hitti, 1957).

Over the years, Lebanon also became the land of the Semitic tribes, the Crusaders, the Caliphs and the Saracens. From 1516 to 1918 Lebanon became subject to the Ottoman Empire, and after the First World War, was transferred to the rule of the French mandate until gaining its independence in 1943. In 1920 the French created Greater Lebanon, the entity of Lebanon as we know it today, which included the Beqaa' valley, Beirut, Tripoli and its surroundings to the north together with Sidon and its surroundings to the south. Beirut and the Beqaa' valley, under the Ottoman rule, were

only on occasions considered part of old Lebanon depending on the strength of the ruling prince and his occupational armies at the time.

Prior to the twentieth century, the entity called Lebanon consisted of two parallel mountain ranges, the Eastern range and the Western range, a rugged gorge and valley area reaching to the coast of the Mediterranean sea. The Western mountain range and the Eastern Anti-Lebanon mountain range, both run north to south. Today Lebanon is separated from Syria by the fertile Beqaa' valley.

Lebanon, which is pronounced "Lubnan" in Arabic, is derived from an Aramaic word "Laban" meaning "white" which was used to describe the area of the snow capped mountain peaks. It is the Anti-Lebanon mountain range which has its peaks covered with snow nearly all year round that gave Lebanon its name.

Lebanon, with its location in the centre of the Old World between Mesopotamia and Egypt and the Hittite land to the north. (home to one of the earliest Indo-European cultures) and south to Palestine, and the birthplace of Judaism and Christianity. It has always been the link between East and West and the conduit for the exchange of cultural and material products between Eastern and Western civilizations (Hitti, 1957).

From the outset, religion has been a dominant force in the Middle East being the birthplace of Judaism, Christianity and Islam. Religious rivalries and wars have been part of the history of Lebanon and have existed for over a thousand years. The rivalries and differences were not only confined to whether the person was Moslem, Christian, or Jew but to which Moslem, Christian, or Jewish community the person belonged

(Hourani, 1961). Over the years the people of the mountain regions remained autonomous or semi-independent, even when other parts of Lebanon were ruled by the occupying armies. At the time of the Arab conquest, all the countries in the area except Lebanon succumbed to Islamic attacks and became Muslim. Lebanon retained its Christian identity and became a haven for oppressed minorities, who sealed themselves off from persecution by taking refuge in its impenetrable mountain ranges. The persecuted minorities lived side by side in self-contained nationalistic or semi-nationalistic communities (Hitti, 1957). Under the Ottoman rule from 1516 to 1918 the small self-contained community structure was further emphasized through the division of the country into *millets* (communities) of religious rather than regional affiliations, hence preventing the people from acquiring social or regional unity.

1.3.1 Lebanese Migration

Migration of the Lebanese to all corners of the globe started in the middle to late nineteenth century. Various factors contributed to the migration process including a combination of inter-related religious, economic and political factors. A very important cause of this migration was the Turkish oppression of mainly the Lebanese Christians who did not share the Muslim faith with the Turks. During the Turkish rule there was perceived and actual religious intimidation, poor social conditions and poor educational opportunities which were highlighted by the foreign missionaries who encouraged and assisted Lebanese religious converts to pursue studies abroad (Hitti, 1957).

The opening of the Suez Canal in 1869, while hailed as a marvel of nineteenth century engineering, affected the silk industry by opening a door for the far

eastern countries to export silks. This change reduced the income of a large Lebanese community who were dependent on exporting silk to Africa. The heavy taxation and custom duties imposed on the Lebanese, and especially on the Christian Lebanese, by the Turks resulted in severe economic hardships. The conscription of young males to the Turkish army, the forced labour imposed by the Turks on the Lebanese male youth and the introduction of monopolies were among other factors that influenced the Lebanese to migrate.

The turbulent political climate following the civil war between the Christians and the Muslim Druze in 1860 resulted in the deaths of over 14,000 thousand Christians, contributing to the departure of many remaining Christians who sought better opportunities abroad. Last but not least, the achievements of the early migrants to other countries, including Australia, filtered back in letters and tales of success, encouraging more people to venture forth to seek a better life away from the homeland.

1.3.2   Lebanese Migrants in Australia

The Lebanese population in Australia is one of Australia's oldest and largest Arabic speaking immigrant groups. The Lebanese started migrating to Australia towards the end of the nineteenth century, although there is a possibility that there were some Lebanese on gold rush boats as early as 1846. There were reports of Lebanese people boarding boats apparently bound for America to '*Al-Na-Yurk*' (New York) but who had been mistakenly put on boats bound to Australia by the shipping agents in Marseilles.

"he who amassed the largest fortune in Australia was there two years before he discovered he was not in 'Al-Na-Yurk' (New York) , the shipping agent in Marseilles having put him on the wrong boat" (Hitti, 1957, p.58).

Early Lebanese immigrants before 1901 were referred to by the Australian authorities as Turks because Lebanon was then under the Ottoman rule. Thus, the Lebanese were issued with Turkish documents regardless of their regional, linguistic, and religious origins. As the Australian authorities gradually became aware of the internal differences among "Turk" immigrants, they became gradually categorised on the basis of their region of origin and religion. At the beginning of the twentieth century Lebanese and Syrian immigrants started being classified by the Australian government under the one category as Syrians, since Lebanon was an autonomous district in the Ottoman province of Greater Syria. It was not until 1926 that immigrants from Lebanon, as we now know it, started migrating with a Lebanese passport. In 1954 they started being classified separately by the Australian authorities.

Most of the Lebanese immigrants were illiterate peasants and villagers. Very few were from the upper social class who came with education, business experience and sufficient capital (McKay, 1989). Until the late 1880's and 1890's most Lebanese migrants were Christians. They were then followed by Muslim Druze. The early immigrants first arrived as individuals or in small groups. It was not until 1890 that they started migrating in larger groups, thereby attracting the attention of the Australian government. By 1901 about 2000 Lebanese had arrived in Australia. Their number slowly increased to around 3000 by the early

1930s. After forty years, this number had dramatically increased to 48,171 migrants (ABS, 1991).

During 1975 after the start of the Lebanese civil war, 12,144 Lebanese migrated to Australia, and another 2,520 followed a year later. Subsequently, the numbers continued to increase until 1991 when census data showed that the number of Lebanese immigrants in Australia had reached 69,014 (ABS, 1991).

The family unit has always been a strong and most powerful social institution in the Middle East and is still a dominant feature of the Lebanese society today. This strong family solidarity made it unnecessary for Lebanese to rely on the government agencies for social services such as health, education and welfare. The newly arrived immigrants did not possess national identities but rather local identities based on their religion, birthplace, dialect, dress, food and folklore. When they migrated they transplanted these traditions and parochial loyalties and were concerned only with their 'own people' and not outsiders from other villages.

The process of immigration was that of chain migration, where the father first migrated alone and then sent for his wife and children and other extended family members. Fellow villagers, males first, and finally the females, followed later. The Lebanese revealed characteristics that distinguished them from Asian immigrants with whom they were first classified by the Australian authorities. They had a balanced sex ratio and a higher fertility rate (Batrouney and Batrouney, 1985). This compared well with other Asian migrants who had a sex ratio of 9:1 of men to women and who arrived in Australia to exploit its resources

and then return home (McKay, 1989). The Lebanese demonstrated their intention of staying in Australia permanently and took up Australian citizenship as soon as they became eligible. Even so, they gave their allegiance first and foremost to their extended family, and second, to other members of their fellow villagers who were also their co-religionists (McKay, 1989). Since arriving in Australia, the Lebanese established their own voluntary organizations or village associations. The village associations are traditional communal societies based on village/ town and kinship ties. In 1945 the Australian-Lebanese Association of Victoria was established to foster community cohesion and promote the image of the Lebanese community in Australia. With the outbreak of the Lebanese civil war in 1975, the role and the image of the Association altered. Unfortunately, the same division between Christians and Moslems which affected Lebanon became apparent within the Lebanese community in Melbourne. Thus many Lebanese began to identify even more with sectarian community leaders and their village associations. This trend resulted in the failure of the Australian-Lebanese Association to achieve solidarity.

The village associations, having first emerged in Melbourne in the late 1960s increased their numbers rapidly with the onset of the Lebanese civil war in 1975. The activities of the associations were centrally concerned with the pooling of resources to aid relatives in Lebanon and to keep communication channels open with the homeland. During the Lebanese civil war, village representatives were flown to the village in Lebanon with messages and money from worried relatives in Australia. The village associations were also structures for socializing between extended families, an important cultural and settlement need of the Lebanese

(Batrouney and Batrouney, 1985). They also provided financial assistance, information and advice to new immigrant fellow villagers who were facing settlement problems in Australia.

1.4   Health Issues of Immigrants from Non-English Speaking Backgrounds

It is difficult to assess the health status of people from various non-English speaking backgrounds in Australia. Difficulties arise because of the different ways in which symptoms, experiences and the labelling of ill health are recognised by different individuals and cultural groups. Some people may not recognise that certain symptoms are possible risk factors for underlying diseases. They may also stigmatise certain diseases such as mental illness and not seek treatment or report symptoms (Helman, 1985). The human experience of health and illness is culturally shaped.   However, health researchers and service providers do not necessarily think in the same way as ethnic communities about what constitutes illness (Kleinman, Eisenberg, and Good, 1977).

The process of migration involves varying degrees of change in the "physical, cultural and linguistic environment and in the family, social, occupational and economic circumstance of immigrants" (Minas, 1990:253). Whether people migrate voluntarily or as refugees, factors such as the economic resources they bring with them, education, age at the time of arrival to the new country, the kind of social support, and the role of their family in the settlement process, all impinge on their migratory experience and, in turn, on their general health status (Minas, 1990).

Immigration has significant effects on health and illness (Hull, 1979; Kasl & Berkman, 1983; McKinlay, 1975). The health of migrants may be affected by many factors associated with being a migrant. Studies exploring the links between migration and health have identified that migrants are prone to illness and distress related to pre-immigration experiences as well as to the stress of resettlement and attempts to blend in

with the new culture (Reid, 1990). Stress and anxiety are also caused by changes of lifestyle, separation from family and friends, communication barriers, loss of status due to lack of recognition of professional qualifications often leading to socioeconomic disadvantages, new demands in the new country and changes in gender expectations. The latter applies especially to women, who have a dual role in raising a family and working outside the home to provide income for the family, but without the traditional support of the extended family (Schofield, 1990).

Socioeconomic status, language and culture interact to influence the health experiences of migrants. One of the determinants of socioeconomic status is occupation. Many migrants from non-English speaking background work in lower status jobs than either the Australian-born, or other migrants from English speaking countries. Many are in the lowest paid stratum, and the hardest and most dangerous segments of the labour market, putting their health at risk of industrial accidents, which can lead to long-term disability and illnesses. These migrants have the lowest income and highest incidence of poverty and work injuries (Lin and Pearse, 1990). The socioeconomic disadvantage experienced by some non-English speaking migrants flows on to their children who are over-represented among children in poverty in Australia (Taylor and McDonald, 1992). As might be expected newly arrived migrants are more likely to experience poverty than migrants who have lived in Australia for longer periods of time (Johnson, 1991).

The effects of the migration experience on men and women are well documented in the literature. Women appear to suffer more hardships than men. Although the same effects may apply to men from non-English speaking backgrounds, socioeconomic status, language and culture interact and adversely affect the health of women who experience

isolation and mental stress resulting in sub-clinical depression. Typically, such depression is not admitted nor recognised. These women also experience difficulties with the health system because of communication barriers and its perceived culturally inappropriate practices in women-specific health issues, of birthing, menstruation and menopause (Alcorso and Schofield, 1992). The significant role played by the wife-mother as a primary agent of health behaviour in the Lebanese family is crucial because she has the most prominent influence in matters of health and nutrition. Since life-style, health and illness behaviour are first acquired in the family setting, a mother's illness or prolonged incapacitation poses a serious threat to the family health and functioning.

Although immigrants and ethnic minorities experience the same everyday stressors common to all members of the society, they also face stressors unique to them that are mainly related to their cultural background and their experience within the majority culture (Al Issa, 1997). Their degree of acculturation and assimilation brings problems related to their identity and intergenerational conflicts (Al-Issa, 1997).

Berry (1980) describes four models of immigrant acculturation:

a) assimilation refers to relinquishing cultural identity and socially disappearing into the dominant society;

b) integration which is maintaining cultural identity but adopting some dominant society values;

c) separation refers to withdrawing from the dominant society and keeping cultural identity;

d) marginalisation which is alienation from both the cultural group and dominant society, negating ethnic pride.

Berry (1992) also identified the manifestations of 'acculturative stress' as exemplified by lower mental health status, feelings of marginality and alienation and heightened psychosomatic and psychological symptom levels (p.75). Migration and resettlement stressors may have negative effects on the mental and physical health of immigrants and can precipitate risk-taking behaviours such as smoking and alcohol intake. There have been few investigations of risk factor differentials in immigrant groups in Australia. The risk factors for coronary heart disease are also known to be risk factors for other lifestyle-related diseases (Bennett, 1992).

1.5   Background to the Study

Australia is a multicultural society. While most Australians speak English and come from Anglo-Celtic backgrounds, over 110 different ethnic groups who speak more than 100 different languages also reside in Australia and constitute the Australian population (ABS, 1991). The latest census data (ABS, 1997) shows that 20.8% of the Australian population were born overseas and 11.6% of the total Australian population were born in countries where English is not the main language. Of the Australian immigrants aged 5 years and over, 1.8 % do not speak English at all and 9.2% do not speak English well (ABS, 1997). Women from different ethnic backgrounds are the most disadvantaged because they are either isolated at home, or engaged in working for low wages with rare opportunities to learn and practise English. Those who are elderly are also unlikely to have had opportunities to learn the English language (Young, 1992).

A lack of proficiency in the English language poses problems for the effective provision and access to mainstream health services. Consequently, important health messages are

less likely to be understood by the groups of people from non-English-speaking backgrounds (NESB).

Difficulties in gaining an accurate picture of the health status of immigrants in Australia may arise from the ways in which they themselves define health, illness symptoms and disease. Poor health status of immigrants tends to be related to perceived factors associated with the migration experience which may include: economic hardship, separation from family, friends and social networks, language and communication barriers, changes in lifestyle such as diet, work, recreation and religious practices and the lack of knowledge about the health care system in the host country (Powles and Gifford, 1990).

An example of the lack of literature in relation to immigrants' health is the review of the published studies in the Australian Journal of Public Health that was undertaken by Redman between May 1994 and May 1995. This review found that of the 45 studies examining health behaviours, none focused on the needs or experiences of the non-English-speaking communities (Redman, 1996).

Most medical and health care providers who might understand the complexity of the provision of health care to people from different cultural backgrounds have voiced their concerns and sought to address issues of inequity and disadvantage of migrant populations. The Australian government therefore has identified immigrants from non-English-speaking backgrounds as people with special health needs and regarded them as particularly disadvantaged among Australians, other than Aborigines, with respect to health status and access to health care (Better Health Commission, 1986). The process

of immigration imposes major lifestyle changes on immigrants. Inequalities in health in all societies are influenced by differences in social class, gender and ethnicity which together determine the life chances of individuals (Bates and Linder-Pelz, 1990). These inequalities have been noted in the statistics for cardiovascular disease, respiratory disease, cancer, motor vehicle accidents and other identified illnesses (National Health Strategy, 1992, p.11). In a country where one person in five is born overseas, the national health profile is inevitably significantly determined by the health of its migrants.

1.5.1   Coronary Heart Disease

In modern industrialized countries coronary heart disease is the single most important cause of death and disability as well as the biggest cause of premature death. Coronary heart disease (CHD) is also an increasing cause of death in developing countries. There exists a wide variation in mortality rates from coronary heart disease in the world and these variations are influenced by ethnic origin and social class where the mortality rate is greatest among the most deprived (Lindsay and Gow, 1997).

The Framingham Study (Dawber et al., 1951) was one of the first major studies to monitor and document the incidence of CHD. It aimed to generate information that would help in the early detection and prevention of CHD. It began in the 1940's in the small community of Framingham in Massachusetts in the United States of America. The original study sample included 5,209 individuals between the ages of 30-60 years. This study subsequently grew into a major prospective study where the follow-up of recruits, and in some cases their off springs,

continues today. Data from the study have provided valuable information about the relationship between various risk factors and CHD.

The Framingham study has become synonymous with the risk factors concept which identified that lifestyle behaviours, such as tobacco smoking, high dietary fat and caloric intake, physical inactivity, stress, excess alcohol intake and obesity contribute to the development of coronary heart disease (Dawber et al., 1951). These risk factors are known as modifiable risk factors. Unmodifiable risk factors include family history of CHD, personal history of CHD, age, and gender. The assessment and correction of modifiable risk factors through lifestyle changes poses a great challenge to health care professionals who also have an important role to play in the diagnosis and prevention of coronary heart disease.

There are known global geographical variations in the incidence of CHD, with the eastern European countries currently having the highest CHD mortality rates followed by Ireland and Scotland. The lowest mortality rates from cardiovascular disease are found in Spain, France and Japan. Australia is in the middle of the range, CHD still remains the leading cause of death in Australia despite its decline in age-adjusted death rates over the past 25 years (Al-Roomi, Dobson, Hall, Heller, and Magnus, 1989; Bennett and Magnus, 1994). This decline of CHD mortality has been attributed mainly to improvements in medical management and to the lower prevalence of unhealthy behaviours which increase the risk of heart disease (Cardiovascular Health In Australia, 1994).

It is evident from the literature (Young, 1992; Donovan, d'Espaingnet, Merton and Van Ommeren, 1992) that the mortality rate from CHD amongst immigrant groups in Australia is lower than that of the Australian-born. This is explained in part by the stringent selection process involved in migration approvals where only healthy strong immigrants are selected to come to Australia. However, there is increasing incidence of coronary heart disease amongst migrant Australians as they live longer in Australia (Young, 1992). A review undertaken by the Australian Institute of Health and Welfare of the health of people born outside Australia compared with that of Australian-born people the (Donovan et al., 1992) identified factors that may have influenced this increase. These factors were found to be mainly those associated with the stress of migration and settlement, loss of status and socioeconomic disadvantage experienced by many migrants, limited access to health information and changes in life style which occur with increasing acculturation as the duration of residence in Australia lengthens (Young, 1986, 1992).

Currently, there are few, if any, health education programs available for the promotion and the prevention of heart disease that specifically target the Arabic speaking ethnic group. Consequently, important messages about prevention of heart disease are unlikely to be disseminated to, or understood by, this population of non-English speaking background (Wilson et al., 1993).

It is the role and responsibility of nurses to provide health information and health education whose focus is to change individual behaviour, attitudes and beliefs in order to promote better health. Nurses are the single largest professional group in the health

care team and, as such, should be key figures in the prevention and management of coronary heart disease.

1.5.2 Purpose of the Study

The researcher shares the same ethnic background and language as the population which is the subject of this study. She has an in depth understanding of the cultural and traditional beliefs of the Lebanese community which has assisted her in conducting this study. The study arose from a genuine interest in the health beliefs, knowledge and practices of this community and a fundamental concern felt for the health of this migrant group. The broad aim of the study was to fill a gap in this area and to help other health workers gain an insight into the potential and actual health needs of this particular community.

Given the lack of previous research relating to the prevalence of cardiovascular risk factors among an Arabic speaking community, namely, the Australian-Lebanese in Melbourne, this study was regarded as timely, opportune and especially feasible. The study's ultimate goal is to advance nursing knowledge and understanding of behaviours associated with cardiovascular disease in order to develop effective interventions as needed, motivating and supporting health-promoting behaviours in this Lebanese migrant group. Such interventions would be the proper domain for nurses who could assist individuals and thereby help to improve the health status of this particular population group, decreasing cardiovascular disease mortality and morbidity rates as well as health care costs.

The potential benefits of this study are numerous. As the researcher is a senior nurse academic as well as of Lebanese background, this study would inform community health nurses and migrant health policy makers of the particular needs of this migrant group. It will provide baseline data on risk factors for cardiovascular disease in an under-studied population in Australia, it will also provide information on the knowledge, attitudes and health behaviours of this non-English speaking background group. Such information should lead to appropriate recommendations being made for policy makers regarding health promotion and education programs. These further developments would contribute to reducing the risks of cardiovascular disease in this community, contribute to the community's health agenda and in the long term seek to reduce the economic burden of disease for the individual and the nation.

1 5.3   Aims of the Study

The study aimed to provide information on the health status and health-seeking behaviours of a sample of the Australian-Lebanese population in Melbourne.

The specific aims were to:

1. collect base-line information about cardiovascular risk factors of a sample of adult Australian-Lebanese living in Melbourne;

2. examine health beliefs, attitudes and knowledge of the adult Australian-Lebanese living in Melbourne in relation to cardiovascular risk factors;

3. examine health seeking behaviours of Australian-Lebanese migrants;

4. explore accessibility, availability and use of health care services by Australian-Lebanese in Melbourne;

5. produce recommendations regarding appropriate and effective prevention measures of cardiovascular disease for this particular ethnic group.

1.6   The Conceptual Framework of the Study

There is enough evidence in the literature to support the argument that changes in certain behaviours of individuals may prevent disease. Epidemiological studies have provided ample evidence that describes the association between certain behaviours such as smoking, overeating and lack of exercise on morbidity and mortality of individuals. Health promotion strategies used to describe programmes, mass media campaigns, changes of policies and social and environmental legislation need to be based on sound conceptual and theoretical frameworks in order to succeed. The health behaviour of individuals is far too complex to be explained by a single unified theory. Behavioural and social scientists working in health-related areas have been influenced and guided in their research and practice by models of behaviour change. However, these models

have not necessarily impinged on the practices of other health professionals in the field. Health promotion draws on many disciplines and knowledge bases to inform its practice. Psychological theory has provided a strong basis for the development and implementation of some of the most important population-based health promotion programs conducted (MacDonald and Bunton, 1992). However, not all health promotion programs are appropriate for all populations. This study considers a variety of psychological theories and models of health behaviour in order to assist in the understanding of issues for the pursuit of health promotion strategies for a sample of adult Australian-Lebanese living in a major urban environment.

A conceptual framework (model) is defined as "a set of highly abstract, related constructs that broadly explain phenomena of interest, express assumptions and reflect a philosophic stance (Burns and Grove, 1997, p 145). A conceptual framework provides a systematic guide to investigate a phenomenon of interest (Fawcett, 1995).

Theories, derived from the Greek word *theoria*, which means vision, play a major role in our conceptions of events and people. A theoretical framework is derived from one or more theories or paradigms and postulate relationships among concepts and allows for empirical testing (Fawcett, 1995).

Given the complex nature of behaviour change processes, the most appropriate theoretical approach is an integrated one utilising aspects from a number of behavioural frameworks. The integration of the various approaches is more likely to provide comprehensive guidelines for health promotion and to be effective in dealing with environmental, social and personal factors that influence behaviour. The conceptual

framework for this study is multidisciplinary and multidimensional. It was developed with an eclectic approach utilising numerous concepts and theories from different disciplines. This study drew on a number of concepts, namely :a) health and health promotion (referred to in Chapter Two); b) models and theories of health behaviour such as the Health Belief Model (Becker,1974), the Transtheoretical Model And Stages of Change (Prochaska and DiClemente, 1983), the Social Cognitive Theory (Bandura, 1977), the Theory of Reasoned Action and Planned Behaviour (Fishbein and Ajzen, 1975),(referred to in Chapter Three); and c) the research on cardiovascular risk factors (referred to in Chapter Four). All these concepts closely intersect in an attempt to encompass the breadth of health behaviour, health beliefs and attitudes in relation to cardiovascular risk factors in a sample of adult Australian-Lebanese in Melbourne. The ultimate aim of producing such insights is to assess the health status and particular needs of this specific population. The information obtained would assist in structuring a specific health education and health promotion program at a later stage that would help achieve and maintain an optimal level of wellness in this particular group.

The above concepts and theories formulated the parameters for this research study, guided the design and data collection, and provided a perspective for the interpretation of the data. The conceptual framework of this study is illustrated in the figure below (Figure1.1).

Figure 1.1   Conceptual Framework of the Australian-Lebanese Cardiovascular Risk Factor Study

Cardiovascular Risk Factor Assessment + Beliefs and Attitudes Assessment	Tailored Health Education and Health Promotion Program	Required Changes in Attitudes and Behaviours

31
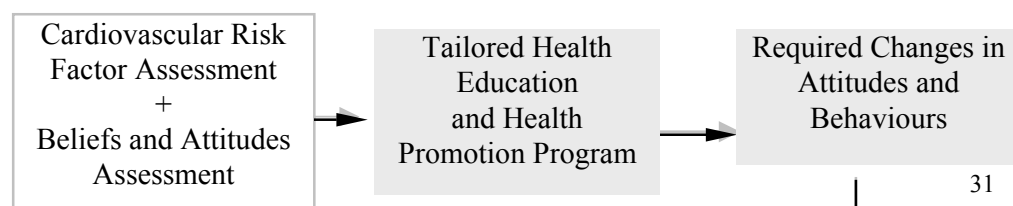
1.7 Summary

The non-Aboriginal population of Australia consists entirely of immigrants who have come to Australia in the past two centuries. Most of these settlers have come from Europe and Asia. This chapter has identified the phases of immigration of populations from the four corners of the globe to Australia. The first phase covered fifty two years, starting in 1788 and lasting until 1840. It was marked by the convict settlements from the British Isles, particularly from Southern England and Ireland. The second phase was from 1840 to the 1890 when free passage and assisted migration from Britain was encouraged. With the gold rush many Chinese sailed from the British port of Hong Kong. The Chinese presented a threat to the half a million British inhabitants of Australia who feared they might be outnumbered. Thus a legislation in Victoria imposed a landing tax on Chinese immigrants in 1855.

The third phase of immigration was from 1890 to 1945. During this time, only limited and controlled white migration prevailed due to the global economic depression. Practices under the 'White Australia' policy which dominated this period until 1970 aimed to reduce and eventually eliminate non-Europeans from Australia. One community which escaped this policy was the Lebanese, who were Catholic or Orthodox Christians and of 'European' appearance. While agitation has been directed

against 'Syrian hawkers' in the 1890s, the Lebanese were not excluded from settlement in Australia like the Chinese. They now constitute the largest Arabic speaking migrant population in Australia (Hassan, Healy, Mckenna, 1985).

The fourth phase started in 1947 when the 'White Australia' policy still existed but was being modified and fading out. Immigration after 1972 was greatly reduced under the Whitlam government and the 'White Australia" policy was abolished. With the end of the Vietnam War in 1975 and the start of the Lebanese war in 1976, communities from the Middle East and Indo-China began to be established in Australia. These posed a special problem for the Australian health and welfare system because these immigrants lacked adequate English, had high unemployment rates, and suffered from post war traumatic stress. Major economic recessions have occurred in Australia since the 1970's and new immigrants have experienced higher levels of unemployment. Those who have been employed mostly were engaged as unskilled laborers doing heavy manual jobs.

This chapter provided a brief review of the attitude of the Australian government towards migrants in the early post World War II period, which was strongly that of assimilation. Migrants were expected to accept the values and behaviours of the host society. The gradual change of attitude to that of integration within the host society and the recognition and adoption in 1980s of multiculturalism became the official Australian government policy.

Discussion also focused on how access to the health care system may be related to the interaction of culture and health status and how such interaction may influence health

beliefs and practices. These aspects all pose problems for immigrants from non-English- speaking backgrounds because of their unfamiliarity with the health care system, lack of proficiency of language and limited comprehension of written information which excludes them from utilising the health services in Australia.

This first chapter presented the conceptual framework of the study and set the scene for the literature review that is presented in Chapter Two. In Chapter Two, the concepts of health and health promotion are presented together with an examination of the initiatives adopted by the Australian government to promote the health of all Australians.

CHAPTER 2 CONTENTS

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CHAPTER TWO

LITERATURE REVIEW

THE CONCEPT OF HEALTH AND HEALTH PROMOTION

2.1   Introduction

Health is a word that everyone uses but finds difficult to explain. There is no sense in talking about promoting people's health if we do not understand what health actually is. Different people will always have different ideas about what constitutes health and ordinary people may not see health in the same way as health professionals do. MacLean (1988) stated that if we are in the business of health promotion in the widest sense, we should always remain sensitive to the enormous number of ways of defining health and disease which are held by ordinary non-health-professional people.

Health pervades all areas of human existence. Thus governments, policy makers, social workers, psychologists, health professionals, religious leaders, manufacturers, nutritionists, environmentalists all speak about health in many different ways. Among the many attempts made to define health, the World Health Organization defined it earlier as a state of complete physical, mental and social well-being and not merely the absence of disease and infirmity (WHO, 1947). This definition suggests that there is a lot more to being healthy than just being physically well. It is imperative to be free of disease to be healthy and there is a requirement for the presence of various other factors in one's life in order to have and enjoy positive health.

Many have criticised this definition as not including spiritual and emotional health. Others have thought it too idealistic, unrealistic, utopian and unachievable (Nutbeam,

1986; Sax, 1990). King (1990) suggested adapting the WHO definition of health to become a *sustainable* state of complete physical, mental, and social well-being, and not merely the absence of disease and infirmity. Yet this definition provided a vision of health beyond that of the narrow but most powerful and influential biomedical model which has dominated the Western thinking for the past two centuries. Both the biomedical model and the World Health Organization define 'health' as an end.

Seedhouse (1986) sees health as 'a means' and equates it with the foundations for achievement, which in turn becomes the goal. Thus, health will not be seen as an object of living but as a resource for everyday life (Nutbeam, 1986, p.113). This shift in seeing health as a 'means' refocuses the attention upon the determinants of health in the real world. To achieve in life, people will need food for sustenance, housing, education, and relationships with other human beings. These are some of the foundations that are the determinants of positive health. However, a person's health will be determined by many other factors such as contact with infection, genetic factors, level of nutrition, access to health care, financial resources, race, class, lifestyle such as smoking, alcohol intake and exercise, and exposure to hazards in the environment. Viewing health as a 'means' rather than an 'end' helps us understand more about the purpose of health but less about the nature of health or what it is;

> "*a person's optimum state of health is equivalent to the state of the set of conditions which fulfill or enable a person to work to fulfill his or her realistic chosen and biological potentials*" (Seedhouse, 1986, p.61).

This idea of a state of health can also be criticised, since it can be argued that no individual can ever achieve his or her maximum potential. However, the words 'chosen potential' might rescue his ideas from this criticism.

Blaxter (1990), Cox et al., (1987), and Williams, (1983) through detailed interviews explored lay peoples' definitions of health and their findings indicate that health is a complex concept which combines different dimensions of existence and that individuals operate with a number of conceptions about health at the same time. The definitions of health identified by some people were influenced by the medical model where the body has been referred to as a "machine", and ill health was referred to as a situation where the body is "under siege" from germs, diseases and stress. Others expressed more positive views of health such as "feelings of equilibrium" or "psycho-social well-being" and "will-power". Others referred to health as a religious and spiritual wholeness with sayings such as "God's power" which views health as "righteous living" (Blaxter, 1990; Cox et al., 1987; Williams, 1983).

We experience health and illness as individuals, yet health is subject to wide social and cultural interpretation. Many individuals emphasise personal behaviour as a major cause of disease and some refer to factors beyond their control such as heredity, external environment and psycho-social influences such as stress. Popular 'folk' beliefs about the causes of health and illness have also always existed reflecting a range of social and cultural experiences (Jones, 1997, p.23).

It is only since the 1980s that health promoting experts have developed strategies to share power with lay people through community action, healthy cities projects and health alliances. Health and its promotion has now become a broad activity undertaken by lay people and health professionals. A new era has begun of a 'salutogenic' (health seeking) approach to health which has created a bridge from the medical model to the 'social model'. According to the latter, health is influenced by political, economic,

social and psychological, cultural, environmental as well as biologic factors. The powerful guiding principles of the social model are the commitment to empowerment, local participation, equity in health, accountability and cooperation and partnerships with agencies and sectors (Jones, 1997). This model provides a framework for health promotion. While it recognises the importance of the medical model, it incorporates the social and environmental factors that affect health and illness.

The health of a nation is determined by the health of all its communities and individuals. The nature of health in the latter part of the twentieth century has changed from a basic human right to become a matter of public concern. Stimulated by the World Health Organization's activities in the late 1970s and 1980s, a shift in paradigm from the traditional disease oriented medical health care system to a social model emphasizing health and health promotion has occurred.

Health promotion in Australia has flourished at both national and state levels. An awakening has occurred of the importance of the health of individuals. Collective health promotion programs have been implemented which have given Australia international recognition for the quality of its preventive activities.

This chapter will explore the concept of health, its origin and historical development. It will also provide an overview of the development of the concept of health promotion, Australia's response to health promotion and the nursing literature in relation to health promotion.

2.2   The Concept of Health

Health is a word which, like many other words, has a number of meanings, depending on the purpose, time, and circumstances which govern its use. In the words of Ben Jonson written 400 years ago:

> *"O health! health ! the blessing of the rich*
> *the riches of the poore! who can buy thee at*
> *to deare a rate since there is no enjoying this*
> *world without thee?"*
>
> *Ben Jonson, in Volpone (1958, p.48)*

Health is sought and valued universally. People greet each other and ask about each other's state of health. People celebrate and salute or toast each other's health, wishing each other prosperity and well-being. There have been many attempts to define health. It is a word used to describe or express a concept, an idea, a state or a condition such as 'well-being'. Like all words however, the meaning varies depending on the context in which it is used.

Freeman (1970) stated that the term 'health' may mean different things to different individuals and different governments and it can also mean different things at different times.

Health was derived from the old English word 'hoelth' which was the state or condition of being 'hal' or the state of being safe and sound. Then it took the form of 'hale' in northern England. In the southern and midland dialects, it was pronounced as hole (Partridge, 1966). Health in its earliest form came to imply the state or condition of being sound or whole. In Roget's Thesaurus the synonyms provided for the noun "health" are vigour, euphoria, well-being, trim, bloom, pink and prime. The word "health" originated with a positive connotation devoid of the idea of illness (Dolfman,

1974) and health as the soundness and wholeness of the body has been used and accepted for a very long time.

In the *Golden Legend* of The Philosophic Society, William Caxton (1483) wrote about " a preest ….had lost the helthe of one of his hands that he myght synge no masse" which conveys the concept of soundness and wholeness of the body with one body part afflicted the rest of the body cannot function. William Shakespeare (1593) in his play *Henry VI* also referred to the notion of soundness and wholeness of the body when Somerest bids welcome to his king "*All health unto my gracious soueraigne*".

Historically, health was perceived by the American Indians as a relationship among human nature and the supernatural. The ancient Chinese incorporated 'yang' energy flow from the sun and the 'yin' energy from the earth, to describe the state of human activity, health and sensitivity. The meaning of the word "health" also assumed religious significance and represented spirituality and salvation in the translation of the Bible in 1382 by John Wycliff where it appeared in Psalm Twenty Seven "*The Lord is my Liztnyng, and myn helthe*". A salutation "*to your health* " was utilized in the historic period to express wishes of prosperity and well-being and is a widespread custom today across all cultures.

It was not until the seventeenth century that the word 'health' started emerging with a negative connotation. Later, various adjectives were used to qualify health such as 'good', 'bad' or 'poor'. These adjectives altered the meaning of the word 'health' from 'soundness' or 'wholeness', changing its implication and giving it a negative notion. Health shifted from a generalized to a specific concept in the early twentieth century and adopted a biomedical orientation. It was defined as a disease-free state and then

expanded in the latter part of the century into a generalized concept. This is illustrated by the World Health Organization's (1947) definition of health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". This definition views and emphasises health as a state with distinct positive qualities (Dolfman, 1973; Pender,1987 b). It is the most widely questioned and criticised yet accepted and quoted definition of health.

Smith (1983) studied the many different definitions of health used by both lay and professional people and identified four models or classifications of health: the *clinical model*, the *role performance model*, the *adaptive model* and the *eudaimonistic model.* These models form a progressive continuum, with each model including aspects of the preceding model. Three of these models focus on stability and one on actualization.

The *clinical model* views health as a disease-free state or condition. This is a biomedical model where the focus is on diagnosis and treatment of disease. A person is considered healthy if the disease state has been eliminated or at least controlled.

The *role performance model* proposes health as a condition enabling individuals to perform their roles in life adequately. Individuals may suffer from physical illnesses but they are considered healthy if they are able to fulfill their social roles and tasks with maximum expected output.

The *adaptive model* describes a person's health as depending on the capacity for adjustment to various life events and circumstances. The individual tries to achieve

equilibrium with the environment. The ability to accommodate and adjust to various tensions and strains is utilised to judge the individual's state of health.

The model of health as a person's ability to adapt to the environment was first developed by Dubos (1965). Some nursing theorists who have proposed definitions of health emphasizing adaptation were first, Neuman (1982) who perceived health as a state in which all subsystems, physiological, psychological and sociocultural are in equilibrium; and second, Roy (1984), who described health as a process of responding positively to environmental changes.

The most complex orientation of health is the *eudaimonistic model* which refers to the maximization of human potential and is characterized by well being and realisation of self-actualization. A number of theorists have subscribed to this view including the following: Maslow (1981) who equated health with self-actualization; Seedhouse (1986) who maintained that health involves maximizing individual and environmental conditions for the fullest achievement of human potential; Parse´ (1981) who stated that health is a process of 'negentropic unfolding' which reflects a person's way of living chosen ideas, and Pender (1987b) who espoused the *eudaimonistic model* of health because of its actualisation theme. She incorporated adaptive and actualisation properties in her definition of health where she stated that health is the actualisation of inherent and acquired human potential through goal directed behaviour, competent self-care, and satisfying relationships with others while adjustments are made as needed to maintain structural integrity and harmony with relevant environments (Pender, 1987b).

The construct of wellness was introduced by Dunn in 1959 and is now sometimes used interchangeably with health. Dunn (1973) differentiated between health and wellness by proposing that wellness is an ideal state of health in which the individual is faced with ever-expanding challenges for self-actualisation. Ardell (1979) defined wellness as a dynamic lifestyle, encompassing the attributes of self-responsibility, awareness, stress management, physical fitness and environmental sensitivity, with health being the outcome of a wellness lifestyle. Dunn's (1980) view of health was of high-level wellness, where an individual has a maximum potential of integrating methods of functioning. This integration is a continuous process that occurs as the individual strives for positive holistic health. Health, according to Dunn, is not simply a "*passive state of freedom from illness in which an individual is at peace with his environment*,"(Dunn, 1980 p.4), but rather an emergent process characteristic of the entire life span.

The elusive nature of health was very well recognized by Florence Nightingale (1860), the British founder of the modern nursing profession who stated in an examination of the meaning and purpose of health,

> "*we know nothing of the principle of health …… except from observation and experience which will teach us the ways to maintain or bring back the state of health*" (Nightingale, 1860, p.133).

It was also Nightingale who first differentiated between nursing the sick and nursing the well. Both kinds of nursing in her work included preventive and health promotion measures.

The literature today describes the concept of health as holistic and not just the absence of illness or disease. Health represents an integrated construct in which multiple domains are considered. Keller (1981) proposed that the word 'health' be used to describe a number of entities such as a philosophy of care, a system of health practice, health behaviours, health care costs, health insurance and health oriented curricula. The health of individuals is influenced by the social, structural, political and economic conditions of the society and cannot be considered outside that context. The values of the social model of health underpin the World Health Organization approaches to promoting health and encompasses all contexts, structures and cultural styles.

2.3   The Concept of Health Promotion

The concept of health and its promotion across the life span has traditionally been one of the main foci of the nursing profession. Yet only as recently as 1978, through the Declaration of Alma Ata "Health for All by the Year 2000" (WHO, 1978), the primary health care approach had been formally recognized as the framework for the improvement of the world's health. The aims of the primary health care concept were to provide a first point of contact with the health system for individuals at an affordable and accessible level, a *disease prevention approach,* focused on improving the health of all individuals and a philosophy to guide the global health system emphasising equity, social justice, participation of the community and empowerment of the population. The Alma-Ata Declaration was endorsed by the governments of developing countries to focus on the development of first contact health services and the implementation of essential activities such as the health education, proper nutrition, provision of safe water and sanitation, provision of maternal and child health care services, including family

planning, immunisation against major infectious diseases, the provision of appropriate treatment of common diseases and the provision of essential drugs (Wass, 1994).

Although the essential health services were generally available in the industrialised countries, access, equity and community participation remained a problem and the implementation of the Declaration of Alma-Ata by governments was slow, due to various reasons that centered on:

a) the lack of understanding of the Primary Health Care concept;

b) the belief that it is relevant to developing countries only; and

c) the threat this concept poses to the illness management system of industrialized countries.

In an attempt to assist industrialised countries to implement primary health care, the WHO held an international conference on Health Promotion in Ottawa, Canada in 1986, to build on the Alma Ata declaration and to outline a clear direction for action to provide health for all individuals. The Ottawa Charter (1986) stated that health promotion is a process that enables people to increase control over and improve their health, and that it requires setting priorities and making decisions to achieve better health (WHO, 1986). The Charter supported a primary health care philosophy and stated that the fundamental conditions for health for all are: peace, shelter, education, food, a stable economic system, sustainable resources, social justice and equity. These prerequisites could be achieved through building healthy public policy, creating environments which support healthy living, strengthening community action, assisting people to develop their skills, and reorienting the health care system so that there is a balance between health promotion and curative services. One of the identified

prerequisites for this reorientation is a major change in the way health workers are educated, especially in the areas of mediation and advocacy, which emphasizes the strategy of empowering people to enable them to exercise greater control over their lives (WHO, 1986).

The Ottawa Charter is regarded as the beginning of the new public health movement, since it recognised the intersectoral nature of health promotion and the need to work with governments and private institutions whose work impacts on health. It acknowledged the need to increase community participation and control over health issues and recognised the primacy of people's physical and socioeconomic environments in determining their health.

The new public health movement outlined in the Ottawa Charter is based on a social and ecological model of health rather than a medical model. It sets wider parameters for health promotion practice and seeks to address health problems at the point of their grass roots (Wass, 1994).

Following the Ottawa Charter, the WHO held three subsequent international conferences on health promotion. Each of these conferences focused on a particular strategy identified in the Ottawa Charter. In Adelaide, Australia (1988), the second International Conference on Health Promotion considered the theme '*healthy public policy'* and it urged industrialized countries to develop policies to reduce the growing disparity between rich and poor countries. The priority areas for action were:

   a)   support for the health of women,

   b)   elimination of hunger and malnutrition,

c) reduction of tobacco growing and alcohol production;

d) the creation of more supportive environments

(WHO/Commonwealth Department of Community Services and Health-Australia, 1988).

The third conference was held in 1991 in Sundsvall, Sweden, where the theme of *supportive environments for health* was examined. Four priorities for action were identified. These were:

a) strengthening advocacy through community action,

b) enabling communities to take control of their health and environment,

c) building alliances to strengthen cooperation between health and environments,

d) and mediating between conflicting interests in society to ensure equitable access to a supportive environment for health.

(WHO, 1991)

The fourth international conference was held in 1997 in Jakarta with the theme of '*forming partnerships with the private sector'*. This conference acknowledged the demonstrated effectiveness of health promotion through research and case studies from around the world. It identified that education and information are essential to achieving effective participation and empowerment of people and communities. It also provided evidence that health promotion is a practical approach to achieve greater equity in health utilising the combined five strategies outlined by the Ottawa Charter:

1) building healthy public health policy,

2) creating environments which support healthy living,

3) strengthening community action,

4) helping people develop their skills,

5) reorienting the health care system.

These strategies are regarded as the "core elements of health promotion and are relevant to all countries" (WHO, 1997).

2.4 Australia's Response to Health Promotion

In 1981 Australia formally committed itself to Health For All by the year 2000. However, it was not until 1986, and in response to the appearance of international initiatives, that the Commonwealth Government established the *Better Health Commission*. This commission produced the 'Looking Forward For Better Health' report which found that the costs for treatment of ill health were rapidly increasing whilst the health of Australians was not improving. The commission identified a set of national health goals that were further examined by the Health Targets Implementation (Health For All) Committee which released the "Health For All Australians" report in 1988. This report contained a set of goals and targets to help reduce inequalities in the health status of all Australians and its focus was on the following:

a) Specific population groups, mainly those with limited literacy from both English and non-English speaking backgrounds, as well as the Aboriginal and Torres Strait Islanders;

b) Major causes of illness and death with particular priorities given to cardiovascular disease, cancer, mental health and injury; and,

c) Risk factors including use of drugs, tobacco, alcohol misuse, nutrition, physical activity, high blood pressure, high blood cholesterol, occupational and environmental health hazards and unprotected sexual activity.

This report represented a milestone in Australian health policy as it was the first time the federal government had adopted a national health strategy document with set goals and targets for improving the health of Australians (Health Targets And Implementation Committee, 1988:8). However, this report was criticised for being based primarily on a biomedical model rather than a social model of health, although it did acknowledge that health inequalities exist between different groups in Australian society. It did not provide a comprehensive intersectoral approach to health but examined one aspect only, which was the changes that could be made within the health system. It also ignored many urgent health issues, presumably because of the difficulties that might surface once these issues are addressed (Wass, 1994. p.18).

The 'National Better Health Program' was established in November, 1989 and was funded for four years to implement the recommendations of the 'Health For All Australians' Report. It developed strategies for five priority areas that were not addressed before: health of the elderly, nutrition, prevention of lung and skin cancer, early detection of breast and cervical cancer, and the prevention of high blood pressure. This program was evaluated in 1993 through the release of the report 'Towards Health For All and Health Promotion' which identified that health promotion still lacked clear direction and recommended that the equity issue remain on the government's agenda (Commonwealth Department of Health , Housing and Community Services, 1993).

In 1991 the Australian health ministers commissioned the National Health Strategy to examine the structure and funding of the Australian health system. The National Health Strategy paper '*Pathways to Better Health*' was produced which made recommendations about continuing the support for health promotion and the

establishment of a National Health Promotion Authority, the education of health professionals for preventive work, development of stronger intersectoral approaches to health promotion, as well as greater health promotion action by the community, health centres, schools, general medical practitioners, hospitals and workplaces (National Health Strategy, 1993).

Meanwhile, the National Centre for Epidemiology and Population Health was also commissioned by the National Better Health Program in 1991 to examine the role of primary health care in health promotion in Australia. Again a report was produced towards the end 1992 entitled 'Improving Australia's Health: The Role of Primary Health Care'. The recommendations of this report were to develop a National Primary Health Care Policy and to establish primary health care reference centres in each state and territory. Also sought were greater involvement of local government in funding innovative Primary Health Care activities and greater support for healthy cities (National Centre for Epidemiology and Population Health, 1992).

In 1993 a more comprehensive revised report on national goals and targets was released entitled "Goals and Targets for Australia's Health in the Year 2000 and Beyond" (Nutbeam et al., 1993). The aim of this report was to involve the health care system and the community at large actively in the national health promotion implementation program. It highlighted the importance of improving people's health knowledge and life skills with the potential to improve health outcomes. It also highlighted the need for an optimal balance of preventive, diagnostic, treatment and palliative services to achieve the best health outcomes for the population. Further, it established targets for the prevention of mortality and morbidity from cardiovascular disease and cancer, risk

factors, health skills and healthy environments. The set of goals and targets in this report are broader, less medically defined than the Ottawa Charter goals and targets but are in line with the Ottawa Charter for Health Promotion framework.

In 1995, the National Health and Medical Research Council (NHMRC) was commissioned by the Health Minister to conduct a review of the health promotion initiatives in Australia. Following this review, a discussion paper was published by NHMRC which identified the progress made in the development of the Australian infrastructure for health promotion. It also identified areas that needed further development which were mainly due to the absence of agreed priorities for health promotion work and overlap in programs (National Health and Medical Research Council, 1996). A range of policies and strategy documents have also been developed which address specific populations and their health issues. The activities and initiatives illustrate the importance of the health promotion approach in striving towards improving the health of the nation.

2.5   Nursing and Health Promotion

The development of a health promotion framework to complement the disease prevention strategies is important in order to identify and eradicate health risks, improve people's quality of life and result in social changes that are conducive to health (Brown, 1985; Wass, 1994). Florence Nightingale can be viewed as a major early advocate of health promotion when she described the role of the nurse as a guide and teacher of health to the individual at home. Nightingale's activities to promote health extended from individuals to communities. The nature of these activities ranged from the promotion of self-care to political activism. Her multifaceted approach is consistent

with contemporary conceptualizations of health promotion since she addressed issues of individual, social and health reforms that shaped in many ways the British health policies (Montiero, 1991). The nursing profession aims to meet the health care needs of individuals and communities (Brunner and Suddarth, 1988) through their very important role as change agents in the 'Health for All' movement which the World Health Organisation strongly supports (Mahler, 1987:23). The health promotion concept is a central activity of the nursing profession in general.

The evolution of the health promotion construct in nursing began with the early work of Leavell and Clark (1965) in their proposed levels of prevention. They describe health promotion as a *pre-pathogenic* phase focused on avoiding illness through the performance of positive health practices. Their definition of *primary, secondary* and *tertiary levels* of prevention is derived from an epidemiology of the natural history of disease. They identified health promotion as the first phase of primary prevention.

The literature provides different nursing views relating to the concept of health promotion. These views emphasize the importance of changing social and physical environments in order to promote health and encourage positive health practices. Benson and McDevitt (1980) examined health promotion in relation to Leavell and Clark's levels of prevention, equating it to *primary prevention* that begins at the wellness end of a continuum. They equated illness to the *secondary* and *tertiary levels*. *Primary prevention* precedes disease or dysfunction and is achieved through measures designed to promote health and protect individuals against disease. In *secondary prevention,* emphasis is on early diagnosis and prompt and adequate treatment to

prevent disability. When the disease or disability becomes permanent, the *tertiary prevention* through rehabilitation is attempted.

Spradley (1981) stated that the goal of health promotion is to raise the levels of wellness in individuals, families and communities and the most important aspect of health promotion is prevention. Health promotion is defined by Brubaker (1983) as "health care directed toward growth and improvement in well-being" (p.9). Within Brubaker's framework, health promotion is a movement toward a positive state of health and the view that health promotion is synonymous with disease prevention is rejected. Disease prevention and health maintenance are viewed as prerequisites or by-products.

Laffery (1985) proposed four dimensions of health promotion that can provide a framework for assessment and intervention for clients with a variety of conditions:

- *clinical health promotion* which advocates screening and prevention programs used for early detection of disease and prevent illness.

- *role- performance health promotion* which involves assessment of the client's roles and skills needed to carry out responsibilities in society successfully.

- *Adaptive health promotion* which refers to promoting the person's ability to engage in effective interaction with the physical and social environment.

- *Eudaimonistic health promotion* which refers to the promotion of a person's well-being and self-actualisation.

Goodstadt Simpson and Loranger (1987) described health promotion as "the maintenance and enhancement of existing levels of health through implementation of effective programs, services and policies"(p.61). An ecological model of health promotion was proposed by McLeroy, Bibeau, Steckler and Glanz (1988) where

patterns of health promoting behaviour are influenced by intra-personal characteristics as well as inter-personal processes, institutional factors, community attributes and public policy. The five levels reflect the range of strategies available for health promotion programs. The purpose of this model was to focus on the environmental causes of behaviour and the identification of environmental interventions.

Health promotion was viewed by O'Donnell (1989) as a positive life experience which incorporates individual change in health behaviours and the creation of societal support systems conducive to health promoting lifestyles.

Various models are being developed to guide nursing research and nursing practice in the field of health promotion. One of these nursing models which is most frequently utilised is Pender's (1987b) Health Promotion Model (HPM). Pender (1987 b) defined the concept of health promotion as

> "activities directed toward sustaining or increasing the level of well-being and self-actualization of a given individual or group" (p. 61).

This definition of health promotion is congruent with her definition of health. Pender differentiated between health promotion and disease prevention behaviours but admitted that they were complementary and that their integrated manifestation was critical to health promotion. She further pointed out that some behaviours may start as preventive behaviours (such as exercising to reduce the risk of cardiovascular disease) but may become health-promoting behaviours as a person practices them and grows to enjoy the internal positive feelings generated by them (Pender, 1987b, p. 60).

Pender (1987a) suggested that attention should be given to the environmental, cultural and social conditions that affect health and health promoting behaviours of individuals

and groups. She defined health promoting behaviours as optimising activities that narrow the gap between actual and potential levels of wellness. The health promoting behaviours identified in the HPM are physical exercise, maintenance of good nutrition and the development of social support systems to enhance the sense of well-being and maximise potential. According to the HPM, the likelihood of a health behaviour or healthy lifestyle occurring is determined by a combination of:

- *Individual cognitive -perceptual factors.* These are identified as motivational mechanisms exerting a direct influence on the acquisition and maintenance of health-promoting behaviours. The cognitive- perceptual factors include: the individuals' perceived importance of health, their control of health, self-efficacy, definition of health, health status, perceived benefits of health-promoting behaviours, and perceived or actual barriers to health promoting behaviours. Theoretically, the importance of health, the perceived control of health, health status, and benefits of health-promoting behaviours have a direct effect on, and a positive relationship with, health-promoting behaviours (Pender, 1987b, p.60-65). When one or more of these variables increases in intensity, the practice of health-promoting behaviours will increase. Barriers to health-promoting behaviour have a direct effect on, and a negative relationship to, health-promoting behaviours. These barriers may be perceived or real and inhibit the practice of health-promoting behaviour (Pender, 1987b, p.65). As the intensity of perceived barriers increases, the practice of health-promoting behaviours decreases.

- *Modifying factors* such as socio-demographic variables, biologic, interpersonal, situational and behavioural variables all impact on the decision-making process by influencing individual perceptions. These variables differ from person to person. They affect the cognitive-perceptual variables to influence indirectly the

acquisition and maintenance of health-promoting behaviours (Pender, 1987b, p.66). Some variables are constant such as race, ethnicity and gender. Others may alter from time to time, such as income, educational level, biological characteristics of body weight, interpersonal relationships, situational factors, such as starting a new job or behavioural factors such as acquiring a new skill. Since many of the modifying factors change over time, their indirect effect on the practice of health-promoting behaviours varies and can be either positive at one time or negative at another.

- *Cues to action* refer to activating stimuli that have a direct influence on the likelihood of a person participating in health-promoting behaviour, through moving the individual from the decision-making phase to the action phase. They can be either of internal origin, such as increased feelings of well-being through practising stress management techniques, or of external origin such as mass media campaigns emphasising the need for good nutritional habits (Pender, 1987 b, p.68-69). The individual's level of readiness determines the intensity of the cue needed to trigger an action. Generally, however, they have a direct effect on, and a positive relationship with, the practice of health-promoting behaviours.

Pender (1987) stated that nurses have the unique opportunity of providing leadership in the promotion of better health among individuals, families and communities because of their recognised expertise and frequent continuing contact with clients.

2.6   Summary

Appreciating the various ways in which health is understood is important for health professionals. The determinants of the health of individuals are complex. Health status

can be represented as resulting from the interaction of several major factors: biological, such as genetic factors, environmental (physical and social), health behaviours and life-style, health care services and economic factors at both an individual level and a collective level. Each of these factors has a separate influence on health. Yet these factors interact with each other to influence the health of individuals.

The World Health Organization's approach to promoting health represents the new public health movement which encompasses a broader view of health focusing on structural rather than individual factors that affect people's health.

Significant variations also exist in the definitions of health promotion and many terms are used to describe it. Some of these terms are public health, health advancement, health enhancement, primary health care and health protection. No matter what term is used, the primary focus remains the same and that is health for all individuals through health behaviour activities directed towards increasing the level of well-being and actualizing the potential of individuals, families, communities and the society at large. Emphasis on positive health behaviours, behaviour change techniques and healthy lifestyles for the enhancement of health is an issue for all health workers.

Chapter Three will explore the theories of health behaviour and behaviour change techniques and will provide an overview of some of the most commonly utilised health behaviour models.

CHAPTER 3 CONTENTS

CHAPTER THREE

LITERATURE REVIEW

MODELS OF HEATH BEHAVIOUR

3.1 Introduction

Health professionals continue to attempt to understand the complex nature of human behaviours, focusing their efforts upon developing effective interventions to change unhealthy behaviours. In order to determine the success of these interventions, one must understand the role the individual in health behaviours.

Numerous theoretical frameworks and models have been developed by social and behavioural scientists to help achieve a greater understanding of individual health-related behaviours. These models attempt to explain the influence of various variables upon an individual's health behaviour. Attitudes, beliefs, motivations, values and instincts of individuals are their main concern.

Services provided by health professionals aim to assist individuals, families and populations to achieve their full health potential. Thus, understanding the motivational dynamics underlying actions that harm health and or promote health is paramount. Health professionals also must understand the determinants of health -protecting behaviours in order to develop effective interventions to encourage healthier lifestyles.

Several models of health behaviour have been developed which describe the behavioural decision-making process. None claims to be encompassing but rather, each

attempts to provide an understanding of at least some of the processes underlying people's behaviours.

Many of these behavioural theories and models have been applied to a wide range of health behaviours (for example, physical activity, nutritional practices, smoking cessation and use of condoms) to determine whether patterns can be predicted and underlying motivational mechanisms explained.

Glanz, Lewis, and Rimer (1997) reviewed 24 journals in health education, medicine and the behavioural sciences published from mid 1992 to mid 1994. They identified 66 different models and theories of behaviour used in research studies. Of these, the most commonly used theories and models are: the Health Belief Model (Becker, 1974), Social Cognitive Theory/Self-efficacy (Bandura, 1977), Theory of Reasoned Action and Planned Behaviour (Ajzen and Fishbein, 1980), and the Transtheoretical Model and Stages of Change (Prochaska and DiClemente, 1983). These widely used models are examined below.

3.2   Health Belief Model

The Health Belief Model (HBM) (Becker, 1974) has been the most widely used conceptual framework in studies of health behaviours. It was proposed in order to explain why some people take actions to avoid illness while others fail to take protective actions. The HBM was first developed in the 1960s by a group of social psychologists in the United States of America in an attempt to explain the low success rate of programs (for example, The Tuberculosis Screening Program) which had been instigated by the Public Health Service to detect and prevent diseases. The

Tuberculosis Screening Program provided chest X-ray units for the public that were placed in convenient locations (for example, shopping malls) for the detection of tuberculosis (Hochbaum, 1958; Rosenstock, 1960).

The HBM expanded its application beyond screening behaviours to include preventive actions. Kirscht (1974) extended the application of the model to evaluate people's responses to symptoms. Becker (1974) expanded the model to apply to people's behaviours in response to illness, their adherence to medical treatment, and their sick-role behaviours. The model was regarded as potentially useful for predicting individuals who would or would not use preventive measures and for suggesting ways to encourage 'resistant' individuals to engage in health-protecting behaviours.

Figure 3.1   Health Belief Model-from Becker (1974)
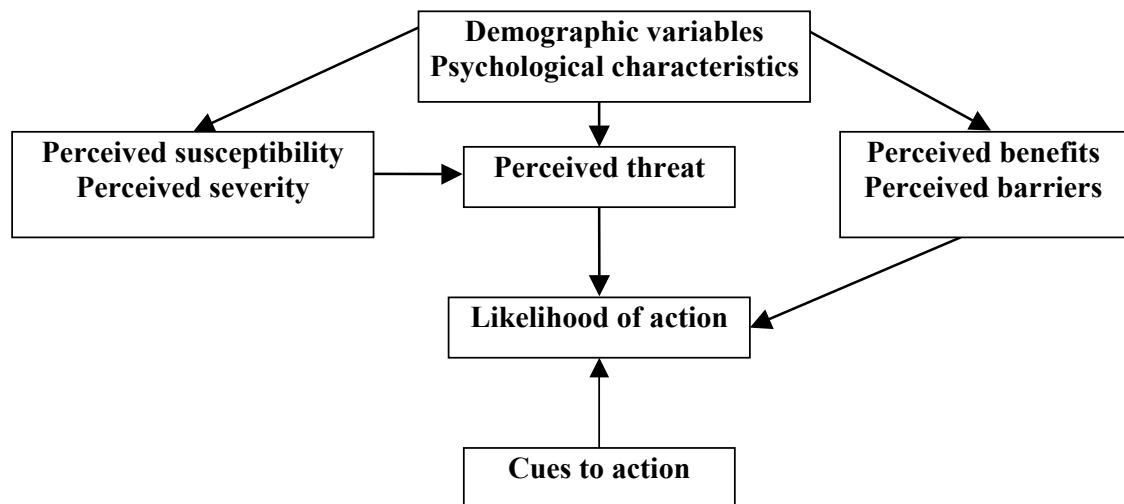
The components of the HBM depend mainly upon two variables: 1) the value placed by the individual on a particular goal; and 2) the individual's estimate of the likelihood that a given action will achieve that goal (Becker and Maiman, 1975). The HBM suggests that individuals will engage in a particular health-related behaviour if:

a) they regard themselves as susceptible to an illness or disease (*perceived susceptibility*),

b) they believe that the illness or disease will have potentially serious consequences (*perceived severity*),

c) they believe that a course of action available to them will reduce their susceptibility to the illness (*perceived benefits*),

d) they believe that the costs associated by taking the action are outweighed by its benefits (*perceived barriers*),

e) *cues to action* are present that take the form of reminders to engage in a certain health-related behaviour. These triggers can be internal, such as perception of bodily states, or external, such as stimuli from mass media and interpersonal interactions. The HBM assumes that motivation is a necessary core condition for action (Becker, 1974).

Other factors indirectly influencing the process of engaging in health-related behaviours through their relationship with a perception of threat include social, personal and demographic factors, as well as motivational and personal beliefs in *self-efficacy* (Janz and Becker, 1984; Bandura, 1986; Rosenstock, Strecher and Becker, 1994; Harrison, Mullen, and Green, 1992). Self-efficacy is the extent to which individuals believe

themselves capable of the behaviour being considered, for example, 'I can give up smoking', or 'I am not sure whether I can give up smoking at present'.

The early HBM required individuals to participate in circumscribed one-shot preventive actions such as undertaking a screening test or accepting undergoing immunisation. These are simple behaviours that require action to be undertaken only once. Individuals usually have adequate self-efficacy to perform such tasks. At this stage, the dimension of self-efficacy was not recognized as an important component of the model (Glanz, Lewis, and Rimer, 1997). The importance of *self-efficacy* became apparent as health practitioners started working with complex lifestyle behaviours that require long-term changes in habits, such as eating sensibly, stopping smoking, drinking in moderation and exercising regularly. Thus, Rosenstock, Strecher and Becker (1988) proposed that it should be included in the HBM in order to increase its explanatory power.

The HBM has been a major organizing framework for explaining and predicting acceptance and adoption of health-related behaviours. In order to permit an overall assessment of the model's performance Janz and Becker conducted a critical review in 1984 of studies involving the use of the model since 1974. They concluded that the most powerful dimension of the HBM is *perceived barriers* in explaining or predicting health behaviours and that *perceived susceptibility* is important in understanding preventive behaviour. They found that both *perceived benefits* in taking action and *perceived severity* of disease lack power in explaining or predicting health-protecting behaviours (Janz and Becker, 1984). When the HBM framework has been utilised in cigarette smoking research, its construct has not been found to be relevant. It was thought that increasing the perceived threat through fear arousal provoked and increased

anxiety levels which might have increased the frequency of smoking instead of decreasing it (Jacobson, 1981; Brownson et al., 1992).

One of the major limitations of this model is the inconsistent measurement of its concepts. Studies reported in the literature using the HBM have failed to establish validity and reliability prior to testing of the model (Rosenstock, Strecher, and Becker, 1994). A problem in earlier research based upon the HBM is that only single components have been assessed, using univariate rather than multivariate analyses which ignored the proposed relationships among the components of the model (Johnston, 1995). Several studies using Pender's HPM to examine predictors of health promoting lifestyles in persons with disabilities did utilise multivariate analyses. Stuifbergen and Becker, (1994) examined the predictors of health promoting lifestyles of persons with disabilities and confirmed the value of using HPM to explain behaviours of disabled individuals. Lusk and Kelemen (1993); Lusk, Ronis, Kerr, and Atwod (1994); Lusk, Ronis and Baer (1997); and Lusk, Ronis, and Hogan (1997) conducted a series of studies predicting blue-collar workers' use of hearing protection. In a series of multiple regression analyses cognitive-perceptual factors were identified as key elements including benefits, barriers, self-efficacy and perceived health all of which influenced the workers' use of hearing protection.

3.3 The Transtheoretical Model and Stages of Change

The Transtheoretical Model (TTM) emerged from theories of psychotherapy and behavioural change. It was first developed by DiClemente and Prochaska in 1983, when studying a group of smokers. They identified that smokers use a range of processes at different times in their struggles with smoking cessation. Their work

revealed that behavioural change unfolds through a series of stages (Prochaska and DiClemente, 1983). These are illustrated in Figure 3.2 below,

Figure 3.2   The Stages of Change Model -from Diclemente and Prochaska, 1983
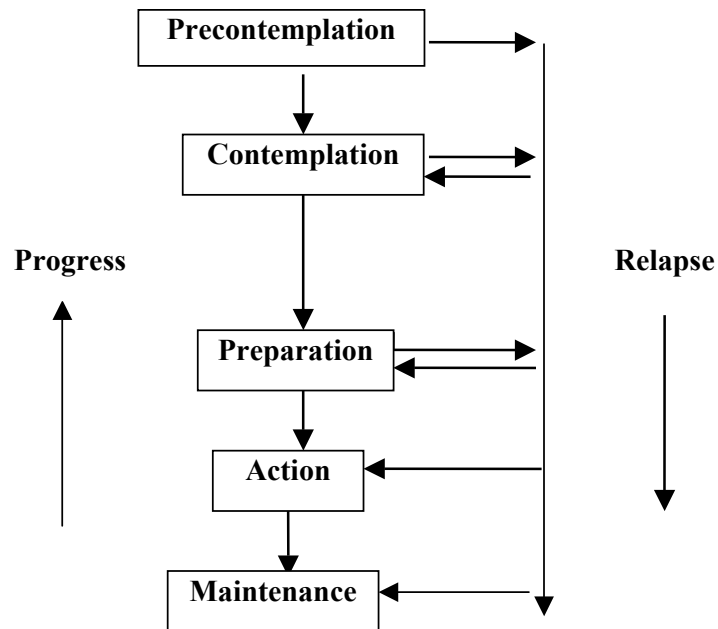
The TTM was formulated based on: a) six stages of change, b) ten processes of change, c) the benefits and costs of changing, and d) self-efficacy in response to temptation.

   a)   These stages of change are as follows:

   - *Pre-contemplation* - the stage in which individuals are not willing or intending to take action to change a health -related behaviour. Individuals in this stage may be uninformed or under-informed about the consequences of their behaviours. They might also be individuals who have attempted to change on several occasions but failed. In other theories such people are referred to as resistant or unmotivated individuals.

   - *Contemplation* - the stage in which individuals are actively thinking about changing their behaviours within the next six months. During this stage

individuals become aware of the pros and cons of change. The weighing of the costs of an action and its benefits can keep individuals procrastinating and stuck in this stage for a very long time.

- *Preparation* - the stage in which individuals are intending to take action in the next month. These individuals have already taken some positive steps toward change. They are the people who should be recruited for action oriented programs.

- *Action* - the stage in which individuals have actually made a change in specific areas of their lifestyle within the last six months. Actions represent observed behavioural changes that can be measured against objective criteria (set by the health professionals). If we consider smoking, for example, total abstinence only counts if eating habits are considered, then the modified behaviour would be the reduction of fat intake to only 20% of the total caloric intake per day.

- *Maintenance* - the stage in which individuals attempt to prevent relapse by continuing to follow the changes they have made in their lifestyle. It is the stage of consolidating the positive behavioural change, resisting temptation to lapse and increasing confidence that they can maintain these changes.

- *Termination* - the stage in which individuals are not tempted to return back to their unhealthy habits as a way of coping and have achieved 100 per cent self-efficacy in their ability to maintain their healthy behaviour.

b) There are ten identified processes of change that allow the individual to move from one stage to the other in this model. These processes of change are: *Consciousness raising,* which involves increasing the awareness of individuals about a particular health-behaviour; *dramatic relief* is used to

move individuals emotionally towards taking positive actions to eliminate health risk behaviours; *self re-evaluation* is the assessment of individuals of their self-image with or without practising a risky health behaviour; *environmental re-evaluation* is the cognitive and affective assessment of how personal habits affect the person's social environment; *self-liberation* is the belief of individuals in their ability to make a commitment to change; *helping relationships* is the social support network individuals utilise through the process of change towards adapting a healthy behaviour; *counter-conditioning* is learning strategies to help support the healthy behaviours; *contingency management* increasingly reinforces healthy behaviours through reward or punishment; *stimulus control* prompts healthy behaviour and reduces cues for unhealthy behaviours and *social liberation* increases social opportunities for health promoting behaviours.

c) *Decisional balance* reflects individuals' weighing up of the benefits and costs of certain actions.

d) *Self-efficacy,* a construct adapted from Bandura's self-efficacy theory (1977), is deemed to play a major role in this model. As previously stated, it refers to one's confidence to maintain healthy behaviours and resist temptations to lapse.

Different processes of change need to be applied at different stages of change in order for individuals to progress. Prochaska, DiClimente, and Norcross (1992) identified fourteen variables where health professionals may intervene to accelerate the progress. A computer-based expert system that can deliver individualised and interactive interventions has been developed to assist individuals to change unhealthy habits and

behaviours (Velicer, et al., 1993). The authors proposed that the differences between the stages were mediated by decisional-balance between the benefits and costs of undertaking the change. Targeting the interventions towards the clients' identified benefits and costs for behaviour change is of utmost importance (Prochaska, 1994b).

At present, the TTM is one of the most widely used models of health behaviour by health professionals. One of the limitations of the theory however, is that without appropriately planned interventions, populations will remain stuck in the early stages. In addition, there seems to be no inherent motivational stimuli to progress through the stages of intentional change compared with the stages of physical and psychological development. Specific processes and principles of change need to be applied at specific stages for progress to occur from one stage to the other. One of the assumptions of the TTM is that there is a common set of change processes that all individuals apply across a range of behaviours. However, the structure of the processes across studies has not been as consistent as the structure of the stages and the benefits and costs of changing (Prochaska, Redding and Evans, 1997).

Any population will contain individuals at different stages of the process and the interventions needed to change a health behaviour will be different for those individuals at different stages.

Several studies undertaken in smoking, diet and exercise research have made it apparent that the benefits only exceed the costs at the early stage of preparation (Marcus et al., 1986; Prochaska, DiClemente and Norcross, 1992). Snow, Prochaska, and Rossi (1992) studied former smokers and alcoholics and found that less than 20 percent of each group

reached the stage of termination. They also identified that reaching the stage of termination is not appropriate for cancer screening and dietary fat reduction. Adequate data sets are needed to develop the decision rules for each TTM variable and computers are necessary to handle the complexity of stage matching on these variables. Further research is needed to determine the relative efficacy, impact, and cost effectiveness of stage matched interactive systems compared to non-interactive stage-tailored programs. Also more research is needed to determine whether variables such as perceived risk, subjective norms, and severity of the problem relate to the stages of change and whether they predict progress across particular stages.

3.4 The Social Cognitive Theory

The Social Learning Theory (SLT) was first introduced by Miller and Dollard (1941) in an attempt to explain imitation of behaviour between animals and humans. It is essentially a behaviorally derived model that accorded limited importance, initially, to the cognitive activities of humans. Hull (1943) stated that individuals emit certain behaviours in response to reinforcements they receive from others. He followed the principles of behaviour theory and emphasised the effects of external reinforcements and internal and external expectancies on an individual's performance and explained how certain stimuli produce certain responses when reinforced by rewards. He also believed that humans and animals have acquired drives as well as cognitions that motivate them to behave in a certain manner.

Rotter (1966), through applying social learning principles to clinical psychology, found that individuals develop a sense of personal (internal) or interpersonal (external) locus of control over the events in their lives depending on the history of negative or positive

reinforcements they have received. Those individuals with an internal locus of control are more likely to self-initiate change and those with an external locus of control are influenced by perceptions of luck and control by powerful others in determining their fate. Wallston and Wallston (1978) developed a scale to assess locus of control in health research. They proposed that their measure was more useful in health research and gave evidence that when individuals have control over their lives their health outcomes improve.

Mischel (1973) and Bandura (1977) further developed the theory of learning and, overtime, Bandura (1986) increasingly emphasized the cognitive concepts individuals employ to explain the behavioural phenomena where the individual is viewed as a thinker and an analyst and not just a reflexive doer. Bandura (1977) explained human behaviour as a dynamic reciprocal interaction between individuals' personal factors, their behaviours, and the environment. The continuing interaction among cognitive, behavioural and environmental determinants is called *reciprocal determinism*, a change in one of these components has implications on the other two. Both the people and the environment are reciprocal determinants of each other, where individuals are not cast into the role of powerless individuals controlled by the environment nor are they free agents who can become whatever they choose.

Figure 3.3   Social Cognitive Model -from Bandura, 1977.

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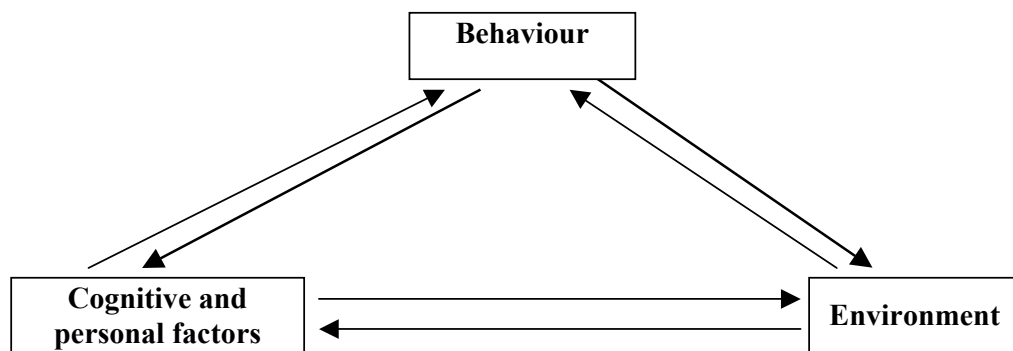
Mischel (1973) and Bandura (1977, 1986) formulated the constructs of the SCT which are important in understanding and intervening in health behaviours. These constructs are: environment, situation, behavioural capability, expectations, expectancies, self-control, observational learning, reinforcements, self-efficacy, emotional coping responses, and reciprocal determinism.

- *Environment* - is described as physically external to the individual and affects the person's behaviour, it could be social such as family and friends or physical such as size of room, and temperature.

- *Situation* - refers to the cognitive representation of the environment and can be real or imagined factors that affect an individual's behaviour such as time, place, and activity. The situation is the person's perception of the environment and it guides and limits the individual's behaviour and provides cues for desirable or acceptable types of behaviour.

The environment and the situation provide an ecological framework for understanding behaviour (Parraga, 1990). For example, worksite policies restricting smoking have assisted smoking prevention and cessation (Biener, Abrams, Follick, and Dean, 1989).

- *Observational learning* - occurs when a person watches the actions of another and the reinforcements the person receives for that behaviour. The observer learns what is appropriate by observing successes and mistakes/failures of others. For example, if children observe that other children who smoke at school are being accepted by peers the observers are more likely to smoke. This will be balanced against the penalties or punishments imposed by "the environment". Mild punishment may deter none or few, severe punishment may deter many or all.

- *Behavioural capability* -refers to the knowledge about a behaviour and having the necessary skill to do the behaviour. The behavioural capability is the result of an individual's training, intellectual capacity and learning style.

- *Expectations* - are anticipated outcomes of certain actions. An individual learns that certain events are the outcome of his/her behaviour in a particular situation and when the situation arises again the same events are expected to occur. Expectations are learned from previous experiences, from observing others in similar situations, from hearing about similar situations and from emotional or physical responses to behaviours. For example adolescents can be deterred from smoking by utilising health education programs that teach adolescents how to handle peer pressures in relation to smoking and highlights the negative social effects of smoking.

- *Outcome expectancies* - refer to the values a person places on particular outcomes of certain actions (Feather, 1982; Fishbein, 1967). Individuals are interested in knowing short term outcomes and benefits of certain actions rather than long term

gains. Emphasis on immediate positive expectancies is more likely to influence the initiation of desired behaviours. The predictiveness of expectancy-value can be enhanced by developing self-efficacy skills (Bandura, 1989), so that individuals feel confident to engage in pro-health behaviours, and have the required personal and social skills to do so, especially in situations that endorse the undesirable behaviours.

- *Self-control of performance* - refers to the personal regulation of goal-directed behaviour or performance. According to Bandura (1991) self control has several components and includes monitoring of one's behaviour and its determinants and effects, comparing behaviours and outcomes, goal setting, problem solving, self-reward, and self efficacy which plays an important role in affecting the change of behaviour and in maintaining this change.

- *Reinforcements* - are responses from the environment to an individual's behaviour that increase or decrease the likelihood of reoccurrence of that behaviour. The reinforcements can either be extrinsic or, intrinsic via self-initiated rewards and incentives. Internal reinforcement accounts for behaviours that are not reinforced externally or may be negatively reinforced externally. Lepper and Cordova (1992) found that educational programs that are intrinsically reinforcing result in more learning, retention, and interest in the subject matter.

- *Self-efficacy* - refers to the confidence a person has about performing a certain behaviour including the confidence in overcoming barriers to performing that behaviour. Bandura (1977, 1982, 1986) proposed that self-efficacy is the most important prerequisite for any behavioural change, because it affects the invested effort in a given task and the achieved level of performance. Individuals can seek behavioural change by learning specific tasks or steps and repeat them

successfully. Then they combine these tasks or steps to successfully achieve a targeted behaviour and build self-efficacy, by experiencing increasing confidence, in relation to that behaviour.

- *Emotional coping responses* - are strategies utilised by individuals to deal with emotional feelings emanating from interactions with the environment and the undesirable behaviours.. Bandura (1977) realized that negative emotional arousal inhibits learning and performance while positive emotional arousal enhances learning and causes a positive change in behaviour. Certain negative stimuli that lead to the arousal of fearful thoughts in turn, produce negative emotional feelings and trigger defensive behaviours. It is important for health educators to help individuals to learn methods that will minimize negative emotional arousal such as anxiety reduction, stress management or alternate problem-solving before they attempt to help them in changing behaviours.

- *Reciprocal determinism* - refers to the dynamic interaction of the person, the behaviour and the environment in which the behaviour is performed. Reciprocal determinism can be used in health programs that do not focus on behaviours in isolation but focus on changes in the environment and the individual as well.

The limitations of the SCT lies within the many constructs it has which lead researchers to explain almost any phenomenon using one construct or another. Further survey research may help in refining the measurements of the constructs and their relationships to behaviour.

The nature of SCT is that single constructs propose linear relationships and this does not provide an explanation for nonlinear relationships. Several intervention studies have utilized the SCT constructs and have not resulted in positive outcomes and

changed behaviour (Carleton et al., 1995; Leupker et al., 1994) thus, there is a need to specify clearly when and where SCT constructs apply, and to carry out extensive evaluations of the programs (Maibach and Murphy, 1995).

The SCT constructs have been applied to a single behaviour and most often individuals are faced with choices of alternative behaviours. Research on SCT should be expanded to predict selections from among multiple behavioural choices facing individuals (Baranowski, et al., 1993).

Another limitation of this model is that it cannot easily explain health-related behaviour which is apparently 'irrational' such as the patient who delays seeking treatment for a large and visible tumour. Several studies investigating health behaviour have found future behaviour to be more strongly predicted by past behaviour than by current cognitions alone. The influence of past behaviour has been noted in relation to diet, exercise and smoking (Mullen, Hersey and Iverson, 1987), and wearing a seat belt (Sutton and Eiser, 1990). Relationship between past and future behaviour may predominate because key cognitions have not been considered or have not been operationalised. Another explanation could be that some behaviours become habitual or routine and are not always preceded by a rational decision based on expectancy-value considerations (e.g. brushing one's teeth before bedtime).

3.5 Theory of Reasoned Action and Theory of Planned Behaviour

Fishbein (1967) introduced the Theory Of Reasoned Action (TRA) in an attempt to understand the relationship between *attitudes* and *behaviour*. The TRA identifies an individual's *behavioural intention* as the most important determinant of behaviour.

Intentions are directly influenced by *attitudes* towards the behaviour and *subjective norms* concerning the behaviour. Fishbein found that attitudes towards a behaviour are a better predictor of that behaviour than attitudes towards the target to which the behaviour is directed (Fishbein and Ajzen, 1975). This is explained by the example of breast screening where the attitude toward breast cancer is expected to be a poor predictor while the attitude toward mammography screening is expected to be a good predictor of mammography screening and subsequent behaviours towards breast cancer.

Figure 3.4   **Theory of Reasoned Action and Planned Behaviour Model-from Ajzen and Fishbein 1975.**
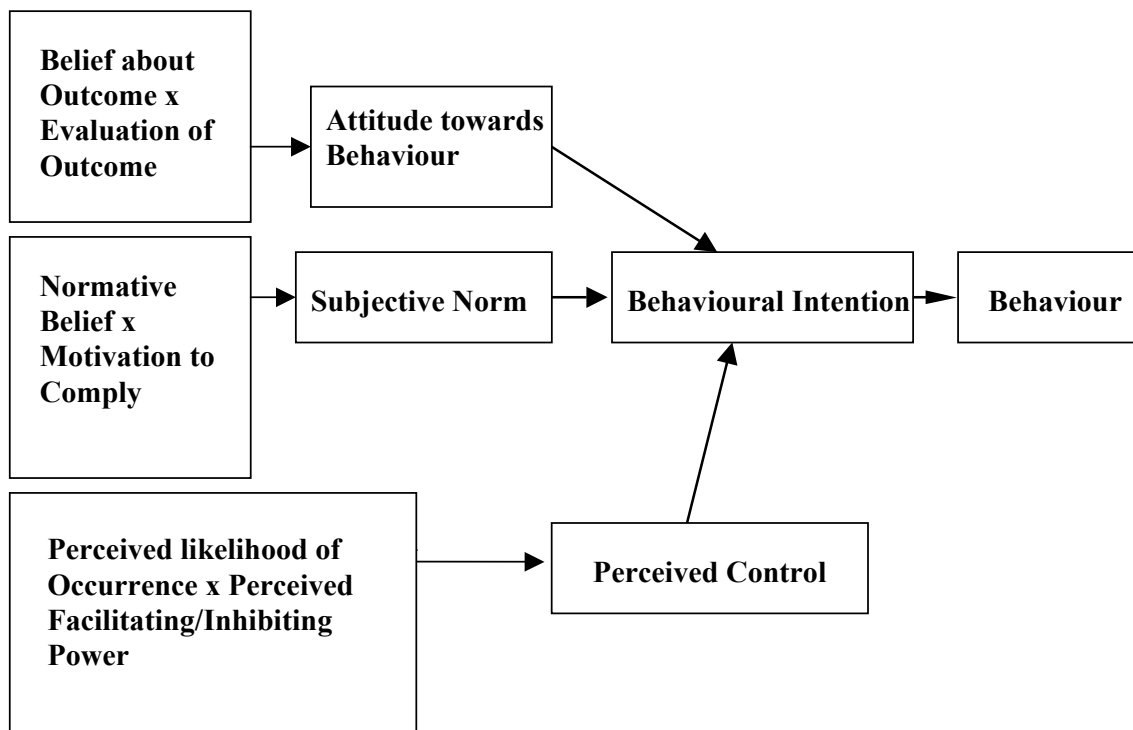
A person who holds strong beliefs that positive outcomes will result from performing a behaviour will have a positive attitude toward the behaviour. *Normative beliefs* also influence an individual's behaviour depending on whether the referent individuals approve or disapprove of the behaviour, weighted by the individual's motivation to comply with those referents. The TRA assumes that *behavioural beliefs* and *normative*

*belief*s are linked to *behavioural intention* and behaviour through *attitude* and *subjective norm*. Fishbein (1990) has found that the same behaviour can be under attitudinal control in one population but under normative control in another population. The components of this model are measured on bipolar scales and the behaviour is computed by multiplying the behavioural belief by the corresponding outcome evaluation ratings and then summing up the scores across all outcome behaviours.

The TRA theory assumes that individuals are rational actors, and that behaviour is under volitional control and there are no barriers to performance of intended behaviour. Although this theory has been used successfully in explaining health behaviours such as smoking, drinking, contraceptive use, breast examinations and mammography it has failed to predict behaviours in which volitional control is reduced. Thus, Ajzen developed the Theory of Planned Behaviour (TPB) (Ajzen, 1988, 1991) where he added a third variable, that of *perceived behavioural control* (to the original Fishbein and Ajzen concepts of *attitudes* and *subjective norms*) to predict behavioural intentions over which individuals have incomplete volitional control. Ajzen argues that individuals will expend more effort to perform a behaviour when they perceive they have high behavioural control. Intention will have a great effect on behavioural performance if the perceived behavioural control is high and perceived behavioural control will have an effect on performance if intention is high (Ajzen, 1991).

The TRA framework has been used in various research studies (Brubaker and Wickerman, 1990; Montano and Taplin, 1991; Taplin and Montano, 1993), where these studies supported the model's ability to explain behaviour under volitional control. The findings indicate that intentions are mostly moderately to highly correlated with

behaviour, attitudes are moderately correlated with behaviour, and subjective norms are uncorrelated or moderately correlated with behaviour. The TPB has not been extensively tested but it was supported in 1991 by Brubaker and Wickerman in their study on testicular self-examination. An assumption of the theory of reasoned action is that individuals have the resources, the skills and opportunities to engage in their desired action. This is not correct in certain situations and explains why the dimension of perceived control was added to the model to increase its predictive utility. Other limitations of this model is that it fails to consider factors such as contextual variables which may impact on decision-making. More studies are needed that test the additional aspects which determine behavior change before the usefulness of TPB can be fully endorsed in explaining the occurrence of health behaviours.

3.6   Summary

This chapter has presented an overview of a number of models and theories of health behaviour and health behaviour change that are relevant to health protection and health promotion. An attempt had been made, where adequate data exist, to indicate the strength of predictive variables from the various theories and models. The value of psychological theories is judged not only by their explanatory and predictive power, but also by their operative power to effect enduring positive changes in human behaviour. There are similarities and redundancies across the existing theories. A number of the concepts in each of the theories have the same underlying meaning.

The process of helping people to change in behaviour can range from a simple process such as that of providing health risk information, to a complex process where

counselling and in depth exploration of issues may be required. The approach to be followed is determined by the length of time available for the health professional, the characteristics of the individuals who need the assistance to change their behaviours, and the 'depth' to which the health care professionals are prepared to explore issues relevant to their clients. However it should never be assumed that individuals attending screening programs and health information programs are motivated and willing to change. For this reason it is important to identify the person's willingness to make a behavioural change and then attempt to assist towards the direction of appropriate behavioural change.

In order to understand the health-behaviours of the Australian-Lebanese community in Melbourne an eclectic approach has been taken and a combination of the health behaviour theories have been utilised in the design of this study. The researcher has in the pilot project (refer to Chapter Five), derived concepts from the several health behaviour models presented in this chapter and tested the appropriateness of the questionnaire and the semi-structured interview based on these aspects.

Behavioural and attitudinal changes toward health prevention have reduced many risk factors in several and different population groups. However, the leading causes of death today are still greatly influenced by lifestyle and behaviour. Chapter Four will review the literature in relation to lifestyle and cardiovascular risk factors which are also risk factors for a majority of other illnesses and diseases.

CHAPTER 4 CONTENTS

CHAPTER FOUR

LITERATURE REVIEW

CARDIOVASCULAR DISEASE (CVD) AND CVD RISK FACTOR STUDIES

4.1   Introduction

Cardiovascular disease (CVD) refers to the diseases of the heart and the blood vessels. The most common CVDs are coronary heart disease (CHD), stroke, peripheral vascular disease and hypertensive heart disease. CVD is a major health problem in the industrialised world, accounting for half of the mortality rates and it is a growing problem in the developing countries contributing to 16 % of total deaths (WHO MONICA Project, 1989).

Although much progress has been made in the fight against CVD, nevertheless, it still remains the number one killer in Australia and it continues to place a heavy burden on Australians in terms of illness, disability, death and health care costs, which exceed those of any other disease. It was reported by Australian Institute of Health and Welfare (AIHW, 2000), report 'Australia's Health 2000', that in 1993-1994 the costs of CVD in Australia accounted for $3.7 billion which is 12% of the total direct health system costs. In the next two decades with the growing number of elderly Australians, among whom CVD is most common, it is expected that these issues would most likely become more acute.

In Australia, the types of CVD that pose the greatest health problems are CHD, stroke, peripheral vascular disease, and heart failure (AIHW, 2000). Since the late 1940s epidemiologic studies have contributed to our understanding of the major risk factors

and risk-reduction strategies for CHD. Since then much progress, has been made in improving the cardiovascular health of Australians. Despite the dramatic drop in death rates in Australia, with improvements in the treatment and care of CVD, 52,641 deaths (41% of total deaths) occurred in 1997 that were directly related to CVD, with CHD accounting for 29,051 lives (AIHW, 2000).

In 1995, 2.8 million Australians (16% of the total population) had a cardiovascular condition and over 10 million Australians had at least one of the following cardiovascular risk factors: tobacco smoking, physical inactivity, high blood pressure or overweight. Four in 5 men, and 3 in 4 women had at least one of these risk factors (AIHW, 2000). Because of this widespread nature of CVD and the potential for its prevention, the Australian government nominated it as one of the five National Health Priority Areas (NHPAs). The government aimed to put strategies in place to reduce the risk factor profile of all Australians and the provision of treatment and management of those already diagnosed as having some type of a CVD (Department of Health and Aged Care and Australian Institute of Health and Welfare, 2000).

This chapter will briefly discuss cardiovascular risk factors and will present Australian figures in relation to each risk factor. It will also provide an overview of international and national epidemiologic studies that have been undertaken to shape our current knowledge of CVD risk factors and risk reduction behaviour.

4.2   CVD Risk Factors

The term "risk' originated from the French word 'risque' and has been used in English since the mid-seventeenth century. It started appearing in an Anglicised spelling in insurance transactions during the mid eighteenth century (Collinson and Dowie, 1980). The most common use of the word, 'risk', is usually associated with the chances of loss rather than gain, and it is often used interchangeably with the word 'uncertainty'. Both words can be defined as a problem of lack of information about future events that might arise. Risk is also defined as the probability of an unfavourable event whereas risk factor is defined as a specific factor associated with an acquired disease. The risk for CHD may be understood in terms of absolute, relative, and attributable risk. Absolute risk or incidence is the expected rate of occurrence of a disease, such as CHD, in a particular population. Relative risk compares the incidence of a disease in a population exposed and a population not exposed to an occurrence. Attributable risk addresses the difference between the incidence in the exposed against the unexposed population. The term 'cardiovascular risk factors' is used widely to describe the characteristics found in individuals in epidemiological, autopsy and metabolic studies to relate to the subsequent occurrence of CHD.

The search for the origins and subsequent prevention of CHD has started with early descriptive epidemiological studies of populations and was extended to prospective cohort studies. One of the major cohort studies to monitor and document incidence of CHD was the Framingham Study in the United States of America. This study has become synonymous with the risk factor concept and is the source of much of our knowledge about the risk of CHD in individuals.

Risk factors are identified as personal, lifestyle, biochemical, physiological and genetic characteristics, some of which are modifiable while others are not. Epidemiologists identify a risk factor as a risk marker, a risk determinant, or a modifiable risk factor. For example, in the context of CHD, earlobe creases have been identified as risk markers, familial hyperlipidaemia as a risk determinant and cigarette smoking as a modifiable risk factor.

Several risk factors are associated with CHD. The modifiable risk factors are smoking, elevated plasma cholesterol, elevated blood pressure, obesity, physical inactivity, excessive intake of alcoholic drinks and possibly stress. The non-modifiable risk factors are family history of CHD, personal history of CHD, diabetes mellitus, age and gender.

The three most important and modifiable risk factors that have supporting evidence to prove that they have a direct association with CHD are smoking, elevated cholesterol and hypertension. They are often referred to as the *classic triad* in recognition of their magnitude and prevalence as CHD risk factors. A brief discussion of CHD risk factors, which are also risk factors for many other illnesses and diseases, is provided below.

4.2.1 Smoking

Smoking is a contributory factor to many illnesses and diseases of the heart and the lungs and is the number one preventable cause of CHD (American Heart Association, 1994). The effects of smoking on the rates of morbidity and mortality have been well researched and documented. Tobacco smoking increases the risk of CHD, stroke and peripheral vascular disease as well as causing a range of cancers. The adverse effects of smoking cause increased

platelet adhesiveness, increased heart rate, with resulting increases in myocardial oxygen demand, elevated catecholamines and decreased serum oxygen-carrying capacity. Research indicates that education, social environment, cultural and racial factors play a role in whether a person continues to smoke. Smoking is more common among people in the lowest socioeconomic group. Gender also appears to influence smoking patterns. Many women continue to smoke fearing weight gain (Denestein, Smith, Morse, 1993).

In 1995, 19% of men and 15% of women in the highest economic group in Australia smoked, compared with 36% of men and 28% of women in the lowest socioeconomic group. Almost 3.2 million adult Australians (24% of the population) were at risk of developing CHD and other chronic conditions from smoking. The trends in adult smoking rates have been declining since the 1960s up to the 1990s, but National Health Surveys show that that the rate of decline lately has slowed down (ABS, 1999). About 27% of men and 20% of women aged 18 years and over currently smoke. Men and women between the ages of 25-29 years have the highest rate of smoking (33%). After the age of 30, the rate of smoking declines and is lowest among the 80 years old and the very old (85 years and over) (ABS, 1995).

4.2.2   Elevated Cholesterol

There is ample evidence in the literature of the strong relationship between elevated cholesterol levels and increasing risk of CHD. The Framingham Study (Dawber, 1980; Anderson, Castelli, and Levy, 1987), the Seven Countries Study (Pekkanen, Nissinen, and Vartiainen, 1994) the Japanese Study (Robertson, Kato,

Gordon, Kagan, Rhoades, Land, Worth, Belsky, Dock, Miyaniski, and Kawamato, 1977), to name a few of many studies, have all contributed to our knowledge of the direct relationship between hypercholesterolaemia and CHD.

Saturated fat in the diet is the main factor that leads to increased blood cholesterol levels. Heredity also affects blood cholesterol levels and a number of people have high cholesterol levels regardless of saturated fat and cholesterol intake. Population-based prospective studies have provided the basis for the treatment and prevention of high cholesterol through the intake of low saturated fat diets and by drug treatment. In Australia recent studies have shown that the cholesterol lowering drug 'Pravastatin' reduces the death and illness from CVD compared with placebo treatment (The Lipid Study Group, 1998).

Total cholesterol levels above 5.5 mmol/L are an indication of an increased risk of developing CHD. Levels above 6.5 mmol/L indicate high risk. In the 1989 Risk Factor Prevalence Survey of the National Heart Foundation in Australia, it was estimated that over 4.5 million Australian adults aged 20-69 years had higher than the desirable cholesterol levels (NHFRFPS, 1990). The average cholesterol level for men in Australia was 5.66 mmol/L and for women 5.55 mmol/L. In 1989 over 47% of men and 39% of women aged 20 -69 years had blood cholesterol levels higher than 5.5 mmol/L. The prevalence of elevated total serum cholesterol in men occurred after the age of 34 and for women after the age of 44, but the level in women exceeded that of men after the age of 55 years. This survey showed, further, that over 15% of men and women aged 20-69 in Australia had a blood cholesterol level of 6.6mmol/L or more.   There was no strong association

established between cholesterol levels and socioeconomic status of the Australians. However, it was clearly demonstrated from the analysis of data of the RFPS NHF, 1989 that high cholesterol (>6.5 mmol/L) was more common among unemployed women aged 25-64, among men aged 25-64 and especially among those men who were living alone or who were previously married but now living alone (Risk Factor Prevalence Study Management Committee, 1990).

4.2.3   Hypertension

High blood pressure is a major risk factor for CHD, stroke, and peripheral vascular disease. The risk of disease increases with the higher level of blood pressure. Hypertension has been known as the 'silent killer'. In Australia individuals are identified as hypertensive if they have systolic blood pressure greater than 160 mmHg and/or diastolic blood pressure greater than 95 mmHg, or if they are receiving treatment for high blood pressure (NHF, 1990). Many factors determine whether a person will or will not develop hypertension, some of which are age, race, socioeconomic status, education and gender. The Framingham Heart Study, amongst several following population studies, has shown an overwhelming relationship between hypertension and CHD. The Framingham Heart Study also showed an incidence of sudden death up to two times higher in hypertensive individuals than in a nonhypertensive cohort (Dawber, 1980). It also indicated that after the age of 65 years isolated systolic hypertension accounted for 57.4% of any type of hypertension in men and 65.1% in women. Some ethnic and racial characteristics influence the rate of hypertension. In Australia data from the Kimberly region indicate that high blood pressure is two to three times more common among indigenous people than

among other Australians (Smith, Spargo, Hunter et al., 1992). Education and socioeconomic resources may also play a role in the progression of hypertension. In 1995 in Australia, the prevalence of high blood pressure was more among women in the lowest socioeconomic group (18%) than those in the highest socioeconomic group (16%) (Waters and Bennett, 1995). The data also indicated that high blood pressure was more common among people with low levels of education and among single men living alone, compared with men with partners and dependent children. In 1995, 17% of Australian men and 15% of Australian women aged 18 years and over had high blood pressure and the proportion of both men and women with high blood pressure increased with age. Around 41% of Australians aged 65-69 years had high blood pressure (ABS, 1995).

4.2.4   Physical Inactivity

Several epidemiologic studies indicate that physical activity reduces the risk of CHD whereas physical inactivity or decreased physical activity increases the risk of CHD. People who do not participate in physical activity are twice as likely to die from CHD than those who do (Paffenbarger, Hyde, Wing, et al., 1990; Emmons, Marcus, Linnan, Rossi, and Abrams, 1994). Insufficient physical inactivity is likely to be associated with other risk factors for CVD, such as overweight, hypertension and high blood cholesterol. There are controversies regarding the recommended time a person should spend undertaking physical activity but it is generally agreed that 30 minutes of moderate intensity physical activity carried out on most if not all days of the week, benefits the cardiovascular system and overall good health (DeBusk, Stenestrand, Sheehan, Haskell, 1990).

In 1995 over 4.5 million adult Australians reported doing no leisure time physical activity. Walking is one popular form of physical activity, with 45% of Australian men and 53% of women reporting that they engaged in this type of leisure activity in 1995 (ABS, 1995). People between 50-70 years undertook more leisure time physical activity, which could be attributed to increased free time with reduced work and family responsibilities. In 1995, men and women in the lowest socioeconomic group were least likely to be physically active (ABS, 1995).

4.2.5 Overweight and Obesity

In 1995 around 7.4 million adult Australians were overweight (BMI>25), and 2.5 million of those were obese (BMI>30 Kg/m2). People who are overweight and obese have a higher risk of CHD, higher blood pressure and higher cholesterol levels. The number of overweight and obese Australians has increased in the last 15 years and data indicate that the proportion of overweight women aged 25-64 years increased from 27% in 1980 to 43% in 1995 while the proportion of overweight men in this age group increased from 48% to 63% over the same period. Men were more likely to be overweight than women. The proportion of overweight increased with age. Being overweight or obese was more common in women of lower socioeconomic groups but it was not significantly different in men from different socioeconomic groups. Rates of obesity among indigenous women was much higher than among all other Australian women (ABS, 1995).

4.2.6 Diabetes

Around 2% of the Australian population have diabetes. CHD is 2-4 times more common in people with diabetes, with Type 2 diabetes or non-insulin-dependent diabetes carrying a greater CHD risk than Type1 diabetes. Type 2 diabetes rates increase with age, especially after the age of 40. Diabetics frequently have multiple CHD risk factors such as hypertension, obesity, dyslipidaemias and smoking.

In 1995, Australians in the lowest socioeconomic group had higher rates of Type 2 diabetes than people in higher socioeconomic groups. Women in the lowest socioeconomic group were 2.5 times more likely to report diabetes than those in the higher socioeconomic group. Men in the lowest socioeconomic group had a rate of Type 2 diabetes of 2.3 times more than men in the highest socioeconomic group (ABS, 1995).

4.3   Research on Risk Factors of Cardiovascular Disease

4.3.1   CVD Risk Factor Studies in the United States

As previously stated, one of the most important cardiovascular risk factor identification studies is the ongoing Framingham Heart Study, initiated in 1949 in Framingham, Massachusetts. This ground-breaking study aimed to identify modifiable and non-modifiable CVD risk factors as well as to provide information on the progression of coronary heart disease (CHD) over time. The original study sample included 5,209 individuals between the ages of 30-60 years, 2,336 men and 2,873 women. It was one of the first CVD studies to include women. The Framingham Heart Study clearly established that the three major modifiable CVD risk factors are: high cholesterol, hypertension and cigarette smoking, frequently

referred to as the *classic triad.* Each of these has a strong causal relationship with CHD, followed by the nonmodifiable risk factors of age, gender, and family history. The other modifiable risk factors that the Framingham study identified are high dietary fat, lack of physical activity and diabetes. Follow-up of the initial recruits and their offspring is still ongoing today and data from the study continue to give valuable information about the relationship between various risk factors and CHD.

A later study (Sytkowski, Kannel, and D'Agostino, 1990) included three groups of male subjects from the Framingham Heart Study who were 50-59 years old at base line in 1950, 1960 and 1970. This study was undertaken to analyse the 10-year incidence of CVD and death from CVD in order to determine the contribution of trends in the incidence of CVD, risk factors and medical care to the decline in mortality. This study found that the 10-year cumulative decline in mortality in the 1970 cohort from CVD was 43% less than that in the 1950 cohort and 37% less than that in the 1960 cohort (P=0.04 by log-rank test). Risk factors for CVD were evaluated for each subject at base-line. The Mantel- Hetszel and general linear-model were utilised for the analysis which showed significant improvements in risk factors for CVD among the men in the 1970 cohort, compared with those of the 1950 cohort. The risk factors showing improvement were lower serum cholesterol level, (where the mean serum cholesterol level at base line decreased by 0.57mmol per litre) a lower systolic blood pressure, (where the percentage of men with hypertension decreased from 21% to 15%) and a reduced percentage of men who smoked (from 56% to 34%). These improvements had pronounced effects on the mortality from CVD rather than on

the incidence of CVD in the population studied. The researchers suggested that the improvements in CVD risk factors contributed to the 60% decline in age adjusted mortality in the 1970 cohort, compared with the 1950 cohort. They also suggested that improvements in medical interventions and the decline in the incidence of CVD may also have contributed to the decline in mortality rate (Sytkowski, Kannel, and D'Agostino, 1990).

The Framingham study provided impetus for additional studies investigating risk factors not only in the United States of America but also in Europe, Australia and other countries in the world.

The Stanford community study is another American large study that began in 1972. This study sought to examine the impact of two levels of intervention for CVD risk factor reduction in two Californian towns with populations ranging between 13,000-15,000, comparing them with a control community. The Stanford Heart Disease Prevention Project (SHDPP) (Farquhar, Maccoby, Wood, et al., 1977) was based on an amalgam of social learning theory, attitude and communication theory and social marketing. The study involved surveys in the three towns, assessing baseline data of the participants as well as their knowledge and beliefs about cardiovascular disease and its prevention. The community of Gilroy received only a mass media program. The other community of Watsonville received an identical media program and was also provided with educational programs to modify knowledge, attitudes and behaviours associated with CVD as well as face to face instructions. Tracy, the control town did not receive any programs at all.

The mass media program was intensive, with television advertisements and programs, radio broadcasting, news paper columns and articles, direct household mail outs of cookbooks and calendars all educating the public about CVD risk factors and the importance of reducing these risk factors, such as stopping smoking, lowering fat intake and increasing leisure physical activity. The benefits and importance of monitoring blood pressure and cholesterol levels were also emphasised in the mass media campaigns. The Watsonville intensive instruction program, which was based on social learning theory, employed a range of behaviour change strategies such as home counselling, group session counseling over a period of 10 weeks which also included spouses who were willing to participate.

The evaluation of this study was further followed by three surveys of the same samples at one yearly intervals (Farquhar, Maccoby and Wood et al., 1977). The summative evaluation showed a reduction in risk factors and an increase in knowledge in relation to these risk factors, where the overall knowledge about triglycerides increased from 18%-45%. As for behaviour change, there had been a 20% decline in smoking in Watsonville and 3% decline in Gilroy. Belief in the statement that 'eating eggs could be harmful' had decreased the consumption of eggs by 40% in Watsonville, 27% in Gilroy and 17% in Tracy, the control town. The summative evaluation demonstrated a significant reduction in risk factors and also revealed an interesting finding that Gilroy, the town exposed only to mass media, compared favourably with Watsonville in risk factor reduction. This

demonstrated that mass media can produce results as good as interpersonal education in a cost-effective manner (Farquhar, Maccoby, Wood, et al., 1977).

The Multiple Risk Factor Intervention Trial (Multiple Risk Factor Intervention Trial Research Group, 1986), also undertaken in the United States of America, selected a group of men with a relatively high risk of coronary heart disease and attempted to modify their blood pressure, serum cholesterol and cigarette smoking. The outcome of the study was that the experimental and control groups both modified their behaviour and reduced their risk factors.

4.3.2   CVD Risk Factor Studies in Europe

An example of a successful intervention study in Europe was The North Karelia Project (NKP) (Puska, Nissinen, Toumilehto, Salonen, Koskela, Mcalister, Kottke, Maccoby and Farquhar, 1985). Following the Seven Countries Study of CHD mortality that started in Finland in the 1950s, it became apparent that Eastern Finland had a very high mortality rate from cardiovascular disease and the highest rate of premature deaths from CHD in the world (WHO, Collaborative Group, 1970). These statistics raised the awareness and concern of the Finnish public who became involved in lobbying and signing petitions that were also signed and supported by the World Health Organization to initiate the North Karelia Project. This project had a large community focus as one of its major features, due to community concern which stemmed from personal exposure of community members to CHD deaths in friends and relatives. This created a level of perceived susceptibility that the Health Belief Model requires as an antecedent before preventive action can be implemented.

A five year program initially started in North Karelia in 1972 to implement a planned comprehensive program in all of North Karelia for the control of CVD and in particular, CHD. Due to its success, it was extended over a ten-year period. The program targeted the total population but with special reference to middle-aged men whose CHD death rates were alarming. The aims of the project were to describe the theoretical framework of the project, its interventions and evaluation, to review and discuss the main results and to relate the NKP to other studies that have been undertaken in other parts of the world (Puska, Nissinen, Toumilehto, Salonen, Koskela, Mcalister, Kottke, Maccoby and Farquhar, 1985). The theoretical foundations of the program were based on those of the Stanford project. It applied medical knowledge and epidemiological knowledge to identify health problems to prioritise health objectives and to determine the behavioural and social knowledge to design the actual program contents and activities. The theoretical framework of the study was based on an amalgam of Social Learning Theory, communication and attitude theory, and community organization principles. Like the Stanford project, the NKP placed great emphasis on various efforts to teach individuals practical skills for change, such as smoking cessation techniques, and ways of buying and cooking healthier foods. Close cooperation with the local housewives association (MARITA) proved most valuable. Environmental contingencies were also established to promote behavioural change through the development of 'healthy restaurants' and 'no smoking' areas. The NKP also worked very closely with local food manufacturers and distributors to produce and promote low fat meat and dairy products. A lot of attention had been given to change old social norms and to adopt new healthy lifestyles.

The NKP showed behaviour change in relation to smoking, with a decline in male smokers from 44% to 31% compared with 39%-35% in the rest of the country. A decline by 3% in mean serum cholesterol was also recorded in the period between 1972-1982. During this period a decline of 3% in systolic blood pressure and 1% in diastolic blood pressure in men and 5% and 2% respectively in women also occurred. The frequency of blood pressure measurements increased and, after 1974, 80% of the population had their blood pressure measured at least every two years. Changes in risk factors were generally greater among men than among women, which was in accordance with project efforts. The risk factors were also analysed according to socioeconomic subgroups. The general finding was that the changes did not markedly concentrate in some groups but took place rather generally throughout the community. The changes resulted in reduced rates of cardiovascular disease and improved health and well-being among the entire population, not only in North Karelia. The coronary heart disease mortality rate of Finnish men, which used to be the highest in the world, decreased nationwide between 1969-1979, with a decline of 24% in men and 51% in women. It can be concluded from the results of this project that well conceived community based programs can have an important impact on life styles and risk factor levels in a population (Puska et al., 1985).

Another European project was the Oslo Study Group Project in Norway (Hjermann, Holme, Velve Byre, and Leren, 1981). All Oslo men aged 40-49 were invited for screening for coronary risk factors between 1972-1973. Sixteen thousand two hundred and two men (65%) of the group aged 40-49 years attended

the screening examination. From this cohort, 1,232 healthy normotensive men with high risk of CHD and elevated total serum cholesterol were selected for a 5-year trial to show whether the lowering of cholesterol and cessation of smoking could reduce the incidence of CHD. The men selected had to have a serum cholesterol level between 7.5-9.8mmol/l, coronary risk scores (based on cholesterol levels, smoking, and blood pressure) in the upper quartile of the distribution and systolic blood pressure below 150 mmHg. These men had normal electrocardiograms (ECG), had no chest pain on exercise, and were free of cardiovascular disease, diabetes and psychopathological disease. The intervention group included 604 men and the control group 628 men. The intervention group was advised to lower blood lipids by change of diet and smoking cessation. Each of the intervention group men had one-to-one information sessions about the risk factor concept and the purpose of the study. A dietitian established a diet record for each man by means of a standardised questionnaire. For the men with high cholesterol levels, a reduction in saturated fat intake was recommended. For those subjects with elevated fasting triglyceride levels, whether overweight or of normal weight, a reduction in total energy intake was recommended. Anti -smoking advice was given individually to all smokers in the intervention group. The wives of the subjects in the intervention group were also invited with their husbands for diet and smoking information sessions. The intervention group subjects were followed up and re-examined every six months and the control group subjects once a year for a period of five years. At each follow-up session, the intervention group men were asked about their eating and smoking habits and information was given emphasising cardiovascular symptoms, body weight, blood pressure and serum cholesterol.

The results of this study indicate that at the end of the trial the mean serum cholesterol was approximately 13% lower in the intervention group than in the control group. The mean fasting serum trigyceride fell by 20% in the intervention group compared with the control. While 80% of the men in both groups smoked daily at the start of the study, the mean consumption of tobacco per man decreased by 45% more in the intervention group than in the control group. However, only 25% of smokers in the intervention group completely stopped smoking, compared with 17% in the control group. At the end of the study, the incidence of myocardial infarction (fatal and non-fatal) and sudden death was 47% lower in the intervention group than in the control group. This study showed that informative advice can bring about significant changes in serum lipid levels with a change in eating habits and smoking habits in healthy middle-aged men at high risk of CHD. The changes were associated with a significant reduction of coronary heart disease (Hjermann, Holme, Velve Byre, and Leren, 1981).

Two more recent studies from the United Kingdom were the Oxford and Collaborators Health Check (OXCHECK) (Imperial Cancer Research Fund OXCHECK Study Group, 1994) and the British Family Heart Study (Wood, et al., 1994), which were conceived in the late 1980s to assess whether health checks of the population carried out by nurses could be effective.

The OXCHECK study was a randomised controlled trial which began in 1989. The subjects in this study comprised the entire 35-64 year old population of five group general practices in Luton and Dunstable in Bedfordshire. A total of

11,090 patients (an estimated 80% of the aggregate population in this age group in the practices) completed a detailed questionnaire covering lifestyle, history of CVD, attitudes to health, social and educational factors. All were randomly invited to have health checks in one of four 12-month periods between 1989-1993. The nurses were trained to counsel the patients and negotiate with them priorities for action and to give them dietary advice. The health checks included personal and family history, detailed information on dietary intake, smoking, alcohol intake and physical activity. Physical examinations were carried out and included measurements of weight, height, and blood pressure. Venous blood samples were also taken for cholesterol measurements. The initial health assessment for each individual took 45 minutes to complete, the follow-up examinations took 10-20 minutes and re-examinations took around 30 minutes to complete. Nurses negotiated priorities and targets with the patients depending on their overall risk.

The outcome measures of the interventions were the differences in risk factor levels for those returning for re-checks (Imperial Cancer Research Fund OXCHECK Study Group, 1991). The one-year follow-up results indicated substantial differences between the intervention and control groups in reported diet and physical activity, significant differences in blood pressure and cholesterol levels but no differences in smoking prevalence, smoking cessation or in body mass index. At the end of the first year of interventions the mean total cholesterol was 2.3% lower, mean systolic blood pressure was 2.5% lower and mean diastolic pressure was 2.4% lower in the intervention group compared with the control group (Imperial Cancer Research Fund OXCHECK Study Group, 1994).

The three year follow-up results, based on the follow-ups in 1992-1993, indicated that those who had received initial check ups in 1989-1990 sustained the effects of the interventions three years later. The mean cholesterol was 3.0% lower, mean systolic and diastolic blood pressure were 1.9% lower, and the mean body mass index was 1.4% lower in the intervention group compared with the control group. There were again no differences in the prevalence of smoking or smoking cessation (Imperial Cancer Research Fund OXCHECK Study Group, 1995).

The results from the OXCHECK study clearly indicate that the nurse-conducted health checks are effective and benefits can be sustained. The lifestyle changes of individuals that occurred showed mainly improvement in healthy dietary intake, with a reduction in fat consumption, lower cholesterol levels and lower blood pressure measurements. It is anticipated that from these interventions there would be a 5% reduction in men and 13% reduction in women in long-term risk of myocardial infarction, attributed to lowering of cholesterol levels, and a 7% reduction in myocardial infarction in the total population attributable to the reduction in blood pressure measurements.

The British Heart Family Study (Wood, et al., 1994) was another nurse-led cardiovascular screening and lifestyle intervention programme that started in 1990 in 13 towns throughout Britain. The overall aim of the study was to estimate the size of change in cardiovascular risk factors in families that can be achieved over a period of one year. The total coronary risk score utilised the Dundee risk score for three modifiable risk factors namely, cigarette smoking, blood pressure,

cholesterol levels, as well as assessing the prevalence of smoking and the distribution of weight, blood pressure and random blood cholesterol and glucose concentrations in the population. It was a randomised controlled trial in which families from two practices in each town were randomly allocated to the intervention group or comparison arm of the trial. The intervention group comprised men and women who were recruited and screened to the study one year earlier, and had returned one year later for a follow-up. The comparison group comprised those whose one year appointment was their first screening visit. The families were identified through the male partner based on the lists of men aged 40-59 years in each practice.

The intervention group was approached by nurses who telephoned the households. A total of 14,086 households were approached; 8,605 households were represented by one or more adult members in this study. A total of 7,640 men and 5,012 women were studied in both the intervention and comparison groups. A total of 2,011 men and 1,425 women participated in the screening program. The initial screening interview for an adult couple was held over an average of an hour to an hour and a half. The interview provided demographic, lifestyle, and medical information. Physical measurements included height, weight, blood pressure and random blood concentrations of total cholesterol and glucose. A coronary risk score was calculated, based on the modifiable and unmodifiable risk factors. The score was recorded in a booklet, *Your Passport to Health*, which also included negotiated lifestyle changes in relation to smoking, weight, healthy eating, alcohol consumption and exercise (Wood, Kinmonth, Davies, Yarwood, Thompson, Pyke, Kok, Cramb and Guen, 1994).

The frequency of follow-up visits was determined by the coronary risk factor score and individual risk factors. People with individual high risk factors such as current smokers, those with body mass index greater than 25Kg/m^2, diastolic blood pressure greater than 90mmHg, cholesterol concentration greater than 6.5mmol/litre, or random glucose concentration greater than 7.0mmol/litre were invited to re-attend every month for a period of 3 months. If any of these risk factors were still high at the end of the three months the individual would be referred to his or her general practitioner. Results showed that the Dundee risk score was 16% lower at the end of the first year in the intervention group for both men and women, compared with the control group. Of this observed lower score, 7% was attributed to blood pressure (systolic blood pressure lower by 7mmHg and diastolic was lower by 3mmHg); cigarette smoking was lower by 5%, and 4% was attributed to lower serum cholesterol concentration (by 0.1mmol/litre) in the intervention group (Wood, et al., 1994).

4.3.3   CVD Risk Factor Studies in Australia

Three of the most important cardiovascular risk factor identification studies in Australia are those of the National Heart Foundation, namely the National Heart Foundation Risk Factor Prevalence Studies (NHF RFPS) undertaken in 1980, 1983, 1989 respectively. These surveys aimed to examine changes in the cardiovascular risk factor profile of Australian adults and to compare them with trends in mortality. The first Risk Factor Prevalence Survey (RFPS) was conducted in 1980. Participants were 5617 men and women aged 25-64 years from state capital cities. The second survey was conducted in 1983 and included 7,640 participants. The third survey was conducted in 1989. In this survey 9,328

men and women participated and it expanded the age range from 20-69 years and included Canberra and Darwin in addition to the state capital cities. The samples were selected from defined catchment areas using the Commonwealth electoral rolls. The names and addresses of all people who were on the electoral roll and aged between 20-69 in each catchment area were sorted by sex and 5-year age groups that provided a representative sample of electors in each catchment area by age, sex and electoral division. A total of 19,315 randomly selected individuals participated in the three studies. Invitations were posted to prospective participants giving them a specific appointment time to attend local survey centres for a free check of heart disease risk factors. Each participant had to complete a structured self-administered questionnaire which collected information on demographic and socioeconomic characteristics, medical condition and treatment, alcohol intake, smoking, dietary behaviours and exercise patterns. The participants were then examined by registered nurses for physical measurements of blood pressure, blood chemistry, height and weight, waist and hip circumferences.

The results indicated that during the 1980s average blood pressure levels declined (by 4mmHg systolic and 3mm Hg diastolic) in all age groups for both men and women. The prevalence of hypertension decreased, total cholesterol levels decreased significantly, and weight for height increased in all ages, strongly suggesting increased body fatness. Fifty eight percent of women and 23 % of men were found to be overweight or obese. The prevalence of smoking declined in both men and women, smoking cessation being greater in women than in men. Adding salt to food and eating fat on meat became less common and walking for

recreation became more popular (Bennett, and Magnus, 1994). Reductions in cigarette smoking and blood pressure are likely to contribute to lower CVD morbidity and mortality rates but the trends towards greater body fatness may retard the benefits of favourable trends in other CVD risk factors. The Risk Factor Prevalence Study demonstrated clearly that risk factors for CHD, although in a decline, are still high throughout the Australian population and that both Australian men and women remain at considerable risk of developing heart disease.

4.3.4   CVD Risk Factor Studies in Immigrant Groups in Australia

A limited number of comprehensive studies have been undertaken in Australia examining cardiovascular risk factors among immigrant groups. Such studies targeted the Chinese (Hsu-Hage and Wahlqvist, 1993), Greek (Wilson, Bekiaris, Wise, and Hawe, 1993), Italian (Armstrong, Margetts, Masarei, and Hopkin, 1983; Ireland and Giles, 1996) and Vietnamese (Rissel and Russell, 1993) communities in particular. A brief discussion on each of the studies will be presented below.

The Cardiovascular Risk in Adult Melbourne Chinese Study (Hsu-Hage and Wahlqvist, 1993) aimed to collect baseline information about CVD risk factors in Chinese-Australians living in Melbourne. The 1983 NHFRFPS methodology was utilised to collect comparable data. Five hundred and forty seven subjects (271 men and 276 women) were recruited. They were permanent residents of Australia of Chinese ethnicity and aged 25 years and over. Information about participants was obtained from self-administered questionnaires, interviews and physical

measurements which provided information about blood pressure, blood lipids and the glycaemic status of each participant. Analysis of the data showed that the Melbourne Chinese generally had a low mean blood pressure. However, more than 10% had been told that they had high blood pressure and 5.5% of men and 9.8 % of women reported having received a high blood pressure treatment. More men (12.9%) than women (4%) reported having a medical history of high blood cholesterol or triglycerides. More than 50% of the men reported smoking at some time in their lives and about half of them had stopped smoking. However, 26.2% of the men were smoking at the time of the interview. This prevalence of smoking is similar to their Australian male counterparts. Compared with the Australian-born population, Chinese- Australians had a much lower BMI in men and women, hypertension was less prevalent in Melbourne Chinese men than in Australian men, but no difference was found in blood pressure between Chinese and Australian females. In both populations, the prevalence of treated and controlled hypertension and of hyperlipidaemia was similar. Melbourne Chinese men had a comparable multiple risk factor profile, while Chinese women had a significantly lower prevalence of one risk factor (15.4% versus 30.1%) than their Australian counterparts. The analysis showed that there were seemingly higher levels of plasma total cholesterol and triglyceride concentrations in adult Melbourne Chinese. This factor is of public health significance. However, no clear-cut association can be claimed to show that the increase in the levels of plasma total cholesterol and triglycerides was related to acculturation. Further retrospective or cohort investigations are required to determine the relationship between plasma lipid levels and the length of exposure to the Australian environment. This study showed that Melbourne Chinese (especially men),

presumed to be a low cardiovascular-risk population, are in fact at a comparable risk to other Australians (Hsu-Hage and Wahlqvist, 1993).

The Good Heart Good Life Survey (Wilson, Bekiaris, Wise, and Hawe, 1993) aimed to assess the prevalence and knowledge of cardiovascular risk factors and perceived risk of coronary heart disease among Greek-Australians in Marrickville, an inner suburb in Sydney. A random sample of 834 households was selected from the 2,403 households having Greek surnames on the electoral roll. In each household one individual aged 18 years or over was selected using a Kish grid procedure. A questionnaire was administered by trained bilingual interviewers to obtain information about the knowledge of, and self reported risk factors for, CHD, attitudes towards CHD health promotion, perceived stress, social supports and networks. Most of the 541 interviewed subjects were born in Greece (86% of the sample). Ninety percent of them had lived in Australia for more than 10 years. The sample comprised 328 women and 213 men. Most of the interviews (77%) were conducted in Greek.

Body mass index was calculated from self-reported height and weight measurements. Cross-tabulations of variables within the study were examined using Chi square statistics. The results showed that the age standardised prevalence of self-reported high blood pressure (5.2% for men and 8.1% for women) was significantly lower than the equivalent age standardised prevalence of self-reported high blood pressure in the NHFRFPS (15.9% for men and 20.0% for women). Blood cholesterol testing in the previous six months was reported by 48.5% of men and 57% of women. Almost half the sample (48.2%) reported

normal blood cholesterol levels, while 18.4% of men aged 45-54 years and 19.5% of women aged 55-64 years reported 'high' cholesterol levels. About half of the participants reported activities to maintain normal blood cholesterol levels, mainly a lower fat diet. Most respondents (73.6% of men and 74.1% of women) reported eating mostly Greek food. Fifty three per cent of the sample was overweight or obese, which was higher than in the 1989 NHF-RFPS. Forty three per cent of men and 15.6 % of women were current smokers at the time of the study. The proportion of Greek- Australian men smoking was higher than those in the 1989 NHF RFPS but was not significantly different from the Greek-Australian women and women participating in the NHF RFPS. Fifty per cent of the men and 50.5% of the Greek-Australian women reported not undertaking any sort of recreational physical activities. Among the rest of the subjects, walking was the most common type of exercise. Of those who exercised, 26.6% did so at least once daily while 39.1% exercised fewer than three times per week. The average duration of the exercise session was 30-60 minutes for 40% of those who exercised.

Regarding the perception of coronary heart disease risk and ability to modify own risk, 21.7% of the total sample (mainly the younger subjects) could not answer the question, while 41.5% of men and 42.5% of the women believed that they would develop heart disease. A similar proportion believed that they would not develop heart disease. There were no significant age or gender differences between these groups. Of those who did not perceive that they had a future risk of heart disease, 25.6% justified this by citing their good health, 11% citing exercise while 27% stated that because they engaged in coronary heart disease-protective behaviours

such as following a good diet and maintaining normal blood pressure. When asked what they could do to prevent developing heart disease, 19% suggested stress avoidance, 14% exercise, and 13% diet modification. Only 7.9% of men and 5.8% of women suggested cessation of smoking.

More men (72%) than women (51%) believed that light drinking is good for the heart. When asked about their knowledge of heart disease risk factors, 48% of men and 81% of women believed that emotional stress was a risk factor; 84% of the men and 75% of the women believed that air pollution was a coronary risk factor. They also recognised most of the major risk factors such as hypertension, lack of exercise, excess dietary fat intake and obesity to be contributing factors. Only 73% of men and 79% of women recognised smoking to be a risk factor. The estimates of this study are based on self-reports and therefore could have some inaccuracy. However, the study concluded that the coronary heart disease mortality rate of Southern Europeans has not followed the declining Australian trend but rather increased. This could be related to their adoption of the Australian lifestyle characterised by higher red meat intakes, the high prevalence of smoking, their low educational levels and poor English language skills.

High blood pressure is an important risk factor for CVD and leads to disability and premature death. The Melbourne Collaborative Cohort Study (MCCS) (Ireland and Giles, 1996) was conducted to investigate changes in the average blood pressure of Australian-born and Italian-born men and women after a 20 year interval in the same location, Brunswick, a suburb in Melbourne. Between November 1990 and October 1994, over 1000 healthy men and women aged 40-

69 years were recruited from the former Brunswick Government Local Area, the same locality in which a cross-sectional study of blood pressure was conducted in 1972 (Lovell and Prineas, 1974). It was a non-random sample comprising volunteers who responded to personally addressed invitation letters, their names and addresses having been obtained from the Commonwealth electoral rolls. At the time of the study, 1259 participants resided in Brunswick. Of these, 673 were born in Australia and 355 were born in Italy. The subjects responded to a fifteen minute questionnaire identifying whether they have ever been told that they had high blood pressure and were asked if they had taken blood pressure tablets to control their blood pressure. Three measurements of systolic and diastolic blood pressure were taken three minutes apart and body mass index was computed. Utilising the SPSS package to analyse the data, it was observed that there was a significant ($p<0.005$) fall in the average systolic blood pressure measurements in the Australian-born subjects between the ages of 40-49 and 50-59, but the fall was not significant in the 50-59 age group. In the Italian-born subjects there was a rise in average systolic blood pressure in each age group, but the rise was statistically significant ($p<0.001$) only for males aged 50-59 years (Ireland and Giles, 1996). This is in contrast to the 1972 results which showed that the age-stratified average systolic blood pressures were lower in Italian-born subjects (Lovell and Prineas, 1974).

The average diastolic blood pressure was higher in the Italian-born subjects relative to the Australian-born men and women in every age group studied in the MCCS. However, the difference for women was statistically significant ($p=0.005$)

only for those aged 40-49 years. This is in contrast to the 1972 results in which the average diastolic blood pressure was lower in Italian-born men and women.

In 1972 the prevalence of diagnosed hypertension in Italian-born subjects was only half or less than that for the age-matched Australian-born men and women. However, in the MCCS, a higher percentage of Italian-born subjects aged 50-59 had been diagnosed as hypertensive. From 1972 to 1990-1994 there was a doubling ($p<0.01$) in the percentage of Italian-born subjects aged 50-59 diagnosed with hypertension. Conversely there was a significant fall ($p<0.0050$) in the percentage of Australian-born subjects, particularly in women with hypertension in the 40-49 age group. There was a similar percentage of subjects in both groups taking anti-hypertensive tablets in the MCCS, while in 1972 a higher percentage of Australian-born subjects were taking tablets to control their high blood pressure. Compared with the Australian-born subjects, mean body mass index (BMI) was significantly higher among Italian-born men and women in each of the age groups in both the 1972 and 1990-1994 studies. The data from this study clearly indicated that average blood pressure among Italian-born migrants is higher than in Australian-born men and women, corroborating the finding from the 1989 NHF survey that average blood pressure is no longer lower in Italian-born migrants compared with native-born Australians. The greater increase in blood pressure with age in the Italian-born is characteristic of a population having a high sodium intake. The study concludes that it might be possible that the reduction in the blood pressure in the Australian-born is related to a reduction of salt intake and an increased consumption of fruits, vegetables, and seafood and a decrease in the consumption of red meat and butter in the past 20-25 years.

A study examining heart disease risk factors in a Vietnamese community in southwestern Sydney (Rissel and Russell, 1993) indicated that the prevalence of risk factors for heart disease has been increasing despite the low mortality rate from heart disease in the Vietnamese community. A list of Vietnamese households was first obtained through the Telecom electronic database and 491 households were randomly selected. From these households, 389 Vietnamese born residents were also randomly selected by using a Kish grid. Respondents were interviewed by telephone about their risk status and then they were asked to participate in a second interview in their homes where physical measurements were taken. Only 237 (61%) agreed to the second interview. Of these 237, 29% rated their health as good or excellent, compared with 42% who said their health in Vietnam was good or excellent. A trend was evident among respondents who claimed that their health had been better in Vietnam (χ^2=14.46, 1df, p<0.001), with 57% rating their health only as fair in Australia. The majority (84%) reported having their blood pressure measured, 67% within the last six months of the date of the study and 80% within the last twelve months. Only 4% (n=12) reported having high blood pressure and, of those, ten were on tablets to control it. Blood pressure was found to increase with age (χ^2=9.54, 2df, p<0.001), yet only 41% had their levels of cholesterol measured and of those 25% reported having high cholesterol levels. Increases of cholesterol levels with age were not statistically significant (χ^2=5.5, 2df, p=0.064) at the conventional level, but did show a trend. Men had higher cholesterol levels than women. The average measured body mass index was 22 Kg/m², for men and 22kg/m², for women. Over half (53%) of the males in the sample aged between 30-49 years smoked, of

whom 70% reported that they would like to stop smoking. Alcohol was infrequently consumed, with 55% reporting they never drank alcohol and 35% reported that they drank alcohol less than once a week. Only 9% engaged in vigorous activity, 17% in less vigorous exercise, while 64% had walked for 15 minutes or less in the last two weeks prior to the interview.

The results suggest that the Vietnamese in Southwestern Sydney are not at high risk of heart disease compared with the Australian- born, but the rate of smoking for Vietnamese men, which is significantly higher than that of the Australian male population, should be a focus for health promotion activity. This health issue is especially important, since almost three quarters of the Vietnamese men who smoke expressed an interest in quitting the habit.

A study of the inequalities in risk factors and cardiovascular mortality among Australia's immigrants was undertaken by Bennett in 1993 utilising the data of the 1989 National Heart Foundation Risk Factor Prevalence Study (NHFRFPS). The study compared the levels of biomedical and behavioural risk factors among a range of immigrant groups in Australia using the native-born Australians as a reference group. Variation in risk factor levels with period of residence was examined and the risk factor profiles for each immigrant group were compared with their cardiovascular mortality experience. Aggregation of birthplaces into immigrant groups was necessary to provide reasonable sample sizes for the analysis. Of interest to the Australian-Lebanese study was the data analysis of the immigrant group of the Middle East and North Africa that included subjects of the NHFRFPS born in Lebanon. The results of the analysis indicated that, compared

with the Australian-born men, the men from the Middle East had relatively low high-density lipoprotein, high body mass index, high smoking prevalence, low prevalence of light alcohol intake and high prevalence of leisure-time physical inactivity. Despite these findings their systolic blood pressure was significantly lower than the Australian-born and the cardiovascular age-adjusted mortality rate for Lebanese and Egyptians was lower than the Australian-born.

This study found that Middle Eastern women had low levels of high-density lipoprotein, high triglyceride levels, high body mass index, light alcohol intake and high rate of physical inactivity. Their systolic and diastolic blood pressures were lower than the Australian-born women. The mortality rate for women for Lebanon and Egypt was higher than the Australian-born women although the differences were not statistically significant. The results of this study suggest that immigrants have generally lower blood pressure levels when they first arrive in Australia but their blood pressure increases as their time in Australia lengthens. There was also suggestive evidence that low levels of alcohol intake increases with longer residence in the host country, but there was no evidence to suggest that blood lipid profiles were affected by the process of acculturation.

4.4 Summary

CHD continues to be the leading cause of death and has a major impact socially, economically, psychologically and physically in Australia. Over the past 40 years the concept of cardiovascular risk factors have been introduced and studied in Europe and the United States of America and in Australia. These studies have explored risk factor

modification and outlined the beneficial effects produced over 2-10 year periods of the various health promotion programmes that were implemented. Approaches to risk factor modification in the Oslo study (Hjermann , Holme, Velve Byre, and Leren, 1981) provided evidence that, as subjects modified their eating and smoking behaviours, they reduced their incidence of myocardial infarction significantly. The North Karelia Project in Finland reported a 50% reduction in coronary heart disease over a period of ten years through the modification of the subjects' risk behaviour (Salonen, Puska, Kottke, Tuomilehto, and Nissinen, 1983).

The modification of risk factors in individuals with severe heart disease in the Cholesterol-Lowering Atherosclerosis Study (Blankenhorn, Nessim, Johnson, Sanmarco, Azen, and.Cashin-Hemphill, 1987) not only reduced the rate of progression of heart disease, but also increased the rate of regression of the coronary artery lesions. The Multiple Risk Factor Intervention Trial conducted in the United States of America (Multiple Risk Factor Intervention Research Trial Group, 1986) examined a group of men who were in the high risk category of coronary heart disease and attempted to modify their smoking behaviour and blood pressure and cholesterol levels. This study found that both the control group and the experimental group modified their risk behaviours and significantly reduced their level of risk factors over the same period of time.

These studies and many others have shown that CVD risk factors carry the largest population attributable risk, but their amenability for treatment is possible and cannot be further emphasised. Many of these large trial studies demonstrated that intensive

cardiovascular screening and intervention programs led by nurses could assist individuals in changing their life style and reducing their risk of CHD.

Through assessment and identification of high-risk individuals and groups, education of the public in relation to these risk factors and assisting and supporting individuals in rehabilitation and secondary prevention programmes, nurses could continue to play a major role in preventing the occurrence of CHD.

This chapter has presented a review of the major CHD risk factor studies conducted by nurses and other health professionals nationally and internationally in several population groups, including immigrant groups in Australia. It also provided a brief introduction to essential concepts in understanding CHD risk and risk reduction through appropriate interventions. Chapter Five will discuss the research method used in the present study which was conducted to identify cardiovascular risk factors, health beliefs and attitudes in an adult Australian-Lebanese community in Melbourne.

CHAPTER 5 CONTENTS

CHAPTER FIVE

RESEARCH METHOD

5.1   Introduction

Coronary heart disease remains a leading cause of death in Australia despite its decline

in the past 25 years (Al-Roomi, Dobson, Hall, Heller, and Magnus, 1989, Bennett and

Magnus, 1994). The decline has been attributed mainly to the improvements in medical

management and to the lower prevalence of behaviours associated with the development

of heart disease, such as smoking (Cardiovascular Health In Australia, 1994). It is

evident in the literature (Young, 1992; Donovan, d'Espaingnet, Merton and Van

Ommeren, 1992) that the mortality rate from coronary heart disease (CHD) amongst

immigrant groups is lower than that of Australian-born people. Research has shown

that heart disease amongst migrant communities rises with their increased duration of

residence in Australia (Young, 1992). It has also been shown that indigenous

Australians, people from rural and remote areas, and people from lower socioeconomic

backgrounds and non-English speaking background are more at risk than the rest of the

Australian population. As seen in Chapter Four, there are some Australian studies that

address factors which may influence the incidence of coronary heart disease amongst

migrant communities in Australia. However, none relate to an Arabic-speaking

community, particularly the Australian-Lebanese. This study was designed to address

the limited information about one of the largest Arabic speaking communities in

Australia. It involved investigating the prevalence of CHD risk factors and examining

which demographic factors, attitudes and behaviours predict the presence of risk factors

for cardiovascular disease.

5.2 Objectives of the Study

To date, there have been no studies undertaken to determine patterns of cardiovascular disease among Australian-Lebanese in Melbourne. Previous researchers have identified many factors that have the potential to influence and increase the risk of cardiovascular disease amongst different immigrant groups (as discussed in Chapter Four). These factors include age, gender, education, income, stress due to immigration, length of stay in the host country and the adoption of adverse health behaviours such as smoking, increased dietary fat intake, and weight gain, once in the new country.

This study was designed specifically to examine the above factors in an attempt to determine their effect on the cardiovascular health of a sample of adult Australian-Lebanese. The objectives of the study were to determine which demographic factors, attitudes and health beliefs among this Australian-Lebanese sample predict:

1. unhealthy behaviours, namely: physical inactivity, poor dietary habits, obesity, cigarette smoking, alcohol intake, hypertension and high cholesterol levels,

2. knowledge of cardiovascular risk factors,

3. perceptions of own health,

4. health seeking behaviour.

5.3 Sampling Strategy

Research in Australia and overseas has provided well documented evidence of particular sampling problems encountered in research involving ethnic minority groups (Chaturverdi, & McKeigue, 1994; Ecob, & Williams, 1991; Minas, Lambert, Kostov, Boranga, 1996). These difficulties include various definitions of ethnicity, achieving meaningful sampling size, obtaining relevant population denominators and determining appropriate sampling and recruitment strategies (Chaturverdi, & McKeigue, 1994). Due to these difficulties standard random sampling techniques are time consuming and too expensive to be employed successfully (Small, Yelland, Lumley, 1999). Many researchers have therefore utilised non-random sampling strategies in studying ethnic communities, such as snowball sampling from contacts within ethnic community leaders and organisations (Brown, Alexander, McDonald, Mills-Ever, 1997), sampling from geographical areas known to have high concentrations of a particular ethnic group (Plunkett, & Quine, 1996), or using lists of names provided by ethnic health providers (Rissel, 1997) and using surnames to identify and sample particular ethnic groups (Nicoll, Bassett, Ulijaszek, 1986).

5.3.1   Recruitment of Subjects

Two of these non-random strategies were utilised in this study: the snowball sampling strategy and the sampling of geographic areas with high concentrations of Australian-Lebanese. A list of 788 Australian-Lebanese households was compiled with the help of Lebanese community leaders, religious leaders and community members who gave the names and telephone numbers of Australian-Lebanese residing in the geographic areas with high concentrations of Australian-Lebanese at the time of the study (ABS, 1991). These areas were Broadmeadows,

Brunswick, Coburg, Doncaster, Northcote, Preston and Templestowe. Accordingly, socio-economic status was comprehensively covered by the inclusion of suburbs in which Australian-Lebanese from lower socio-economic backgrounds lived, namely the northern suburbs such as Broadmeadows and Coburg, those suburbs in which families from the middle socio-economic background lived such as Northcote Brunswick and Preston, and the eastern suburbs where those who were more affluent lived such as Doncaster and Templestowe.

An attempt was made to utilise the Telecom Database but it soon became apparent that it was impossible to distinguish Lebanese surnames from surnames of other Arabic speaking communities, such as Syrians, Palestinians, Jordanians and Egyptians residing in Melbourne.

Two hundred Australia-Lebanese subjects were therefore selected to participate in this study utilising a systematic sampling technique whereby every seventh family name on the list was contacted by telephone and the respondents were invited to participate in this study. This systematic sampling technique helped to provide a representative sample of the source population (Skodol-Wilson, 1989).

5.3.2   Inclusion Criteria

Subjects who met the following criteria were eligible to participate in the study:

a. all Lebanese born female and male subjects between the ages of 20 -69 who were residing permanently in Melbourne, and

b. all Australian born female and male subjects of Lebanese born parents between the ages of 20-69 who were residing permanently in Melbourne.

5.3.3   Exclusion Criteria

Pregnant female subjects were excluded from the study to rule out changes in physical measurements such as weight, waist circumference and blood pressure which could be associated with pregnancy rather than a change of lifestyle.

5.3.4   Ethical Considerations

All individuals who participated in this project received verbal and written explanation (in both English and Arabic languages) of the procedures involved and the benefits expected from the study. All respondents were asked to sign an informed consent form (provided in both English and Arabic) prior to the commencement of the interview. All participants were also advised that they were able to withdraw at any time during the interview if they so wished. Anonymity of participants and confidentiality of all the data were guaranteed during the process of data collection, and it was explained that all results would be reported only as group data so that no individual could be identified.

Permission to conduct the study was obtained from the Human Research Ethics Committee of the RMIT University. The conduct of the study and the management of the data conformed to the University's requirements. Following completion of the data collection, candidature and responsibilities for completion of the study were transferred to Victoria University due to the relocation of the principal supervisor.

5.4 Instrumentation

The study used three instruments to obtain the data. The first was the questionnaire adopted from the National Heart Foundation Risk Factor Prevalence Study (NHFRFPS) conducted in 1989, in collaboration with the Commonwealth Department of Community Services and Health (DCSH). The questionnaire was translated into the Arabic language and participants were given the choice of answering in English or Arabic since depending on their preference, since the researcher was fluent in both languages (see Appendix 3a and 3b).

The second part of this survey involved the assessment of physical measurements, including height and weight for the calculation of body mass index, waist and hip circumferences and blood pressure. These measurements were taken on site and followed the protocols developed for the National Heart Foundation of Australia Risk Factor Prevalence Study 1989. These instruments are explained in full detail below.

The third part involved a semi-structured interview adapted from the Survey of Factory Women Workers conducted by the Heart Research Centre (1993-1994) (see Appendix 4).

5.4.1   The Risk Factor Assessment Questionnaire

As stated, this study used the questionnaire developed for the National Heart Foundation Risk Factor Prevalence Study (NHF RFPS, 1990). This questionnaire was designed to elicit information about the participants' demographic and socioeconomic characteristics, including the following: age, gender, marital status, number of children, living arrangements, birthplace, level of schooling and education, employment status, income and occupation. Medical history and medical conditions were investigated, including reported high blood pressure, high cholesterol levels and high triglyceride, history of angina, heart attack, stroke, heart disease, diabetes and the type of treatment if any, for these conditions. Information was also gathered about the time since participants had their blood pressure and cholesterol levels last tested. Alcohol intake, smoking habits, dietary habits, exercise patterns were also investigated.

5.4.2   Physical Measurements

Physical measurements of weight, height, waist and hip circumferences and blood pressure were obtained by the following methods:

5.4.2.1   Weight

A digital scale was used to measure weight. The scale was placed on a hard surface of the participant's house, usually in the kitchen or the bathroom. Each participant was requested to remove shoes, heavy outer clothes (such as jumpers, cardigans, or jackets), belts, mobile telephones from their waist. They were also asked to empty from their pockets heavy coinage, wallets and keys. Participants were allowed to remain only in their dresses, skirts and blouses or pants and shirts. The same scale was used for all participants and it was calibrated four times. The

weight of each participant was recorded to the nearest tenth of a kilogram following the NHFRFPS method.

5.4.2.2 Height

Stature was measured against a straight wall with a height scale taped on it in either the bathroom or the kitchen of the participant's home. Participants were measured in socks or stockings or bare feet. Participants were instructed to stand with their back against the wall and to look straight ahead so that the ear passage formed a horizontal line with the lower eyelid edge. A ruler was used as a sliding horizontal bar that rested gently on the head compressing the hair. The height was measured to the nearest centimeter following the NHFRPS method.

5.4.2.3 Waist and Hip Circumferences

While still in their light clothing participants were asked to remain facing the researcher. A non-stretch tape was used to measure the waist and hip circumference. Facing the participant, the researcher identified the narrowest point between the ribs and the hips of the participant as being the natural waist. In cases where the natural waist was difficult to identify, several measurements were taken to identify the lower edge of the ribs and the supra-iliac crest and the smallest of these measurements was identified as that person's waist line.

Two readings were taken for each subject and measured to the nearest centimetre. The average of both readings was then recorded as the waist circumference of the participant.

Using the same non-stretch tape, measurement of the hip circumference was undertaken with the researcher viewing the participant from the side to see the maximum extension of the buttocks. The tape was then used around the hips at a horizontal plane and the measure was taken to nearest centimetre. Two readings were obtained for the hip circumference and the average of those readings was then recorded as the hip circumference.

5.4.2.4 Blood Pressure

Blood pressure was measured using a normal mercury sphygmomanometer placed on the dining room table or the kitchen table of the participant's home. The sphygmomanometer scale was always facing the researcher. Steps were taken to ensure that the middle of the mercury scale was level with the researcher's eyes to minimize any error resulting from reading at an angle.

The subject was seated with the right arm resting on the table to allow for the cubital fossa to be at a level with the heart. This required adjustment in several cases where the arm of the subject was raised on a folded blanket or towel in order to maintain this level. Two cuff sizes were made available, one with a bladder width of 18-20 cm to accommodate

obese individuals and the other with a 13 cm standard cuff size for the average individuals. There was no need in this study to use the small cuff which is usually required for individuals with very thin arms.

The brachial artery was pulsated with the cuff placed 2 centimeters above the elbow band. The cuff was then inflated until the pulse disappeared. The cuff was rapidly deflated. The researcher then waited for half a minute before inflating the cuff again to 30 mm Hg above the palpated systolic pressure noted before. The air was then released from the cuff very slowly. The first clear tapping was recorded as systolic pressure and was noted to the nearest 2 mm Hg. As the pressure was lowered and at the point where no sound was heard, the researcher recorded the diastolic pressure reading. After five minutes a second reading of the participant's blood pressure was recorded using the same techniques. The average of the two readings was then recorded as the final systolic and diastolic blood pressure reading of the subject.

5.4.3   The Semi-Structured Interview

The semi-structured interview was based on open-ended questions designed to elicit information about respondents' general health and knowledge of heart disease, blood pressure, the effects of CVD, prevention of CVD risk factors and personal susceptibility to CVD. As previously stated, this semi-structured interview schedule was adapted from the 'Survey of Knowledge, Attitudes and Behaviours Concerning Cardiovascular Disease of Women Working in Factories in Melbourne', submitted to the Commonwealth Department of Health and Aged Care, (Heart Research Centre, 1995). Some of the responses were dichotomous

and others were categorical where 1 represented excellent, 4 represented wrong answers, the open-ended questions asked during interviews used the same coding categories and thematic responses developed and validated for the Survey of Factory Women Workers in Melbourne.

The framework for the construction of the semi-structured interview (see Appendix 4) was derived from several health behaviour models. These models were primarily the Health Belief Model (HBM) (Becker, 1974), which predicts that health-related behaviour depends on the desire to avoid illness and that specific health actions will prevent illness. Questions were asked in relation to *perceived susceptibility* (subjective perception of personal risk of heart disease), *perceived severity* (evaluation of the consequences of a heart attack using verbatim responses)*, perceived benefits* (beliefs about the effectiveness of reducing CHD risk factors using verbatim responses)*,* and *perceived barriers* (effectiveness of the action such as a healthy diet, exercise, and cessation of smoking, weighed against perceptions of cost in terms of convenience, time and pleasure using thematic analysis). A variety of coding and thematic analyses using verbatim responses were applied. The Transtheoretical Model of Change (Prochaska and DiClemente, 1983) was utilised to assess the distinct stages to which the participants belonged in relation to dietary habits, smoking behaviour and leisure-time exercise. These stages include the *precontemplation stage* (participants had no intention to change behaviour in the foreseeable future), *contemplation stage* (participants intended to change their health behaviours in the near future), *preparation* (participants were planning to change their behaviour in the near future), *action* (they recently changed their behaviour),

maintenance (they sustained behaviour change over time). Social Cognitive Theory (SCT) (Bandura, 1977), provided the basis for questions concerning *self-efficacy* regarding behaviour change. SCT posits that confidence in one's ability to perform a behaviour (self-efficacy) is strongly related to successful behaviour change and maintenance of change. Participants were asked if they were confident in their capability to change risky behaviours and whether they could perform and maintain healthy behaviours.

The Theory of Reasoned Action (TRA) and Planned Behaviour assumes that human beings behave in a sensible manner so that they might obtain favourable outcomes and meet the expectations of others (Fishbein and Ajzen, 1975). This theory incorporates measures of attitudes, intention, and behaviour. Behaviour is predicted by the intention to perform the behaviour of interest and intention is predicted by a person's attitudes and social context. TRA was used in this study to identify health related behaviours (such as dietary habits, fat and sugar intake, consumption of milk, fruits and vegetables and dairy products), intentions to change these behaviours and determinants of these intentions.

Semi-structured interviews were held with the first one hundred subjects. The interviews were intended to be as non threatening as possible to enhance the participants' comfort and information gathering. All interviews were conducted by a single interviewer (the researcher). Each interview followed the same format sheets. However, additional questions were asked to clarify points of confusion if it appeared that the original question had been misunderstood by the participants or if their responses were not clear. Each interview lasted between 45-70 minutes

and the responses were recorded on the format sheets. To ensure consistency and accuracy of coding, all responses to open-ended questions were independently coded by researchers at the Heart Research Centre who had participated in the Survey of Factory Women Workers. The codes utilised for the open-ended questions ranged from 'excellent', 'good', 'poor' and 'wrong'.

The interviews elicited information about how participants viewed their health, health practices, attitudes in relation to health and healthy life style, perceived barriers to behavioural change, knowledge of heart disease, blood pressure, cardiovascular risk factors, and actions undertaken to avoid developing cardiovascular disease. The interviews also examined health related habits, attitudes towards health habits and daily living activities in relation to the promotion and maintenance of health, as well as use of the health care system and access to health care facilities.

5.4.4   Validity and Reliability of the Instruments

The reliability of an instrument is the degree of consistency with which the instrument measures the attribute (Polit & Hungler, 1993). These instruments had already been validated for reliability by the National Heart Foundation and the Heart Research Centre. To test the validity of the questionnaire and the semi-structured interview on a different culture, a pilot study was first conducted to ascertain that the items contained in the questionnaire and semi-structured interview were interpreted correctly by a non English-speaking background population.

The questionnaire investigating physical and medical characteristics was utilised three times by the National Heart Foundation to assess cardiovascular risk factors of Australian participants in the 1980, 1983, 1989 surveys. The same questionnaire was also utilised in 1992 by the Heart Research Centre in the Rural Cardiovascular Risk Factor Survey conducted in northern Victoria.

The semi-structured interview instrument was utilised previously in the Study of Factory Women Workers in Melbourne conducted by the Heart Research Centre in 1994 which established the reliability of this instrument. By using the semi-structured interview, it was possible to increase the accuracy of the data generated by allowing the subjects and the interviewer the opportunity to clarify points of confusion. Consistency regarding the subject areas was maintained by using the interview format sheet. Similarly the utilisation of the objective score sheet used by the researchers of the Heart Research Centre in the Factory Women Study (1994) enabled a consistent approach for the interpretation and coding of the data. The score sheets used in the present study were also independently evaluated by researchers at the Heart Research Centre, in order to ascertain the validity of the scoring of the instrument by the investigator.

Every effort was made to minimize non-sampling and sampling errors in this study by first pilot-testing the questionnaires and semi-structured interviews and also by using only one researcher (the author) to collect and record the data. However, non sampling errors could have occurred as a result of respondents' inability to recall or provide accurate information, unwillingness to provide accurate information, or deliberate provision of incorrect information.

5.5   Pilot Project

The pilot project was conducted using a sample of six Australian-Lebanese before undertaking the major study to examine the applicability of the questionnaire on this ethnic group. The pilot study enabled appropriate changes to be made to the questionnaire. It also provided an opportunity to determine the appropriateness of the semi-structured interview in terms of its scope, length and clarity. Participants in the pilot project were not included as subjects in the main study.

Three female and three male Australian-Lebanese from Coburg, Brunswick and Doncaster were selected to participate in the pilot project. The participants were chosen from the different geographical areas and had varying degrees of educational levels, socioeconomic status and length of residency in Australia. They were also representative of the two main religions, Christian and Muslim.

Participants were initially contacted by telephone and were given the choice of being interviewed in their own home, workplace or at another nominated place. They were also requested to specify the language in which they preferred to receive the introductory letter, consent form, and questionnaire. These were posted to them two weeks prior to the agreed date of the visit. The participants were interviewed in their own homes after the researcher had obtained their written consent and had explained the procedures involved in the study.

It became apparent during the pilot study that only one participant had read the posted material about the study before the visit. The other five indicated that they believed that

the introductory telephone call gave them sufficient information about the study and that they preferred to discuss face to face with the researcher the content of the introductory letter and the interview process before commencing the interviews.

The introductory letter was discussed before the consent form was signed to ensure that all participants were well informed about the study. None of the six subjects attempted to answer the questionnaire prior to the scheduled visit by the researcher. The questionnaire was individually completed with each participant. This method was used in the main study.

Results of the pilot project identified the need for minor alterations to the questionnaire to make it more relevant and meaningful for this ethnic group. The questions that required modification were those dealing with religion, age and year of arrival in Australia. Most participants identified themselves as Christians or Muslims without giving great importance to the sect of their religion. Thus, the question concerning religion was modified to identify only those two main religions. A third option of 'other' religion was retained, rather than listing all the religious sects.

Both female and male subjects were reluctant to identify their exact age. It was more acceptable to them to identify the 5 year age group to which each subject belonged rather than their year of birth. The NHFRFP study categorised age in groups of five years and this method was also used in this study.

The question relating to the period of residency in Australia was slightly modified to indicate the actual date of arrival in Australia. Some subjects had difficulty

remembering the exact number of years they had spent in Australia but had no difficulty remembering the exact date of arrival to their new country. Each questionnaire took around 15-20 minutes to complete.

Following the questionnaire, physical measurements were taken on tiled or hard non-carpeted areas of the home (usually the kitchen or the laundry). It was virtually impossible to take physical measurements without the involvement of the other family members who found this part of the survey most interesting. Many of the subjects had some knowledge of their weight but most did not know their height, waist, and hip measurements. The physical measurements were completed within 15-20 minutes.

Following the physical measurement the semi-structured interview was conducted. The researcher explained the importance of audio-taping the semi-structured interviews in order to allow her to give her full attention to the discussion without the distraction of note-taking. Unfortunately, the presence of the tape recorder evoked many comments and created an inhibited atmosphere. All six subjects requested not to have the semi-structured interviews recorded. It was clear that the semi-structured interviews would not proceed if they were going to be tape-recorded. Despite all the researcher's efforts to explain the benefits of tape recording, the participants found this approach very distressing. They indicated they would be unable to relax and be themselves in the presence of the tape recorder. One participant stated that he felt threatened by its mere presence. Thus, this method was not followed during either the pilot or the main study. Closed and open-ended questions in the semi-structured interview did not require any modification. Participants were able to respond to these questions with no difficulty

and it was deemed that the questions were culturally acceptable and applicable. The interview time ranged between 45 and 75 minutes.

The pilot project was beneficial in identifying the time required to complete the questionnaire, physical measurements and the semi-structured interview with each subject. This information made it easier for the researcher to inform participants in her initial contact with them about the approximate time she would spend with each eligible member of the family. The pilot study also informed the researcher about the appropriateness of the questions or, where inappropriate, about how the questions relating to religion, age and date of arrival in Australia should be modified. Comments made by the participants in relation to the mailing of the written material and questionnaires were very valuable and proved to be economical as these were handed at the beginning of the visit instead of being posted two weeks earlier.

5.6   Main Study

5.6.1   Duration

The data collection phase of this survey extended for 18 months from June 1995-December1996.

5.6.2   Research Procedure

Each Lebanese household was contacted by telephone to establish the number of eligible family members in that household and their willingness to participate in the study. A brief overview of the study was provided over the telephone. Eighty nine households accepted the invitation to participate in the survey from which a sample of two hundred subjects was derived.

This favourable response was facilitated by arranging two on-air, twenty minute interviews with the researcher, during the Arabic program of the SBS radio in Melbourne. The first interview with the researcher was held after the Sunday morning Arabic news and the second a week later after the Sunday evening Arabic news. Hence, when contacted by telephone most of the Australian-Lebanese families already knew something about the study and were very receptive to taking part. Subjects were asked to identify an appropriate date and time for the visit. Almost all subjects wanted the interviews to be held in their own homes. In the initial telephone contact with the prospective participants, the researcher always asked whether participants would like her to post an introductory letter about the study beforehand and in which language they wanted this letter. The researcher was requested to post the written information in very

few cases. Nearly all participants were content to await her visit to hear further details about the study.

At each visit, the introductory letter outlining the purpose of the study was given to all participants to read. It was printed in both Arabic and English languages. Most subjects preferred to have the letter read out to them by the researcher who explained the procedures involved. All subjects were given the opportunity to ask questions to clarify the contents of the introductory letter. Subjects were also requested to read and sign the consent form which was written in simple language and printed in both Arabic and English. Approximately 90% of the participants chose to be interviewed in the Arabic language.

The questionnaires and the semi-structured interviews were then completed by the researcher during a face to face private interview with each participant. Two hundred participants responded to the questionnaire. However, since the semi-structured interviews were lengthy and only one person (the researcher) was collecting the data, it was decided, on the advice of the researcher's supervisor and a statistical consultant, that it was necessary to conduct the semi-structured interviews with only 100 subjects. This number was considered sufficient to allow important themes to emerge and for patterns to be identified concerning health behaviours, attitudes and barriers to the adoption of healthy behaviours. This decision facilitated completion of the data collection in good time.

The time spent in collecting data from each subject ranged from 35-40 minutes for individuals who participated only in the questionnaire and had their physical

measurements taken. Individuals who participated in the questionnaire, and the semi-structured interview and had their physical measurements taken required 75-80 minutes each.

5.7 Description of Variables

The predictor variables were those of age, gender, religion, level of education, income, and birth place/year of arrival to Australia. The outcome variables were physical activity, measured by amount of hours of the various physical activities per fortnight (number of session and hours), salt intake, fat intake, body mass index (BMI), tobacco smoking, self -reported cholesterol levels and blood pressure.

5.7.1 Age

Age was classified into three categories using the cumulative percentages of the frequencies for age. These cumulative percentages divided age into three groups using the 33rd percentile and the 67th percentile approximately as cut off points. The range of the first age group was 20 to 34 years, the second group were those aged 35 to 44 years and the third 45 to 69 years.

5.7.2 Religion

Two dominant religions were identified Christians and Muslims.

5.7.3 Income

The combined income of the husband and wife was considered as the family income. It was classified into two categories: low income (less than $41,000), and medium to high income ($41,001 and above). These two categories were chosen through the cumulative percentile of the frequencies for the family income category.

5.7.4 Level of Education

The attained level of education was categorized into three groups. The low education group were those with no formal education or primary education only. The second group were those who had secondary education or a trade qualification and the third group were those who had university or tertiary qualification.

5.7.5 Birth Place /Length of Residency in Australia

Length of stay in Australia determines the length of exposure to the Australian environment and lifestyle. The participants were divided into three groups, the first group being those born in Australia. The second group were those who arrived in Australia less than ten years, and the third group were those who arrived in Australia longer than ten years ago.

5.7.6 Physical Activity

The questionnaire investigated vigorous exercise, less vigorous exercise and other physical activities. Vigorous exercise included any sporting activities, such as football, running, gym exercises or tennis, that made a person breathe hard or puff

and pant. Less vigorous exercise was identified as activities that did not make a person breathe hard or puff and pant. Other physical activity referred to hours of gardening or housework that made a person breathe hard or puff and pant. The number of walking sessions and the time spent in each walking session were also investigated. Responses to all the above questions all referred to the two weeks prior to the interview. For the purpose of the statistical analyses and to conform to the National Heart Foundation protocol (NHF, 1990), participants were considered to have engaged in exercise if they walked at least 4 hours per fortnight, or engaged in several sessions of 20 minute duration of vigorous exercise with a total of 2 hours or more per fortnight, or engaged for 2 hours or more in housework activities or gardening that made them breathe hard or puff per fortnight, or if they engaged in 3 hours or more of less vigorous exercise per fortnight.

5.7.7 Salt Intake

Increased salt intake was defined as adding salt to already cooked food where salt had already been included in the cooking and/or preparation process.

5.7.8 Fat Intake

Increased fat intake was defined as 'always' eating fat on meat and fried foods.

5.7.9   Obesity

The classifications of acceptable weight, overweight and obesity were based on the recommendations and guidelines of the National Health and Medical Research Council (National Health and Medical Research Council, 1985).

The estimates are based on Quetelet's body mass index (BMI), which is calculated by dividing weight in kilograms by height in squared metres. The following criteria (NHF, 1990) were applied:

Table 5.1   Categories of Body Mass Index (BMI)

Descriptive term	BMI (Kg/m²)
Underweight	<20
Acceptable weight	20 to 25
Overweight	> 25 to 30
Obese	>30

5.7.10   Tobacco Smoking

The number of cigarettes smoked per day was identified rather than the packets of cigarettes smoked per day, since different brands of cigarettes have different number of cigarettes with some having 20, 25 cigarettes or 30 or more cigarettes per packet. Participants were classified as smokers, ex-smokers or non-smokers.

5.7.11   Cholesterol

Self-reported cholesterol levels were obtained from the participants since it was not feasible for the researcher to collect blood samples. Cholesterol levels of 5.5mmol/L were regarded as higher than desirable (NHFRFPS, 1990).

5.7.12   Blood Pressure

For the purpose of this study, all participants who were taking prescribed tablets for blood pressure and all those who had systolic blood pressure >160mmHg and diastolic blood pressure >95mmHg, were defined as "hypertensive' (NHF, 1990).

5.7.13   Alcohol Intake

Alcohol intake was identified by the frequency of drinking and the daily amount of alcohol consumed. Individuals who had more than three alcohol drinks per day were considered at risk. The 'at risk levels' have been assigned to categories by NHFRFPS (NHF, 1990) as follows:

Table 5.2   At risk categories of alcohol intake (NHF, 1990)

Category	Description	Risk for Men	Risk for Women
A	Non-drinkers	None	None
B	Average Intake of <3 drinks/day	None	Low
C	Average of 4 drinks or 9-12 drinks in any day	Low	Intermediate
D	Average daily intake of 5-8 drinks	Intermediate	High
E	Average daily intake of 9-12 drinks/day	High	Very high
F	Average daily intake of >12 drinks	Very high	Very high

5.8   Data Analysis

The Statistical Package for Social Sciences (SPSS 6.1) was utilised to analyse the data.

5.8.1   Significance Levels

Significance level was set at 5% unless otherwise specified.   The following symbols were adopted to indicate the probability values in the tables:

*****, p<0.0001*

****, p<0.001*

**, p<0.01

*, p<0.05

5.8.2   Abbreviations

N represents total sample size

n represents number of subjects in the various categories

ns represents not significant.

s represents sample standard deviation

$\bar{x}$ represents sample mean

5.9   Description of Data Analyses

5.9.1   Statistical Analyses I: Descriptive

To obtain baseline data of the Australian-Lebanese population in Melbourne, descriptive analyses were conducted including percentage breakdowns of predictor and outcome variables.

5.9.2   Statistical Analyses II: Inferential

Inferential statistical analyses were conducted to examine which demographic variables predicted the outcome variables. The variables were first examined for assumptions of normality, linearity and multicollinearity. All variables except BMI were non-normally distributed.

Univariate non-parametric tests were used to analyse the following outcome variables: physical activity (vigorous exercise, less vigorous exercise, walking, gardening/housework), number of cigarettes smoked per day; frequency of adding

salt to cooked food, eating fat on meat, number of alcoholic drinks consumed per day, systolic blood pressure, diastolic blood pressure, reported cholesterol levels, waist; and hip circumferences. All outcome variables were examined across gender, religion, age groups, income, education levels and birth/arrival categories.

Mann-Whitney U-tests were used to examine the categorical predictors of difference in all the categorical outcome variables. Kruskal-Wallis tests were utilised to examine the continuous predictors of difference in the categorical outcome variables.

Logistic regression analyses were first conducted on each of the outcome categories separately. To examine the strongest relationship between demographic variables and outcome categories, all outcome categories were entered together in multivariate analyses using forward multiple logistic regression. As recommended by Hosmer and Lemeshow (1989) when conducting forward stepwise logistic regression, the significance level (p) for inclusion of a variable into the multivariate model was increased to .15 to ensure the entry of variables with coefficients greater than zero.

Multivariate forward logistic regression analysis was also utilised to examine the association between demographic variables and the presence of a major risk factor. The presence of a major risk factor was defined as having one or more of the following risk factors: current smoker, hypertensive and having high cholesterol levels (>6.5mmol/L) (NHF, 1990).

Chi square tests were used to examine differences in responses among the demographic variables, health beliefs and attitudes on a number of variables which were all categorical.

5.10   Summary

This chapter described the sampling technique used, inclusion and exclusion criteria, ethical considerations, and research instruments. It also outlined the pilot project which ascertained the validity and reliability of the instruments used and the methods and techniques for taking physical measurements of the participants. It also provided a description of research methods, definitions of the variables, data analyses and levels of significance.

CHAPTER 6 CONTENTS

CHAPTER SIX

STATISTICAL ANALYSES I: DESCRIPTIVE ANALYSES

6.1 Introduction

Although there is considerable information about CVD risk factors among Anglo-Australians through the National Heart Foundation Risk Factor Prevalence Surveys (1980, 1983, & 1989), little is known about the Arabic speaking communities in Australia and, in particular the Australian- Lebanese population.

As previously stated, this cross-sectional study aimed to collect baseline data regarding CVD risk factors of the Australian-Lebanese in Melbourne. The present chapter outlines the geographic representativeness and sociodemographic characteristics of this population group, specifically their gender, religion, age, educational level, birthplace and length of residence in Australia, and describes the relationship of these attributes to their CVD risk factors. Employment characteristics and income are also reported, as are their attitudes, knowledge, health beliefs and health seeking behaviours together with their perceived barriers to engaging in healthy behaviours.

6.2 Part I: The Questionnaire

6.2.1 Description of Sociodemographic Characteristics

The study included 200 participants, 112 women and 88 men. The sample was obtained from seven catchment areas in Metropolitan Melbourne that are highly populated by Australian-Lebanese (ABS, 1991). As shown in Table 6.1, the largest number of subjects interviewed were from Broadmeadows and Brunswick.

Table 6.1   Geographic Representativeness (N=200)

Suburb	Men n=88	%	Women n=112	%
Broadmeadows	10	11	22	20
Brunswick	21	24	24	21
Coburg	13	15	15	14
Doncaster	11	12	11	10
Northcote	11	13	16	14
Preston	8	9	10	9
Templestowe	14	16	14	12

As seen in Table 6.2 below, 150 (75%) subjects were married, 39 (20%) were never married, 4 (2%) were separated and 7 (3%) were widowed. Most (86%) were born in Lebanon, 26 (13%) in Australia and 1 in Ghana. All subjects arrived in Australia between 1956 and 1994. The highest number of people immigrated between 1970-1979 and 1984-1991 during the civil war in Lebanon. One hundred and twenty eight (64%) of the subjects were Christians and 72 (36%) were Muslims.

A quarter (24%) of the participants had tertiary qualifications. Very few (4%) had trade qualification, 26 (13%) had completed high school, approximately a third (29%) had some secondary or high school education, and a quarter (24%) attended primary school. A few (6%) had never attended school.

Almost half of the participants 101 (50%) reported that they were employed either full time or part time. Twelve men reported that they were unemployed at the time of the study. Nineteen (9%) were retired, 10 (5%) were not retired but unable to work due to ill health, (29%) 57 women and one man were engaged in

home duties. Eleven participants, 4 (4%) men and 11 (10%) women, were full

time students and not working.

Table 6.2   Sociodemographic Characteristics (N=200)

	Men *n=88*	*%*	*Women* *n=112*	*%*
Age in years				
20-24	11	12	15	13
25-29	6	7	15	13
30-34	5	6	18	16
35-39	21	24	22	20
40-44	12	14	15	13
45-49	10	11	9	8
50-54	10	11	2	2
55-59	4	4	8	7
60-64	8	10	3	3
65-69	1	1	5	5
Marital status				
Married	74	84	76	67
Never married	13	15	26	23
Separated	1	1	3	4
Widowed	0	0	7	6
Country of birth				
Lebanon	77	88	96	86
Australia	10	11	16	14
Other	1	1	0	0
Religion				
Christian	56	64	72	65
Muslim	32	36	40	35
Educational level				
University/tertiary	23	26	25	22
Trade qualification	1	1	7	6
Year 12	13	15	13	12
Some high school	28	32	30	27
Primary school	22	25	25	22
Never attended school	1	1	12	11
Employment status				
Employed full time	46	52	32	28
Employed part time	9	10	14	13
Unemployed	12	14	0	0
Retired	12	14	7	6
Not in work force (due to ill health)	8	9	2	2
Home duties	1	1	57	51

6.2.1.1   Number of Dependents

All of the married couples had children living with them at home. Almost half (53%) of the sample (54 men and 51 women) had 1-4 children between the ages of 0-14 years of age. Five men and 4 women, had 5-6 children aged 0-14 years. Over a third (36%) of the sample, 34 men and 37 women had 1-4 children between the ages of 15-24 years. Only one couple had 5-6 children between the ages of 15-24 years. Four men and 4 women had children over the age of 24 years living with them, since it is customary and culturally appropriate for Middle Eastern ethnic groups to have unmarried adult children living at home until they get married. The 13 single men and 26 single women had no children. Three families had a widowed person living with them.

6.2.1.2   Occupational Status

Only 101 participants were employed either full time or part time. Occupational status was classified according to the Australian Bureau of Statistics Australian Standard Classification of Occupations (ASCO), Table 6.3 below, outlines the occupations held by the part-time and full-time employed participants in the study.

Table 6.3   Occupational Status

Occupational Status	Men n=55	%	Women n=46	%
1. Administrator/Own Business	21	38	10	22
2. Professionals	8	15	7	15
3. Paraprofessionals	0	0	7	15
4. Tradespersons	10	17	5	11
5. Clerks	2	3	6	13
6. Salespersons and personal service workers	4	8	4	9
7. Plant and machine operators and drivers	4	8	2	4
8. Labourers and related workers	6	11	5	11

6.2.1.3   Gross Yearly Income

As seen in Table 6.4, Almost half of the sample were on a gross yearly income of $0-$41,000 and the other half on a yearly income over $41,001

Table 6.4   Yearly Income

Yearly Income	Men n=88	%	Women n=112	%
$0-$41,000	33	37	59	53
>$41,001	55	63	53	47

6.2.2   Reported Medical Conditions

Table 6.5, outlines the responses to the question " Have you ever been told that you have any of the following?"

Table 6.5   Reported Medical Conditions

Medical Condition	Men n=88	%	Women n=112	%
Hypertension	2	2	6	5
Angina	2	2	2	2
Heart attack	5	5	0	0
High cholesterol	7	8	11	10
High triglycerides	3	3	0	0
Past diabetes	3	3	4	3
Past sugar in urine	3	3	3	3
Past stroke	0	0	0	0

6.2.3   Reported Blood Pressure

One hundred and three participants (52%), reported that their blood pressure had been measured within the last three months of the date of interview; 18 (9%) within the last six months, 42 (21%) within the last year, 21 (11%) within the last three years and 7 (3%) longer than three years ago. Eight (4%) had never had their blood pressure measured. One man did not know whether he ever had his blood pressure measured.

Eight (4%) subjects (2 men and 6 women) reported that they were told that they were hypertensive. Two hypertensive men and 4 hypertensive women were taking prescribed treatment tablets to lower their blood pressure. One hundred and ninety two subjects (96%) did not report having high blood pressure.

6.2.4   Reported Cholesterol Levels

Fifty three participants (26%) reported that they had their cholesterol measured within the last three months from the date of interview, 22 (11%) within the last six months, 30 (15%) within the last year, 12 (6%) three years before the date of

interview. Fifty six (28%) participants had never had their blood cholesterol measured and 7 (3%) participants, (2 men and 5 women) did not know whether their cholesterol had ever been measured.

Eighteen (9%) of the subjects, 7 (8%) of the men and 11 (10%) of the women reported being told that their cholesterol levels were of 6.5 mmol/L and above. Thirteen of those were in the oldest age group (45-69 years), 3 were in the middle aged group (35-44 years) and 2 were in the youngest age group (20-34). Three men and 3 women were receiving prescribed treatment tablets to lower their cholesterol levels.

6.2.5 Reported Diabetes

Of the 200 subjects, 7(3%) participants (3 men and 4 women) reported having diabetes and were following dietary advice. Three men and 3 women reported having sugar in their urine. One man and 2 women were on treatment tablets for diabetes, none were taking insulin injections.

6.2.6 Tobacco Smoking

Sixty seven (33%) subjects (39 (44%) men and 28 (25%) women) were current smokers. Twenty three men and 13 women started smoking between the ages of 15-19 years. Four men started smoking below the age of 15 years. Twenty one female smokers started smoking at the age of 20 years.

None of the participants smoked the pipe, cigar or rolled cigarettes. One man and one woman smoked the 'hubble-bubble' once a day. Nine men and 12 women

changed to low tar cigarettes between the years 1980 to 1994. Smoking was more

common among younger women aged below 44 years.   Forty two smokers

(63.5%) were between the ages of 20-44 and 25 (36.5%) were between the ages of

44-69 (refer to Tables 6.6, 6.7, 6.8).

Table 6. 6   Cigarette Smoking Status (N=200)

Smoking Behaviour	Men n=88	%	Women n=112	%
Current	39	44.3	28	25
Former	6	6.8	4	3.5
Never Smoked	43	48.8	80	71.4

Table 6.7   Number of Cigarettes Smoked per Day (N = 67)

Number of cigarettes Smoked/day	Men n=39	%	Women n=28	%
Light <10	5	12.8	8	28.5
Moderate 10-19	5	12.8	9	32.1
Heavy =20	29	74.3	11	39.2

Table 6. 8   Age of Current Smokers (N=67)

Age in Years	Men n=39	%	Women n=28	%
<44 years	21	53.8	21	75
>44	18	46.1	7	25

6.2.7   Physical Activity

The subjects were asked to report the number of sessions of physical activity they engaged in during the fortnight preceding the interview, as well as the duration spent on these physical activities. Results are in Table 6.9.

Seventy four (84%) men and 102 (91%) women did not engage in any vigorous activity. Fourteen men and 10 women from the younger age groups (20-34) and (35-44) and only one man in the oldest age group (60-64 years) reported engaging in vigorous exercise during the fortnight preceding the interview. Twelve men and 14 women reported engaging in less vigorous activity and they were in the youngest age group.

Fifty nine men (68%) and 72 women (64%) did not perform housework or gardening activities that made them 'breathe hard' or 'puff and pant' two weeks prior to the interview.

Sixty nine (79%) men and 75 (67%) women did not walk in the two weeks prior to the interviews. Only 9 men and 8 women reported walking for less than 2 hours, 7 men and 9 women reported walking for 3-4 hours and 2 men and 5 women reported walking for 5-6 hours, 1 man and 13 women reported walking for 7-8 hours and two women and not a single man reported walking for more than nine hours two weeks prior to the interviews

Table 6.9   Hours of Physical Activity

Activity	Men n=88	%	Women n=112	%
Vigorous Exercise/Sport				
none	74	84	102	91
<2 hours	4	4	2	2
3-4 hours	3	4	4	3
5-8 hours	4	5	3	3
>9 hours	3	3	1	1
Less Vigorous Activity				
none	76	86	96	86
<2 hours	4	4.5	5	4
3-4 hours	3	3.4	5	4
5-8 hours	1	1.1	3	3
>9 hours	4	4.5	3	3
Vigorous Housework/Gardening				
none	59	68	72	64
<2 hours	9	10	8	7
3-4 hours	12	13	14	12
5-8 hours	8	9	16	14
>9 hours	0	0	2	2
Walking				
none	69	79	75	67
<2 hours	9	10	8	7
3-4 hours	7	8	9	4
5-8 hours	3	3	18	16
>9 hours	0	0	2	2

6.2.8   Use of Oral Contraceptives

Oral contraceptives were introduced to Australia in 1960. Thirty eight (33%) of

the women aged between 20-59 years reported having taken the pill at some time.

Thirty five of these women were currently aged between 20-49 years. Of the

women who had taken oral contraceptives, 12 (31.5%) had done so for longer

than five years, and 6 (5.3%) for less than six months. The proportion of users of

oral contraception decreased with age. Twenty one (18%) of the women aged
between 25-44 years were current users of the pill.

6.3   Dietary Habits

6.3.1   Types of Diets

A high proportion of both men (96%) and women (92%) reported that they did
not follow any special diet. Muslims reported following Islamic rules eating only
Halal meat and not consuming forbidden pork products. A low fat diet was
claimed to be followed by one man and two women. A diabetic diet was followed
by one man and one woman, who were both in the oldest age group (65-69 years).
Five women (3 aged between 20-24 years, 1 aged Between 25-29 years and one
aged between 30-34 years) reported following a weight reduction diet. One man
aged 30-34 years and 2 women aged between 35-39years reported being
vegetarian.

6.3.2   Consumption of Dietary Fat

Fifty four (61%) men and 77 (68%) women rarely ate fat on meat. Twenty seven
(30%) of the men and 30 (26%) of the women indicated that they 'sometimes' ate
fat on meat and only 7 (8%) of the men and 5 (4%) of the women indicated that
they 'always' ate fat on meat. Those who ate fat on meat were in the youngest
(20-34 years) and the oldest (45-69 years) age groups.

6.3.3   Consumption of Milk and Dairy Products

As seen in Table 6.10, the consumption of milk and milk products appeared very low in this population group. Most of the subjects reported drinking Lebanese coffee which is taken without milk. Very few reported eating cereal in the morning with milk as it is not a traditional Lebanese breakfast. Very few reported eating 1-2 scoops of ice-cream. Cream was consumed rarely and by many, less than once a year.

Table 6.10   Consumption of Milk and Dairy Products

Consumption of milk and dairy products	Men n=88	%	Women n=112	%
Litre(s)/week of full cream milk				
0 litres	44	50	82	73
1 litre	20	22	20	18
2-3 litres	23	26	8	7
= 4 litres	1	1	2	2
Litres/week of skim milk				
0 litres	85	96	101	90
1 litre	3	4	8	7
2-3 litres	0	0	2	2
= 4 litres	0	0	1	1
Small carton of yoghurt/week				
0 cartons	67	76	84	75
1 small carton/week	21	24	28	25
Scoops of ice-cream/week				
0 scoops	83	95	100	90
1-2 scoops/week	5	5	12	10

6.3.4   Use of Salt

At all ages adding salt to food was not very common among both sexes, with 70 (80%) of the men and 96 (86%) of the women reporting that they rarely or never added salt to cooked food. Eighteen (20%) men and 16 (14%) women reported

adding salt to cooked food. The men and women who added salt to their cooked

food were mostly in the younger age groups.

Figure 6.1   Adding Salt to Cooked Food

Women

Men
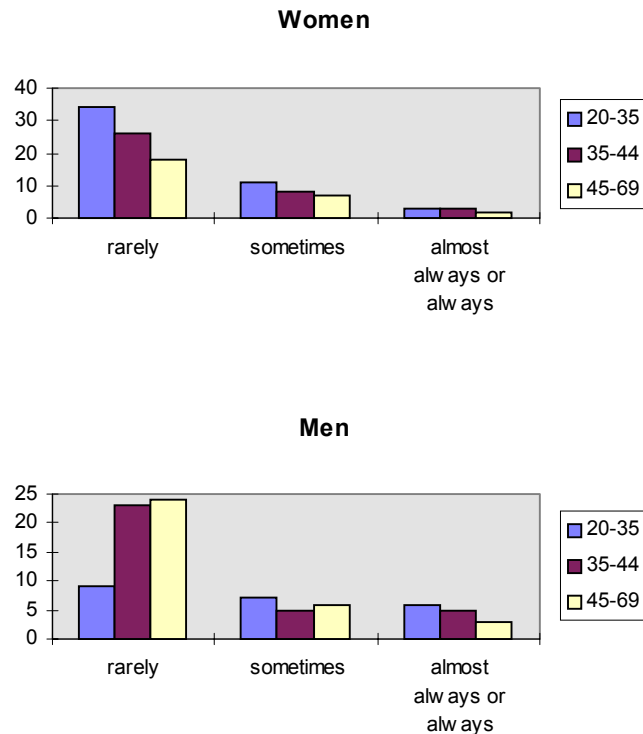
6.3.5   Consumption of Alcoholic Drinks

More than half of the sample (43 (48%) men and 77 (68%) women) did not

consume alcoholic drinks. The proportion of occasional drinkers of both sexes

was highest between the ages of 35-44 years. Thirty three (37%) of the men and

32 (36%) of the women were occasional drinkers, drinking one alcoholic drink or

less each week. Seven (8%) men and 2 (1%) women said they drank one glass of

wine on one or two days each week. Most of the Muslim men and women

reported not drinking at all, as it is against their religious beliefs and practices.

6.4 Part II: Physical Measurements

6.4.1 Blood Pressure

Although only 8 (4%) participants (2 men and 4 women) reported being told that they were hypertensive, when blood pressure was measured 24 (12%) of the participants (16 men and 8 women) were found to be hypertensive, thus, 16 had undetected hypertension. Nineteen (10%) participants were in the oldest age group (45-69 years), 4 were in the middle aged group (35-44 years) and 1 was in the youngest age group (20-34 years).

6.4.2 Actual Height and Weight

Measurements revealed that the mean height for men was 1.72 cm and the mean height for women was 1.57cm. The mean weight for men was 81.97 kilograms and the mean weight for women was 68.75 kilograms.

6.4.3 Perceived Height and Weight

Nineteen (21.5%) men and fifty one (45.5%) women did not know their height. Further, 10 (11.3%) men and 11 (9.5%) women did not know their weight. When perceived height of the remaining participants was compared with actual height, the difference was minimal (on average around 1.2 cm). Interestingly however, when the perceived weight was compared with actual weight, there was a remarkable difference in weight, ranging between 1-12 kilograms.

6.4.4 Body Mass Index (BMI)

Table 6.11 sets out the classification of BMI of the participants. As shown, (3%) of the total sample (2 men and 3 women) between the ages of 20-34 years were

underweight. The prevalence of overweight increased with age for both sexes and was more common among men (48%) than women (38%). On the other hand obesity was more prevalent among women (37%) than men (21%). The average BMI was 27.8 for women and 27.7 for men.

Table 6.11   Body Mass Index

BMI(Kg/ m²)	Men n=88	%	Women n=112	%
Underweight BMI<20	2	2	3	3
Acceptable weight BMI = 20-25	23	26	34	30
Overweight BMI >25	42	48	38	34
Obese BMI> 30	21	24	37	33

6.4.5   Waist and Hip Circumference

Mean waist circumference was 112 cm for men and 105 cm for women. The hip measurements averaged 121 cm for men and 111 cm for women. These measurements where much higher than the NHF RFPS results where the average waist circumference was 89 cm for men and 76 cm for women. The hip measurement average was 100 cm for both men and women.

6.5   Part III: Description of the Semi-Structured Interviews

As explained previously, the semi-structured interview constituted the third part of the study, and included only 100 subjects (38 men and 62 women). It explored the participants' perceived health status, medical history, health attitudes and beliefs, knowledge of CVD risk factors, health behaviours and barriers to healthy lifestyles.

It also elicited information on the usual dietary intake of participants in relation to fruits, vegetables, intake of foods rich in cholesterol such as fried foods and diary

products (butter, margarine and cheese) and eggs. It requested information in recent

changes in dietary habits, intentions to change and aids to change food habits.

6.5.1   Perceived Health Status

There was a significant difference between genders in perceptions of their own

health. Almost half of the men, 17 (45%) considered their health as "excellent"

while only 4 (6%) of the women did so. Forty seven (76%) women and 20 (52%)

men described their current health as "good".   Eight (13%) of the women

considered their health as "fair" and 1 as not good, while (3%), 2 women and 1

man considered themselves to be in "poor" health.

Table 6. 12   Perceived Health Status (N=100)

Perceived Health	*Men n=38*	*%*	*Women n=62*	*%*
Excellent	17	45	4	6
Good	20	52	47	76
Fair	0	0	8	13
Not Good	0	0	1	1
Poor	1	2.5	2	3

6.5.2 Reported Medical History

Medical history was assessed by self-report. Questions were asked about previous illnesses, accidents and operations, the number of visits to the family doctor in the past 12 months and utilisation of health services provided by other health professionals such as nurses, occupational therapists and chiropractors.

Reported medical history for most of the population (31 men (82%) and 54 women (87%))was "good". Six (16%) men and 8 (13%) women reported that they have a "satisfactory" medical history. One man reported having a "poor" medical history due to several hospital admissions for various medical problems.

6.5.3 Effects of Employment on Health

More than half (54%) of the sample {14 (37%) of the men and 40 (65%)} of the women) reported that they were not working. Almost one third of the sample (34%) (18 men and 16 women), stated that their jobs had a good effect on their health. Twelve percent (6 men and 6 women) stated that their jobs had a bad effect on their health, because they were not working in their specialty areas since their educational qualifications were not accepted in Australia.

6.5.4 Knowledge of Blood Pressure

Knowledge of blood pressure was generally deficient among most of the participants. Only 2 (2%) had "good" knowledge and were able to describe blood pressure. One was a medical doctor and the other a nurse. Twenty one percent had "satisfactory" knowledge, being able to describe more signs and symptoms of elevated blood pressure. Responses included the following: "if a person's blood

pressure goes up, it can cause stroke", and "blood pressure should always be in normal range or it will cause dizziness and headaches".

Three quarters (77%) of the sample gave "poor" responses and were not able to describe blood pressure at all. Some of the respondents gave replies such as "blood pressure comes from anger", or "blood pressure means there is too much blood in the body" or "when you worry a lot you feel high blood pressure".

6.5.5   Knowledge of Contribution of High Blood Pressure to Disease

When participants were asked whether blood pressure causes or contributes to any diseases or health problems, 28 (28%) gave "good" responses such as "it can cause stroke", or "it can lead to heart attacks" or "it can cause haemorrhage in the brain". Forty (40%) gave "satisfactory" responses such as "it can cause severe headaches" and "it can cause dizziness". Thirty (30%) gave poor responses indicating that they had no knowledge of any diseases caused by high blood pressure.

6.5.6   Knowledge of Cholesterol

Nearly three quarters of the participants (76%) (29 men and 47 women), were found to have "good" knowledge of what cholesterol was. Examples of good responses included the following: "accumulation of fat in the blood vessels" and "high percentage of fat in the blood that might block the blood vessels". Some were able to differentiate between "good" cholesterol and "bad" cholesterol and the food sources that contribute to 'bad cholesterol". Less than one fifth (18%) of the participants gave "poor' responses. Examples of poor responses included "too

much fat in the stomach" or "the liver does not work properly". However, only 2% provided wrong answers and 3% could not respond at all to the question.

6.5.7   Knowledge of Contribution of High Cholesterol to Disease

The participants were asked whether a high level of cholesterol contributed to any illness or disease. Only 22 (22%) had a "good" knowledge of the relationship between high cholesterol levels and disease and gave "good" answers, such as " high cholesterol causes heart disease" and "high cholesterol blocks the arteries of the heart causing heart disease". Almost half of the men and women (54%) had "satisfactory" knowledge, and 22% had "poor" knowledge or no knowledge at all.

6.5.8   Attitudes Towards Smoking Cessation

Twenty two (58%) men and 19 (31%) women who responded to the semi-structured interview were smokers. Three men and 2 women stated that their smoking decreased in the last year. One man said that his smoking increased in the last year because he was going through very stressful times. Fifteen men and 16 women reported no change in their smoking habits.

When smokers were asked whether they were contemplating taking action to cease smoking, 8 (36%) men and 8 (42%) women said they had not considered quitting. However, 14 (64%) men and 11 (58 %) women reported that they were contemplating action to cease smoking. Only one man had reported taking previous action and quit for a period lasting only for three months.

6.5.9   Perceived Effect of Smoking on Health

As shown in Table 6.13 below, 11 (50%) men and 11 (58%) women who smoked believed that smoking was bad for their health. The other half of the smokers, 11 (50%) men and 8 (42%) women were convinced that smoking was not harmful to their health.

Table 6.13   Perceived Effects of Smoking on Health of Smokers (N=41)

Effects of Smoking on Health	Men n=22	Women n=19
Harmful	11	11
Not Harmful	11	8

6.5.10   Confidence in Ability to Stop Smoking

As shown in Table 6.14, one third of the smokers were "very confident" in their ability to stop smoking and two thirds were not. Interestingly, women of 35 years and older stated that they were "very confident" in their ability to stop smoking while younger women (20-34 years) were "uncertain" and "not confident" in their ability to stop smoking.

Table 6.14   Confidence in Ability to Stop Smoking (N=41)

Confidence Levels	Men n=22	%	Women n=19	%
Very confident	8	36	7	37
Uncertain	2	10	1	5
Not very confident	6	27	3	16
Not at all confident	6	27	8	42

6.5.11   Perceived Barriers to Stopping Smoking

Smokers were asked to identify barriers to stopping smoking. The most common barriers to stopping smoking were, enjoyment of the habit, addiction to smoking and life being too stressful. Participants from both sexes from the youngest age group (20-34 years) identified the pressure of smokers around them as a barrier to quit smoking. Table 6.15 below lists the identified barriers.

Table 6. 15   Barriers to Stopping Smoking (N=41)

Barriers to Stopping Smoking	Men n=22	%	Women n=19	%
Enjoyment	4	18	8	42
Life too stressful	6	27	4	21
Addiction	3	14	3	15
No desire to stop	3	14	0	0
Belief smoking is harmless	4	18	0	0
Fear of weight gain	0	0	2	11
Smokers around	2	9	2	11

6.5.12   Aids to Stopping Smoking

Smokers were asked to identify what would assist them in their efforts to stop smoking. Table 6.16 lists the factors which the smokers identified to help them quit smoking.

Table 6.16   Aids to Stopping Smoking (N=41)

Aids to Stopping Smoking	Men n=22	%	Women n=19	%
Will Power	17	77	12	63
Advice form the Doctor	6	27	7	37
Bans at Work	1	5	1	5
Partner/family support	0	0	1	5
Work Site programs	0	0	1	5
Written material	0	0	0	0

Most smokers considered personal motivation or willpower to be the major aid in stopping smoking. Advice from their doctor was thought to be another useful aid to stop smoking. Two people identified bans at work to be helpful in quitting smoking, and only one person mentioned work-site programs. Written material was not seen to be a useful aid to stop smoking by any of the smokers.

6.5.13 Knowledge of Conditions or Diseases Caused by Smoking

Table 6.17 sets out the identified diseases and conditions caused by smoking. Most of the men and women believed that smoking causes lung cancer, heart disease, emphysema and bronchitis. Around a third of the subjects knew that smoking causes stroke. Not many were aware of the adverse effects of smoking on the skin.

Table 6.17   Diseases or Conditions Caused by Smoking (N=100)

Disease or condition caused by smoking	Men n=38	%	Women n=62	%
Lung cancer	37	97	56	90
Heart disease	35	92	57	92
Emphysema	17	45	27	43
Bronchitis	22	58	34	55
Thrombosis	7	18	14	23
Stroke	11	29	21	34
Skin complaints	5	13	2	3

6.5.14 Attitudes Towards Leisure Activity

Of the 100 participants interviewed 30% (14 men and 16 women) reported engaging in one sort of physical exercise. Thirty six percent (14 men and 22 women) did not exercise at all, (17%) (8 men and 12 women) were contemplating starting some kind of physical activity and 17% did not express any interest in attempting to be physically active.

When questioned about their confidence levels to increase their physical activity, 59% stated that they were confident while 41% lacked any confidence.

6.5.15   Perceived Barriers to Physical Activity

Lack of time attributed to work and family commitments, fatigue and laziness were perceived as barriers to physical activity as shown in Table 6.18 below.

Some of the comments made in relation to barriers to exercise were, "I am always tired", and " when I have a minute to myself I would rather rest than go for a walk" and others, mainly men, believed that they are undertaking enough exercise on the job that when they come home they would rather rest.

Health problems were cited by 6% (2 men and 4 women) as a barrier to exercise. Dislike of exercise and dislike to exercise alone were two other factors that were identified. Six subjects complained that joint and muscle pain prevented them from exercising, and 7 found physical exercise as boring and 6 women stated that it was such an effort to organize the children and their households in order to be able to engage in physical activity.

Table 6.18   Perceived Barriers to Physical Activity (N=100)

Barriers to exercise	Men n=38	%	Women n=62	%
No time	13	34	21	34
Fatigue and laziness	8	21	19	31
Dislike to exercise alone	4	11	3	5
No place to leave the children	0	0	6	10
Health problems	2	5	4	6
Exercise is boring	3	8	3	5
Joint or muscle pain	4	10	2	3
Expence of exercise	1	1	0	0

6.5.16   Belief Inactivity Causes Heart Disease and Stroke

Forty one per cent of this sample, {14 (37%) men and 27 (44%)} women mentioned that they believed inactivity causes heart disease. Eighteen percent of the sample mentioned that inactivity causes stroke. The rest of the participants did not seem to relate physical inactivity to any diseases of the cardiovascular system.

6.5.17   Attitudes Towards Reduction of Alcohol Consumption

Only two men mentioned attempting to reduce their drinking habits in the past two years. Three men stated their desire to stop drinking, and 2 men stated that advice from their doctors would help them reduce their drinking. The rest of the subjects did not believe that their drinking habits warranted any change, since they were occasional drinkers only and regarded their alcohol intake as modest.

6.5.18   Dietary Habits

Dietary habits were assessed by requesting participants to describe usual daily diets. Food frequency consumption of fruits, vegetables, fried foods, eggs and

cheese, were assessed by a scale of: "once/day, 3 times/day, 1-2 times/week, several times/week, and once/week" Preference to low or high fat and sugar products was also requested. The frequency of using oil, butter, margarine and lard in cooking.

6.5.19   Frequency of Consumption of Different Foods

As seen in Table 6.19, fresh fruits and vegetables were eaten once or more per day by more than three quarters (83%)of the subjects. A high proportion (91%) stated that they had fried foods once or twice per week or even less often. Fifty (50%) subjects stated that they had eggs once per week and about half (50%) said they had cheese once per day.

Table 6. 19   Frequency of Consumption of Food Groups

Foods	>3times/ day	Daily	Several times/ week	1-2 times /week	once/week
Fresh Fruit	39	44	4	8	5
Vegetables	37	41	4	15	3
Fried Foods	1	3	4	42	50
Eggs	0	7	5	33	59
Cheese	7	48	4	20	21

Ninety seven percent said that they used olive oil almost daily, 76% used vegetable oil for cooking, 48% consumed margarine and butter, 13% used lard. The use of lard in cooking was more common among Muslim women. Forty three per cent stated that they had a preference for low fat products and 21% had a preference for low sugar products.

6.5.20   Attitudes Towards Changing Food Habits

The majority of the women in the sample made the decisions about family meals with only 7 (8%) men stating that they made the decisions about family meals. The women in general stated that they cooked what they thought their children and husbands would like to eat.

Eighty nine (89%) subjects considered that they already have excellent dietary habits and believed that Lebanese food is very healthy and had no intention to change. 2% were taking active steps towards improving their food habits, 4% were contemplating doing so, and 5% had improved their food habits and were planning to continue doing so. Table 6.20 summarises the responses to the question, 'What do you think will help to change someone's food habits?"

Table 6.20   Aids to Change Food Habits

Aids to change food habits	Men n=38	%	Women n=62	%
More information	12	32	23	37
Advice from health professionals	10	26	22	35
Support from partner	3	8	3	5
More time	2	5	2	3
Changes at work	2	5	2	3
Willpower/Self discipline	20	52	26	42

6.5.21   Knowledge of the Meaning of Heart Disease

In response to the question "Do you know what heart disease is?" Almost a quarter of the subjects gave "good" responses such as "a blockage in the arteries of the heart that won't allow the blood to pass" and "people born with a hole in the heart". Almost half of the subjects gave "satisfactory" answers such as "heart is not pumping well the blood to the body" or "persons with heart disease need bypass surgery", or "people with an enlarged heart" while a quarter of the subjects

gave "poor" responses. The following are examples of poor knowledge: "disease

in the heart" or a "virus in heart" or "when the blood is thin" (refer to Table 6.21).

Table 6.21   Knowledge of Heart Disease

Knowledge of Heart Disease	Men n=38	%	Women n=62	%
Good	10	26	12	20
Satisfactory	18	48	38	60
Poor	10	26	12	20

6.5.22   Knowledge of the Functions of the Heart

As shown in Table 6.22, 17% of the responses reflected "good" knowledge of the

heart's function. Sixty one per cent gave "satisfactory" responses and 22% of the

responses were "poor".

Table 6.22   Knowledge of the Functions of the Heart

Functions of the Heart	Men n=38	%	Women n=62	%
Good	8	21	9	14.5
Satisfactory	26	68.5	35	56.5
Poor	4	10.5	18	29

6.5.23   Causal Factors for Heart Disease

An open-ended question "What do you think causes heart disease?" was asked to

investigate knowledge of the causes of heart disease. The answers were grouped

into three categories ; life style factors, constitutional factors and stress factors.

As seen in Table 6.23, most of the participants nominated smoking, high

cholesterol, physical inactivity and overweight as causal factors.   A most

commonly cited cause, was stress either at work (88%) or at home (81%).

Examples of their responses included "very anxious persons" "people on the run" or people "who worry all the time" were at risk of developing heart disease.

Table 6.23   Factors Causing Heart Disease

Factors causing heart disease	Men n=38	%	Women n=62	%
Life Style Factors				
Smoking	34	89	59	95
High Cholesterol	33	87	53	85
Overweight	27	71	46	74
Alcohol Intake	16	42	27	44
Immoderation	2	5	5	8
Physical Exertion	7	18	9	15
Physical Inactivity	20	52	27	43
Unfitness	9	24	10	16
Constitutional Factors				
High Blood Pressure	18	47	27	43
Heredity	20	53	27	43
Old Age	4	10	4	6
Diabetes	4	10	6	10
Stress				
At Work	33	87	55	88
At Home	30	79	51	82
Personality	25	66	39	63

6.5.24   Prevention of Heart Disease

An open-ended question was asked about the participants' beliefs of what helps to prevent the development of heart disease. The majority of the subjects believed that a healthy diet, exercise, stress reduction and quitting smoking prevent heart disease. Interestingly many of the participants had a fatalistic view and believed that "it is all in the hands of God", and "no one can stop heart disease from occurring, no matter what humans try to do". The responses are presented in Table 6.24.

Thirty one percent believed that it was likely that they would develop heart disease in the future, while 46% were uncertain and 22% thought it was unlikely.

Table 6.24   Aids to Prevent Heart Disease

Prevention of heart disease	Men n=38	%	Women n=62	%
Healthy diet	21	55	38	61
Nothing can prevent heart disease	28	74	25	40
Regular exercise	17	45	26	42
Reducing stress	8	21	17	27
Quitting smoking	10	26	15	24
Weight control	5	13	8	13
Moderation in life	0	0	2	3
Medical advice	0	0	1	1

6.5.25   Knowledge of the Relationship Between Overweight and Disease

One fourth (24%) of the sample identified a relationship between obesity and disease and gave "good" responses by naming more than four diseases that could be caused by overweight or obesity. Fifty nine percent gave "satisfactory" responses by naming at least two relevant diseases. Fifteen percent gave "poor" responses.

6.5.26   Sources of Health Knowledge

When asked "Where do you get your health information from?", almost half of the participants stated from family doctor, friends and family, magazines and newspapers, and the Arabic radio programs and the television. There were few individuals who also mentioned books and general knowledge as a source of health information under the category of 'other'. These responses are presented in Table 6.25 below.

Table 6.25   Sources of Health Information

Sources of health information	Men n=38	%	Women n=62	%
Family doctor	16	42	36	58
Family members and friends	20	52	33	53
Magazines	19	50	25	40
Newspapers	16	42	20	32
Arabic radio program	19	50	31	50
Television	20	52	25	40
Other	15	39	17	27

6.5.27 Encouragement to Take Part in Health Activities

When asked 'Why do you think people take part in health activities?', 33 men and 54 women said that "it is useful to keep healthy and in good form", 28 men and 48 women said that their children motivated them to take part in health activities in order to "to keep fit and live longer and see them grow up". When asked if they would attend health programs 15 men and 13 women responded positively, while 22 men and 49 women responded negatively. When asked 'why do they believe some people do not attend health programs?', the responses were varied. Twenty three men and 38 women said 'lack of motivation', 4 men and 9 women said 'no time', 2 men and 1 woman stated that 'it could be related to language problems', and others stated that it could be due to 'lack of understanding and awareness by some of the importance of physical activity to keep healthy'.

When participants were asked about their thoughts of where health activities should take place, 5 men and 4 women said the workplace, 7 men and 9 women said the community, and 24 men and 46 women said at both the workplace and the community.

6.6 Summary

This chapter reported the results of the survey using descriptive analyses and percentages for demographic and physical characteristics, life style factors, and health and associated behaviours and attitudes of the sample.

These results showed that 12% of this sample were hypertensive, two thirds of the sample had their cholesterol levels checked 10% of them reported being told that they had high cholesterol levels (one third reported that they had never checked their cholesterol levels), 33% of the sample were smokers. Half of the participants were overweight and a quarter obese and most participants were not physically active.

Chapter Seven will provide the results of the inferential statistical analyses of CVD risk factors in this sample.

CHAPTER 7 CONTENTS

CHAPTER SEVEN

STATISTICAL ANALYSIS II: INFERENTIAL ANALYSES

7.1 Introduction

Studies have shown that differences in cardiovascular risk factors are explained predominantly by differences in socio-demographic characteristics of the population being studied. In particular, an increased risk of cardiovascular disease has been found in those who are less educated and in those from lower socio-economic groups (Dobson, et al, 1985). The main objectives of this chapter are to describe the methods of analysis used to show differences in cardiovascular risk factors in this sample of Australian-Lebanese adults and to identify high-risk groups according to the demographic characteristics of the study population. The established cardiovascular risk factors of high blood pressure, low physical activity levels, prevalence of cigarette smoking, overweight and obesity, high dietary intake of salt and fat, and consumption of alcoholic beverages are examined in this population according to gender, religion, age, education, income and birth place/arrival in Australia, using a range of statistical analyses.

7.2 Univariate Analyses

7.2.1 Blood Pressure

The Mann-Whitney U tests revealed significant differences between males and females in systolic ($z = -3.37$, $p < .001$) blood pressure and in diastolic ($z = -3.47$, $p < .001$) blood pressure. The males had higher systolic and diastolic blood pressure levels than females. However, there were no significant differences in systolic and diastolic blood pressure according to religion and income.

The Kruskal-Wallis analyses revealed significant differences in systolic blood pressure (χ^2(2,198) =35.16, p <.0001) and diastolic blood pressure (χ^2(2,198) =31.35, p <.0001) across the three age groups. The oldest age group (45-69 years) had the highest levels of both systolic and diastolic blood pressure levels followed by the middle aged group (35-44 years) and the youngest age group (20-34 years) had the lowest levels.

The participants with no formal education or with primary education only had the highest systolic blood pressure levels. However, there were no significant differences in diastolic blood pressure (χ^2(2,198) = 2.98, ns) among the three educational groups.

Among the birth/arrival categories those who resided in Australia longer than ten years had the highest systolic ($\bar{x}$ =127.79; s = 16.32) and diastolic ($\bar{x}$ = 81.32; s = 10.12) blood pressure levels.

7.2.2   Cigarette Smoking

The Mann-Whitney U-test analyses revealed that there were significant differences between males and females in the number of cigarettes smoked per day (z = -3.20, p < .01) with males ($\bar{x}$ = 42.86, s = 25.64) smoking more than females ($\bar{x}$ = 16.00, s =8.41). However, the analyses revealed that that there were no significant differences in the number of cigarettes smoked per day between Christians and Muslims (z = .5044, p> .01) and low ($0-41,000) and medium to high ($41,001 and above) income earners (z = -.08, p> .01).

The Kruskal-Wallis analyses indicated no significant differences in the number of cigarettes smoked per day across the three age groups, the three educational levels, and in the birth/arrival categories.

7.2.3   Physical Activity

The Mann-Whitney U-test was applied to compare the amount and duration of all types of physical activity (categorised as vigorous, less vigorous, walking and gardening /housework) per fortnight.   The analyses indicated that there were significant differences in the number of hours of vigorous physical activity and less vigorous activity between Christians and Muslim $(p<0.05)$, with Christians engaging more than the Muslims in these type of activities.

No significant differences were found between males and females, nor between low ($0-41,000) and medium to high ($41,001 and above) income earners. There were also no significant differences between Christians and Muslims in the number of walking sessions (z =   -0.54, *ns)* nor in the number of hours spent doing gardening or housework (z =   -0.54, *ns)*. These findings are presented in Table 7.1 below.

Table 7.1   **Mann-Whitney U-tests of Comparison Between Males and Females, Christians and Muslims, Low and Medium-High Family Income on Physical Activity Levels (N=200)**

Activity	Male	Female	z-value, p	Christian	Muslim	z-value, p	Low income	Medium - High Income	z-value, p
	(n = 88) Mean Rank	(n = 112) Mean Rank		(n = 128) Mean Rank	(n = 72) Mean Rank		(n = 92) Mean Rank	(n = 108) Mean Rank	
Vigorous Activity *(hrs per fortnight)*	104.26	97.54	-1.50, n.s.	104.33	93.54	-2.32, .020	103.79	97.69	-1.37, n.s.
Less vigorous *(hrs per fortnight)*	100.59	100.43	-0.03, n.s.	104.43	93.36	-2.25-, .024	100.39	100.59	-0.04, n.s.
Walking (sessions per fortnight)	94.07	105.55	-1.57, .n.s.	101.95	97.87	-0.54, n.s	106.92	95.03	-1.62, n.s.
Gardening/ Housework *(hrs per Fortnight)*	98.95	101.72	-0.49, n.s.	99.39	102.51	-0.54, n.s.	101.86	99.34	-.044, n.s.

Using the non-parametric Kruskal-Wallis test the analyses indicated that there were significant differences ($p < .001$) on the levels of vigorous and less vigorous exercises across the three age groups, with the youngest age group engaging most in vigorous and less vigorous activities per fortnight and the oldest age group the least. There were also significant differences among the three age groups in walking with the youngest age group (20-34 years) walking the most ($\bar{x} = 4.47$, $s = 5.56$), followed by the oldest age group (45-69 years) ($\bar{x} = 3.38$, $s = 5.25$) and interestingly the middle-aged group (35-44 years; $\bar{x} = 3.27$, $s = 7.16$) walked the least.

When comparisons of levels of physical activity were conducted on educational categories there were significant differences in the vigorous activity, (χ^2(2,198) = 10.80, $p < .01$), favouring those with tertiary or university education.

The Kruskal-Wallis tests of comparison also indicated that there was a birth/arrival effect on the levels of physical activity undertaken. The analyses indicated that those born in Australia participated the most in all types of physical activities ($p < .001$) and those who had arrived in Australia longer than 10 years ago participated the least. These findings are presented in Table 7.2.

Table 7.2   Kruskal-Wallis Tests of Comparison Between Age Categories and Education Levels on Physical Activity Levels (N = 200)

Activity hrs/ 2 weeks	Young (n = 70) Mean Rank	Middle Aged (n = 70) Mean Rank	Older (n = 60) Mean Rank	chi-square, p	None or Primary school (n = 60) Mean Rank	Secondary or Trade (n = 92) Mean Rank	University (n = 48) Mean Rank	chi-square, p
Vigorous Activity (hrs per fortnight	109.87	99.08	91.22	11.58, 0.003	92.98	99.06	112.66	10.80, 0.004
Less vigorous (hrs per fortnight)	109.18	98.04	93.93	7.83, 0.019	96.55	98.84	108.63	3.94, n.s.
Walking (sessions per fortnight)	111.98	90.56	98.70	6.15, 0.04	97.80	96.69	111.18	2.74, n.s.
Gardening/ Housework (sessions per fortnight)	101.27	94.98	106.15	2.65, n.s.	99.91	103.18	96.09	1.03, n.s.

7.3   Dietary Habits

7.3.1   Eating Fat on Meat

Chi square analyses indicated that there were significant differences in the frequency of eating fat on meat according to the birth/arrival categories, age and educational levels. The more recent arrivals in Australia (< 10 years ago), the middle aged group (35-44 years) and those who had higher levels of education (tertiary/university) ate the least fat on meat. (χ^2(2,198) = 6.84, $p < .05$).

The analyses indicated no significant differences in the frequency of eating fat on meat between men and women, Christians and Muslims, and low or medium to high-income earners.

7.3.2   Adding Salt to Cooked Food

There were no significant differences among the various groups in this study on the salt intake variable according to Chi square analyses.

7.3.3   Obesity - Body Mass Index (BMI)

Chi square analyses revealed no significant differences in BMI according to gender, religion and income. However, there were significant differences according to age education and birth/arrival categories ($p < .0001$). Those who were in the oldest age group ($\bar{x}$ == 29.51, s= 4.46) and those with no formal education ($\bar{x}$ == 29.98, s = 4.58), and those who had arrived in Australia longer than ten years ago ($\bar{x}$ == 28.76, s = 4.60) had the highest BMI values and are classified as 'overweight'.

7.3.4   Waist and Hip Circumferences

The Mann-Whitney U test revealed that there were no differences in waist and hip circumferences according to religion and income. However there were significant differences between males and females in waist circumference ($z = -5.69$, $p <$ .0001) with males having larger waist circumferences.

The Kruskal-Wallis analyses revealed that there were significant differences in waist and hip circumferences according to age, education and birth/arrival categories. Those who were oldest participants, those with no formal education, and those who had resided in Australia longer than ten years had the largest waist and hip circumferences.

7.3.5   Alcoholic Drinks

The Mann-Whitney U-test analyses showed that gender and religion had effects on the consumption of alcoholic drinks. Christians consumed more alcoholic drinks ($\bar{x} = 0.59$, $s = 0.51$) than Muslims ($\bar{x} = 0.06$, $s = 0.23$), ($z = -7.08$, $p <$ .0001). Men ($\bar{x} = 0.52$, $s = 0.52$) consumed more alcoholic drinks than women ($\bar{x} = 0.30$, $s = 0.46$) ($z = -3.02$, $p < .01$). But there were no differences in the consumption of alcoholic drinks according to income.

The Kruskal-Wallis analyses indicated that there were significant differences in the number of drinks consumed among the three age groups ($p < .05$) with the middle aged group (35-44 years) consuming the highest number of alcoholic drinks ($\bar{x} = 0.53$, $s = 0.53$) and the youngest age group (20-34 years; $\bar{x} = 0.29$, $s = 0.46$) the least. There were no significant differences on the number of drinks

consumed per day across the three levels of education or in the birth/ arrival categories.

7.4 Multivariate Analyses

7.4.1 Blood Pressure

The multivariate analysis using forward stepwise regression indicated that older age (45-69 years) was the strongest predictor of hypertension (systolic BP>160 mmHg and /or diastolic BP>95mm Hg, or on prescribed tablets for hypertension). The odds of being hypertensive for the older age group was more than four times that of the youngest age group (20-34 years). These findings are presented in Table 7.3.

Table 7.3   **Multiple Forward Logistic Regression of Association Between Demographic Predictors and Blood Pressure**

Predictors	Univariate estimates		Multivariate model of best fit			
	B	SE B	B	S.E B	Odds Ratio	R
Age						
20-34 yrs[a]						
35-44 yrs	-0.061	0.491	-0.061	0.491	.941	.000
45-69 yrs	1.553***	0.429	1.553***	0.429	4.725	.298
Religion						
Christian[a]						
Muslim	-0.237	0.272				
Gender						
Male[a]						
Female	-0.309	0.244				
Education						
No formal or Primary only[a]						
Secondary or Trade	0.117	0.441				
University or Tertiary	-1.236	0.695				
Income						
<41,000 per annum[a]						
>=41,000 per annum	-0.030	0.242				
Birth/Arrival						
Born in Australia[a]						
Arrived in Australia < 10 yrs	1.449	6.531				
Arrived in Australia > 10 yrs	2.991	6.520				

[a]Reference group; *p< .05, **p< .01, ***p< .001, ****p< .000; χ^2 (2,198) =19.242***

7.4.2   Cigarette Smoking

This analysis using forward multiple regression showed that being male was the single strongest predictor of risky smoking behaviour compared to females. As shown in Table 7.4, odds ratio of smoking for women was significantly less than for men.

Table 7.4   Multiple Forward Logistic Regression of Association Between Demographic Predictors and Smoking

Predictors	Univariate estimates		Multivariate model of best fit			
	B	SE B	B	S.E B	Odds Ratio	R
Age						
20-34 yrs[a]						
35-44 yrs	-0.196	0.207				
45-69 yrs	0.455*	0.209				
Religion						
Christian[a]						
Muslim	0.076	0.151				
Gender						
Male[a]						
Female	-0.481**	0.149	-0.481**	0.149	.618	-.177
Education						
No formal or Primary only[a]						
Secondary or Trade	-0.275	0.200				
University or Tertiary	-0.242	0.234				
Income						
<41,000 per annum[a]						
>=41,000 per annum	0.189	0.147				
Birth/Arrival						
Born in Australia[a]						
Arrived in Australia < 10 yrs	0.071	0.249				
Arrived in Australia > 10 yrs	0.435*	0.219				

[a]Reference group; *$p < .05$, **$p < .01$, ***$p < .001$, ****$p < .000$; $\chi^2 (1,199) = 10.623$**

7.4.3 Physical Activity

Multivariate analyses were conducted utilising forward multiple logistic regression to examine which factors actually influenced physical activity. Only birth/arrival variable was retained in the multivariate equation. As seen in Table 7.5 the findings indicated that undertaking physical activity below the level believed to confer a 'training effect on the heart' was most strongly predicted by having resided in Australia for longer than 10 years.

Table 7.5   Multiple Forward Logistic Regression of Association Between Demographic Predictors and Physical Activity

Predictors	Univariate estimates		Multivariate model of best fit			
	B	SE B	B	S.E B	Odd Ratio	R
Age						
20-34 yrs[a]						
35-44 yrs	-0.423*	0.202				
45-69 yrs	-0.025	0.207				
Religion						
Christian[a]						
Muslim	0.076	0.148				
Gender						
Male[a]						
Female	0.168	0.143				
Education						
No formal or Primary only[a]						
Secondary or Trade	-0.139	0.191				
University or Tertiary	0.415	0.226				
Income						
<41,000 per annum[a]						
>=41,000 per annum	-0.240	0.143				
Birth/Arrival						
Born in Australia[a]						
Arrived in Australia < 10 yrs	-0.471	0.261	-0.471	0.261	.625	-.067
Arrived in Australia > 10 yrs	-0.798***	0.237	-0.798***	0.237	.450	-.183

[a]Reference group; *p<.05, **p<.01, ***p<.001, ****p<.000; χ^2 (2,198) =17.446***

7.5   Dietary Habits

57.5.1   High Fat Intake

Multivariate analyses were carried out to predict the likelihood of high fat intake, defined as 'usually or always eating fat on meat'. It was revealed in the analyses that no variables were retained in the multivariate model as presented in Table 7.6 below.

Table 7.6   Multiple Forward Logistic Regression of Association Between Demographic Predictors and Fat Intake

Predictors	Univariate estimates		Multivariate model of best fit			
	B	SE B	B	S.E B	Odds Ratio	R
Age						
20-34 yrs[a]						
35-44 yrs	0.474	0.410				
45-69 yrs	-0.526	0.529				
Religion						
Christian[a]						
Muslim	-0.270	0.342				
Gender						
Male[a]						
Female	-0.606	0.604				
Education						
No formal or Primary only[a]						
Secondary or Trade	-0.052	0.420				
University or Tertiary	-0.343	0.529				
Income						
<41,000 per annum[a]						
>=41,000 per annum	-0.091	0.298				
Birth/Arrival						
Born in Australia[a]						
Arrived in Australia < 10 yrs	2.425	6.651				
Arrived in Australia > 10 yrs	2.012	6.649				

[a]Reference group; *p<.05, **p<.01, ***p<.001, ****p<.000; No variables entered the multivariate model.

7.5.2 High Salt Intake

The same demographic variables were entered to predict the outcome category of high salt intake, defined as 'always adding salt to cooked food'. In the multivariate model of best fit conventional levels of significance were not achieved, a trend towards men adding salt to cooked food more than women can be seen in Table 7.7.

Table 7.7   Multiple Forward Logistic Regression of Association Between Demographic Predictors and Salt Intake

Predictors	Univariate estimates		Multivariate model of best fit			
	B	SE B	B	S.E B	Odds Ratio	R
Age						
20-34 yrs[a]						
35-44 yrs	0.072	0.318				
45-69 yrs	-0.278	0.356				
Religion						
Christian[a]						
Muslim	-0.214	0.252				
Gender						
Male[a]						
Female	-0.450	0.234[b]	-0.450	0.234[b]	.638	-.110
Education						
No formal or Primary only[a]						
Secondary or Trade	0.143	0.307				
University or Tertiary	-0.258	0.388				
Income						
<41,000 per annum[a]						
>=41,000 per annum	0.012	0.227				
Birth/Arrival						
Born in Australia[a]						
Arrived in Australia < 10 yrs	0.587	0.355				
Arrived in Australia > 10 yrs	-0.236	0.350				

[a]Reference group;[b]p=.055; *p<.05, **p<.01, ***p<.001, ****p<.000; χ^2 (1,199 =3.851*

7.5.3   Obesity - Body Mass Index (BMI)

Using multiple forward logistic regression this analysis indicates that older age
(45-69 years) is the strongest predictor of increased Body Mass Index as shown in
Table 7.8. Older participants had twice the likelihood of being overweight than
the younger age groups (OR =2.262).

**Table 7.8   Multiple Forward Logistic Regression of Association Between
Demographic Predictors and Overweight/Obesity (BMI >25)**

Predictors	Univariate estimates		Multivariate model of best fit			
	B	SE B	B	S.E B	Odds Ratio	R
Age						
20-34 yrs[a]						
35-44 yrs	-0.071	0.226	-0.071	0.226	.932	.000
45-69 yrs	0.816**	0.268	0.816**	0.268	2.262	.171
Religion						
Christian[a]						
Muslim	-0.050	0.159				
Gender						
Male[a]						
Female	-0.109	0.155				
Education						
No formal or Primary only[a]						
Secondary or Trade	-0.363	0.212				
University or Tertiary	-0.474*	0.242				
Income						
<41,000 per annum[a]						
>=41,000 per annum	0.258	0.154				
Birth/Arrival						
Born in Australia[a]						
Arrived in Australia < 10 yrs	-0.321	0.234				
Arrived in Australia > 10 yrs	0.735***	0.219				

[a]Reference group; *p<.05, **p<.01, ***p<.001, ****p<.000; χ^2 (2,198) =14.868***

7.5.4   Alcoholic Drinks

In the multivariate analysis, using forward multiple logistic regression, no demographic variables were found to be associated with the consumption of alcohol which could cause cardiovascular risk (refer to Table 7.9).

Table 7.9   Multiple Forward Logistic Regression of Association Between Demographic Predictors and Alcohol Intake

Predictors	Univariate estimates		Multivariate model of best fit			
	B	SE B	B	S.E B	Odds Ratio	R
Age						
20-34 yrs[a]						
35-44 yrs	5.980	43.177				
45-69 yrs	-2.990	69.882				
Religion						
Christian[a]						
Muslim	-4.369	34.780				
Gender						
Male[a]						
Female	-4.175	43.686				
Education						
No formal or Primary only[a]						
Secondary or Trade	5.795	47.520				
University or Tertiary	-2.897	77.600				
Income						
<41,000 per annum[a]						
>=41,000 per annum	-4.346	35.422				
Birth/Arrival						
Born in Australia[a]						
Arrived in Australia < 10 yrs	-2.816	80.881				
Arrived in Australia > 10 yrs	5.633	58.076				

[a]Reference group; *p<.05, **p<.01, ***p<.001, ****p<.000; No variables entered the multivariate model

7.6 Measurement of All Predictor Variables by Major Risk Factors

7.6.1 Multivariate Analysis

A logistic regression analysis was conducted to assess which demographic factors predicted the presence of a major risk factor. In this sample, the strongest predictor was being male, with men more likely to have at least one major risk factor. The second strongest predictor was age, with those in the oldest age group (45-69 years) being more likely to have a major risk factor. The next strongest predictor was education. Those who had no formal education or primary school education only were more likely than others to have a major risk factor. . These findings are presented in Table 7.10

Table 7.10   Multiple Forward Logistic Regression of Association Between Demographic Predictors and a Major Risk Factor

Predictors	Univariate estimates		Multivariate model of best fit			
	B	SE B	B	S.E B	Odds Ratio	R
Age						.082
20-34 yrs[a]						
35-44 yrs	-0.365	0.206	-0.336	0.216	.715	-.039
45-69 yrs	0.854***	0.217	0.570	0.239	1.768	.116*
Religion						
Christian[a]						
Muslim	0.046**	0.148				
Gender						
Male[a]						
Female	-0.474**	0.147	-0.510	0.161	.601	-.171**
Education						
No formal or Primary only[a]						.107*
Secondary or Trade	-0.246	0.197	-0.244	0.208	.783	.000
University or Tertiary	-0.497*	0.234	-0.418	0.256	.658	-.050
Income						
<41,000 per annum[a]						
>=41,000 per annum	0.139	0.143				
Birth/Arrival						
Born in Australia[a]						
Arrived in Australia < 10 yrs	0.052	0.247				
Arrived in Australia > 10 yrs	0.636**	0.218				

[a]Reference group; *p<.05, **p<.01, ***p<.001, ****p<.000; χ^2 (5,195) =31.656****

7.7   Semi-Structured Interviews

Using the statistical package for social sciences (SPSS, 6.1), chi-square analyses were employed to identify if statistically significant relationships existed between the predictor variables of age, gender, religion, educational qualifications, household income and length of residence in Australia across the following categorical outcome variables: knowledge of blood pressure, heart function, cholesterol, perceived importance of physical activity, beliefs on the effects of smoking and drinking alcohol on health, high dietary intake of fat and salt, effects of being overweight, perceptions of

own health status and the means whereby individuals gather information about their health practices.

7.7.1 Knowledge of Blood Pressure, Cholesterol and Heart Function by Age, Religion, Gender, Education, Income, Birth/Arrival to Australia

Most respondents expressed reasonable knowledge of blood pressure, heart function in general and cholesterol, however, the youngest subjects (20-34 years) had the highest levels of knowledge of the diseases caused by high blood pressure and high cholesterol levels, and the oldest age group (45-69 years) the least. Christians reported greater knowledge of heart disease ($\chi2$=8.3, p< .05) and knowledge of diseases caused by high cholesterol ($\chi2$=8.91, p< .05). The university educated had greater knowledge of the ill effects of high blood pressure and high cholesterol on health in general and on the heart in particular. Subjects with the least education and those who had resided in Australia for more than ten years reported the highest levels of serum cholesterol (6.5mmol/L and above) ($\chi2$=18.11, p< .05).

7.7.2 Attitudes, Beliefs and Barriers Towards Leisure-Time Physical Activity by Age, Religion, Gender, Education, Income, Birth/Arrival to Australia

There were no significant differences in the attitudes concerning physical activity according to age, gender, religion, education, income and birth/arrival categories. However, 'lack of time' was identified as a barrier to being physically active ($\chi2$=12.97, df = 2, p<0.05) by the middle aged group (35-44years).

Participants who belonged to the higher income category ($41,001 and above) were over represented in their perceptions of self-efficacy to increase their leisure-time physical activity (expected frequency = 11, actual frequency = 15). The same applied to Christians and those with higher education levels (secondary and university). Also the university educated reported spending more time on leisure-time physical activity per fortnight than those with no formal or only secondary education.

The least educated group identified musculo-skeletal health problems as barriers to exercise ($\chi 2=6.70$, *df*= 2, *p*<0.05, expected frequency = 2.1, actual frequency = 5) and they also had the least knowledge about the relationship of inactivity to heart disease (expected frequency = 14.4, actual frequency = 8) and stroke ($\chi 2=7.22$, *df* = 2, *p*<0.05).

There were no significant differences among the birth/arrival categories in attitudes, beliefs and barriers concerning leisure-time physical activity.

7.7.3   Attitudes, Barriers, and Beliefs Towards Smoking by Age, Religion, Gender, Education, Income, Birth/Arrival to Australia

There were no major differences in the habits, attitudes and beliefs about smoking and in the identification of resources to assist in stopping smoking in this sample. However, there were significant differences in identifying barriers to quit smoking ($\chi 2=10.27$, *df* = 4, *p*<0.05). The youngest age group (20-34 years) identified 'smokers around them' (expected frequency = 1.9, actual frequency = 4) as a

barrier to quit smoking while analyses showed that the oldest age (45-69 years) group identified will power (expected frequency = 9, actual frequency = 15) as a very important factor that could assist them to stop smoking.

Christians had better knowledge than Muslims of diseases and illnesses caused by smoking such as thrombosis ($\chi2=3.99$, *df* = 1, *p*<0.05), and bronchitis ($\chi2=3.99$, *df* = 1, *p*<0.05).

There were significant differences between men and women in their smoking habits ($\chi2=11.63$, *df* = 4, *p*<0.05) with men smoking more than women. There were also significant differences between men and women in their perceptions of the effects of smoking on their health ($\chi2=12.57$, *df* = 3, *p*<0.01). More men than women believed that smoking was not having a harmful effect on their health, yet interestingly more men than women in the past year had decreased or stopped smoking.

There were also significant differences between men and women in identifying the barriers to stopping smoking. More men than women expressed no desire to stop smoking ($\chi2=10.18$, *df* = 2, *p*<0.01), nor did they identify addiction as a barrier to stopping smoking ($\chi2=7.72$, *df* =2, *p*<0.05). Instead, the men proposed that the stress of life ($\chi2=7.23$, *df* = 2, *p*<0.05) and lack of 'will power' were barriers to quitting smoking ($\chi2=7.65$, *df* = 2, *p*<0.05). The higher income category ($41,001 and above) also identified 'life being too stressful' as a barrier to stopping smoking ($\chi^2= 6.179$, *df* =2, p<.05). Will power as an aid to quit smoking ($\chi2=9.84$, *df* = 4, *p*<0.05) was identified by the least educated whom

interestingly, had the least knowledge about the effects of smoking in causing illnesses and diseases ($\chi2$=6.54, *df* = 2, *p*<0.05).

7.7.4   Attitudes, Barriers, and Beliefs Towards Alcoholic Drinks by Age, Religion, Gender, Education, Income and Birth/Arrival to Australia Categories

There were no significant differences by age, gender, religion, educational levels, income, and birth/arrival categories in attitudes towards drinking alcohol, desire to stop drinking, and perceived aids to stop drinking alcohol. However, there were significant differences between Christians and Muslims and among the three educational levels in knowledge of diseases and illnesses caused by alcohol drinking. Christians had a better knowledge of the effects of alcohol drinking on heart disease (χ^2= 6.31, *df* =2, p< .05) and cirrhosis of the liver (χ^2= 7.78, *df* =1, p< .05), while participants with no formal education had the least knowledge of the relationship of drinking alcohol and heart disease (χ^2= 14.65, *df* =4, p< .01).

7.7.5 Attitudes, Barriers, and Decisions Concerning Dietary Habits by Age, Religion, Gender, Education, Income, Birth/Arrival to Australia

The Australian-Lebanese did not differ in their eating habits, decision making in relation to family meals, attempts to change the family diet nor in perceived barriers to change the diet. However, the middle aged group (35-44years) identified the 'longer time it takes to prepare healthy food' (χ^2=6.90, df = 2, p< .05) as a barrier to eating healthy meals (expected frequency = 1.5, actual frequency = 4). There were significant differences in the use of lard in cooking (χ^2= 13.06, df = 1, p< .001) with Muslims using it more in their cooking than Christians. The analyses also revealed that the youngest (20-34 years) and the oldest age (45-69 years) groups used lard in their cooking more than the middle aged (35-44 years) group. There were also significant differences in the preference the university educated (χ^2=19.98, df = 4, p< .01) and the Christians to purchase and use low fat (χ^2=25.28, df = 2, p< .001), and low sugar products (χ^2= 12.58, df = 2, p< .001).

There were significant differences between men and women in the decision making in relation to family meals (χ^2=30.47, df = 3, p< .001) with women (expected frequency = 34, actual frequency = 47) making most of the decisions in relation to family meals, as well as in attempting to change the family diet (χ^2=8.22, df = 1, p< .01). The secondary and university educated preferred written information (χ^2=10.56, df = 2, p<. 01) to be provided to assist them to make positive changes to their food habits while the least educated preferred to be told by health professionals.

There were significant differences between the two income categories in the frequency of eating fruits (χ^2=13.07, df = 4, p< .05) and vegetables (χ^2=11.59, df= 4, p< .05), with the higher income category ($41,001 and above) eating more fruits (expected frequency = 22.6, actual frequency = 28) and more vegetables (expected frequency = 21.5, actual frequency = 28) than the lower income category ($0-$41,000).

7.8 Perceptions of Own Health, Use of Health Services and Sources of Health Information

The analyses revealed that there were significant differences in perceptions between men and women of their own health status ($\chi2$=23.87, p<0.05). Men were over represented in reporting excellent health (expected frequency = 8, actual frequency =17) while women were under represented (expected frequency = 13, actual frequency = 4) and reported less positive ratings (fair, not good and poor health) of their health. There were also significant differences in the frequency of visits to the doctor ($\chi2$=10.41, df = 1, p<0.05), with women visiting the doctor more frequently than men. All the women had visited the doctor at least once in the past year, while some men had never visited a doctor.

There were significant differences among the three age categories in their perceptions of effect of work on their health. The middle-aged group (35-44 years) identified their work as having bad effects on their health (actual frequency = 7; expected frequency = 3.2) and fewer than expected (actual frequency = 5; expected frequency = 8) thought that their work had good effects on their health.

There were significant differences between Christians and Muslims in the effect of employment on health. Christians more than Muslims reported 'good effect' of employment on their health.

There were significant differences among the three educational categories in their perceptions of own health status. Those with the least education (no formal education or primary education only) were under represented in reporting 'good health' (expected frequency = 7.4, actual frequency.= 3), they also reported more frequent visits to physiotherapists and chiropractors and experienced the least positive effects of work on their health.

There were no significant differences among the two income groups in their perceptions of own health status, reported medical history and effect of work on one's health (p>.05). However, the low-income earners (0-$41,000) reported more visits to the doctor in the past year than the medium to high-income earners ($41,001 and above).

There were no significant differences among the birth/arrival categories in the perceptions of own health status ($\chi2=9.42$, $p>0.05$), or in their reported medical history. However, there were significant differences in their perceptions of the effect of work on their health ($\chi2=20.74$, $df = 10$, $p<0.05$). Those who had arrived less than 10 years ago were under represented in their perceptions that their work is good for their health (expected = 9, actual = 6) and clearly over represented in their perceptions of the adverse effects of their work on their health ($\chi2=20.74$, $df = 10$, $p<0.05$), (expected frequency = 3.5, actual frequency = 8). This contrasts with the Australian born who

were over represented in their perceptions of the benefits of employment on their health (expected frequency = 3, actual frequency = 7), and under represented in their perceptions of the adverse effects of employment on their health (expected frequency =1.2, actual frequency = 0). Interestingly, those who had resided in Australia for longer than 10 years were under represented in their perceptions of the benefits of employment on their health (expected frequency = 15.4, actual frequency = 14), and under represented in their perceptions of the adverse effects of employment on their health (expected frequency =6.3, actual frequency = 3).

7.9   Sources of Health Information and Health Activities

The analyses of the data indicated no differences according to age and gender in the sources accessed for health information.

It was evident that there were significant differences between Christians and Muslims in the sources accessed for health information. Muslims identified 'family and friends' as a major source of health information, while Christians identified 'magazines' and 'newspapers' as a source of health. Christians were also more confident that they would attend health programmes at work and in the community.

There were significant differences among the three educational categories in identifying sources of health information. The least educated identified 'friends and family' as a source of health information rather than 'magazines' and 'newspapers' which were identified by the higher educated groups. There were also significant differences among the educational groups in their intentions of attendance of health programmes at

both the workplace and the community with an over representation among the most educated.

There were significant differences among the income categories in the use of sources for health information. The low-income group ($0-$41,000) identified 'the chemist' as a source of health information, while the higher income group ($41,001 and above) identified the use of own knowledge and education as a source of health information.

7.10 Summary

Analysis of the data revealed some major differences in this sample in health activities, knowledge of cardiovascular risk factors, perceptions of own health and the use of health services and resources. It also indicated that the younger participants, those with higher education levels, were those with the most positive perceptions of own health and self-efficacy and engaged more in health activities than others. Further, such individuals were able to utilise all sorts of resources to obtain health information.

Conversely, the least educated had negative perceptions of their health and were not able to utilise available sources to improve their health status. The least educated also suffered the most from musculoskeletal health problems that prevented them from undertaking physical activity to improve their cardiovascular health. They also engaged in risky health behaviours, such as high intake of fat and salt, physical inactivity and smoking.

It became evident from the analyses that those in the oldest age group were most at risk of cardiovascular disease, since they had higher levels of reported cholesterol,

hypertension, obesity and overweight and many were current smokers. This group also had the least education and they were not able to utilise available health resources and services. The prevalence of undetected hypertension amongst this group was high.

In general, Christians were more educated than Muslims and had better knowledge of the risk factors of cardiovascular disease. Muslims reported higher number of visits to doctors than Christians. In general, there were no significant differences between the two income categories in practices and knowledge of healthy lifestyles.

Analysis of the data also indicated that men were generally more at risk than women. Men smoked more than women but, had more positive perceptions of own health, and more confidence to undertake healthy activities than women.

It was also found that those who had resided in Australia over ten years were more at risk than those who were born in Australia and those who had arrived to Australia within ten years. Chapter Eight will present a discussion on the findings of both the descriptive and inferential statistical analyses presented in Chapters 6 and 7.

CHAPTER 8 CONTENTS

CHAPTER EIGHT

DISCUSSION AND INTERPRETATION OF ANALYSES

8.1   Introduction

It must be clearly stated that these results are applicable only to the sample of adult Australian-Lebanese aged 20-69 years living in the metropolitan Melbourne area who participated in this study. These results could be generalised to a segment of the Australian-Lebanese population who have similar characteristics to the sample in this study. However, one must be cautious in generalising the results concerning cardiovascular risk factors to the wider Australian-Lebanese community in Australia.

No risk profile is able to predict coronary heart disease (CHD) with certainty and known risk factors do not fully account for the observed incidence and mortality from CHD. However, over time the collection of studies with adequate baseline data will help further develop improved risk profiles (Knuiman, Vu, & Bartholomew, 1998).

The multifactorial nature of CHD suggests that multiple risk factors must be evaluated simultaneously when assessing an individual's risk of CHD and a global approach to risk factor modification should be adopted (Kannel, McGee and Gordon 1976; Fraser, 1986). The estimation of risk based on multiple risk factor assessment provides a useful method for health care professionals to monitor and evaluate health promotion and public education programs and interventions specifically tailored for the target groups.

CHD occurs in individuals where several risk factors coexist and are even moderately elevated, as well as in individuals who have extreme elevations of one or few risk

factors. Therefore, simple analysis of one factor or the other may fail to identify high risk individuals with multiple risk factors that are moderately elevated and do not exceed the critical thresholds. Thus, logistic regression has been the predominant method used in this study to identify significant risk factors from a list of various risk factors that are known to jeopardise cardiovascular health.

The risk factor profile presented in this study has been found to be similar in many ways to those found in other Australian studies (NHF, 1990; Ireland & Giles, 1996). Age, gender, high systolic and diastolic blood pressure levels, elevated cholesterol levels, current smoking behaviour, physical inactivity, high salt and fat dietary intake, high BMI, alcohol intake and length of stay in Australia have all been included in the multivariate analyses in this study to identify the risk of CHD in this non-English-speaking background group.

It is generally accepted that cardiovascular disease is related to several risk factors (refer to Chapter 4), but can become even more complex with the added factors associated with immigration (Powles and Gifford, 1990). Risk factor behaviours are influenced by environmental factors after immigration, the degree to which culturally specific habits and customs are maintained, sociocultural factors and the changed diet and lifestyle, as well as the additional stress that immigrants are exposed to after migration.

This study revealed some interesting findings in relation to health knowledge, beliefs, attitudes and health behaviours of a Melbourne-based group of Australian-Lebanese adults.

The prevalence in this study sample of hypertension, high cholesterol levels and smoking behaviour, frequently termed the *classic triad* in recognition of their magnitude as CHD risk factors will first be discussed. A discussion of other modifiable behavioural risk factors will then follow.

8.2 The Three Major Risk Factors Hypertension, Cholesterol and Smoking (*The Classic Triad)*

8.2.1 Hypertension

High blood pressure is an acknowledged major risk factor for CHD and stroke. Several factors influence the development of hypertension, such as age, race, socioeconomic status, education and gender. Ethnic and racial characteristics influence hypertension. However, identifying the reasons for ethnic and racial differences in the incidence of hypertension can be quite complicated because of the presence of multiple interrelated contributory factors such as salt intake, obesity, cigarette smoking and the prevalence of non-insulin dependent diabetes as well as education and socioeconomic factors which may also play a role in the. progression of hypertension. The Framingham Heart Study data indicated an incidence of sudden death of up to two times higher in hypertensive individuals than in a nonhypertensive cohort (Dawber, 1980).

This study found that 16 (15 %) men and 8 (7%) women of the total sample were hypertensive, although only 8 (4%) subjects reported that they had been told that they had high blood pressure. Those 16 subjects who were found to have undetected hypertension were advised to consult their local doctor for further investigation and monitoring and, if necessary, treatment for their high blood

pressure. This is relatively higher than the NHF-RFPS of 1989 results (NHF, 1990), which indicated that 11% of the men and 5% of the women were hypertensive.

The multivariate analysis also showed that of all key variables, age was the strongest predictor of hypertension, with the oldest age group having significantly the highest systolic and diastolic blood pressure readings. Hypertension was prevalent particularly among the lower education levels and especially in those who had resided in Australia for longer than ten years.

It appears that many factors are interacting to produce this outcome of high blood pressure levels in this sample. Many of the older aged group (45-69 years) participants who were hypertensive were found to be leading inactive lives, they were overweight or obese and current smokers. They also were suffering from the stress of migration due to isolation and lack of socialisation. All of these factors are known to increase high blood pressure (Corrigan, Raczynski, Swencionis, et al., 1991; Joint National Committee V, 1993; Podszus & Grote, 1996). Hypertension poses a greater risk factor for CVD events in the elderly than in the younger people (WHO/ISH, 1993). Lifestyle modification is the least costly treatment for hypertension. Australian-Lebanese should be educated on reducing their weight, engaging in regular physical activity, restricting their sodium intake reducing their saturated fat intake and maintaining adequate dietary intake of potassium, calcium and magnesium. Other life style changes that will reduce hypertension are cessation of smoking and stress reduction.

Men in this study in particular had higher blood pressure levels than women and characteristically also reported a higher sodium intake. This trend was also evident in the Melbourne study of Italian migrants (Ireland & Giles, 1996) where it was found that blood pressure increased with the longer duration of residence in Australia, especially in males aged 50-59 years.

Surprisingly there were no differences detected between the low and medium to high income earners in blood pressure measurements, although, many studies have attributed low socioeconomic status with hypertension (Furberg, Berglund, Manolio, & Psaty, 1994).

Most (72%) of the participants in this study did not know the definition of blood pressure. Around 40% who were mainly in the older age group (45-69 years) were able to describe the symptoms associated with having high blood pressure.

8.2.2 Hypercholesterolaemia

A large body of research indicates a strong and consistent relationship between elevated cholesterol levels and increasing risk of coronary heart disease. Hypercholesterolaemia is estimated to account for 40% of all myocardial infarctions. Familial predisposition to hypercholesterolaemia is related to both genetic and environmental factors. Caggiula and Mustad (1997) have proposed that genetic risk can be modified by environmental influences such as dietary interventions and exercise

Seven (8%) men and 11 (10%) women reported having high levels of cholesterol of 6.5 mmol/L and above. These levels in general are lower than the national levels where 16% of the men and 14% of the women had levels of 6.5mmol/L or greater (NHF, 1990). It is unclear whether these levels of cholesterol in the Australian-Lebanese are associated with the event of immigration to Australia. There is no data from Lebanon to compare the cholesterol levels of Australian-Lebanese to the Lebanese in Lebanon. Thus, a longitudinal study investigating the relationship of plasma lipid profiles to the length of stay in Australia may be warranted.

Although hypercholesterolaemia is genetically determined, careful dietary constraints (for example, low intake of dietary fat, salt and dairy products) may alter cholesterol levels. Important modifiable lifestyle behaviours (for example, exercise and effective body weight maintenance) can positively counter the high cholesterol levels. The effect of changing dietary intake to lower the risk of high cholesterol is of great importance to this Australian-Lebanese group since the analyses revealed that those in the oldest age group and those in the youngest age group ate more fat on meat than the middle aged group. This might be explained by the fact that the younger individuals stated that they like to eat fast food which is rich in fat, especially when they are out with friends. Also younger individuals are not usually worried about diseases and illnesses they associate with old age and thus they engage in risky behaviours and are not worried about the long-term consequences. Around 32 subjects (16%) in this sample reported that they would eat 'fried foods' or 'fried rice' and 'fast food' meals which are usually high in saturated fat at least once per week. This dietary pattern combined with the

reported low physical activity level of this sample may affect the cholesterol level of this population group.

The analyses also showed that those reporting high cholesterol levels had no formal education yet had lived in Australia longer than 10 years. This could suggest that health messages about healthy dietary intake from mainstream print or visual media are not reaching this 'hard to reach' group. Their lack of knowledge of the English language also compounds the problem. The lack of awareness of CHD risk factors among those with limited formal education is understandable.

In addition, meat in Australia is abundant and less costly (in Lebanon, lamb meat is much more expensive than beef meat) and is consumed much more frequently in their adopted country than in Lebanon. The traditional Lebanese diet is characterised by bread and legumes, vegetables, yoghurt and cheese, fish, high fibre intake and lower animal-fat intake and normally meat is consumed once or twice per week only. Although the Australian-Lebanese in this study reported eating vegetables and fruits daily, their diets also consisted of daily intakes of large quantities of meat especially lamb meat which over time will influence their cholesterol levels. These combined factors could have contributed to the elevated levels of cholesterol.

This trend of higher meat consumption by Australian-Lebanese is similar to that of the Greek immigrants in Australia. Powles et al.(1988) compared the dietary habits of Greek immigrants in Australia with their siblings remaining in Greece.

Findings from the Greek study indicated that most of differences occurred within a year after migration, the major characteristics being lower intakes of olive oil and wine and higher meat consumption.

The new dietary profile of the Australian-Lebanese in this study, with higher consumption of meat mirrors that of native Australians. The relationship between diets, serum cholesterol levels and CHD risk factors were also examined in the Seven Countries Study (Keys, Menotti, Karvonen, et.al., 1986) and the Japanese Migrants' Study (Egusa,, Murakami, Ito, Matsumoto, Kato, Okamura, Mori, Yamani, Hara, & Ymakido, 1993). Data analysis from the Seven Countries Study indicated that dietary saturated-fat consumption was associated with total serum cholesterol levels within and between the populations, although the risk varied widely according to the presence of other risk factors such as hypertension and cigarette smoking.

Data analysis of The Japanese Migrants' Study which followed Japanese men who had migrated to the United States and adopted the Western high-fat diet indicated, that the incidence of CHD increased in the Japanese migrants compared to the Japanese men who did not migrate. The greater the acculturation of the migrants to the American diet, the greater the elevation of cholesterol and the development of subsequent CHD risks.

Seventy five percent of the sample in the present study knew the relationship of high cholesterol to cardiovascular disease, but had little knowledge of the specific foods that raise cholesterol levels. There were no significant differences between

Muslims and Christians in the reported frequency of eating fat on meat. However, Christians compared to Muslims had higher education, better knowledge about cardiovascular risk factors and expressed confidence in their abilities to conduct and maintain a healthy lifestyle which included the purchasing of low fat and low sugar products.

8.2.3 Tobacco Smoking

Tobacco smoking is the largest preventable cause of death and disease in the world (McElduff, Dobson, Beaglehole, and Jackson,1998). On average smokers have a 70% greater risk of mortality than non-smokers. There is, further, a direct relationship between the number of years they have smoked and the extent of their risk (Botvin, & McAlister, 1981). In Australia, smoking results in more than 18,000 deaths per year, a rate equivalent to about 50 deaths per day (AIHW, 1998; DCSH, 1990). In the Australian-Lebanese community smoking is widespread. It was prevalent in all age groups, at all educational levels and socioeconomic categories. This health practice alone is of considerable concern.

Reviews of the literature on smoking indicate that once the smoking habit is firmly established, due to its addictive properties it is extremely difficult to break (Bernstein & McAlister, 1976). Nicotine is one component of cigarette smoke currently identified as the active pharmacologic agent in tobacco that determines the addictive behaviour of the cigarette smoker. The pharmacologic and behavioural processes that determine tobacco addiction are similar to those that determine addiction to drugs such as heroin or cocaine (U.S. Department of Health and Human Services, 1989b). The psychophysiology of nicotine addiction is characterized by relative loss of control regarding use of cigarettes, strength of

addictive behaviour, occurrence of withdrawal signs and symptoms after abstinence, increase in urge and craving to use the drug after abstinence and pressures to relapse despite the fact that the completion of acute phases of nicotine withdrawal end within about two weeks of drug abstinence (Jarvick & Henningfield, 1988). Smokers cite the "positive" effects of cigarettes as improved concentration, improved focus during task performance, and improved mood demonstrated by reduced anger, tension, depression and stress (Benowitz, 1992).

Sixty seven current smokers in the present study irrespective of age, education or religion, identified similar barriers to stopping smoking. These explanations included stress at home and at work, social isolation due to immigration, and difficulties in finding appropriate employment in their new country resulting in disillusionment and disappointment which may border on sub clinical depression. They also referred to difficulties they face in trying to quit smoking due to its addictive properties and stated that strong will power was needed to help them stop smoking.

The proportion of male smokers in this study was much higher than female smokers, about half of the men 38 (44%) and a quarter 28 (25%) of the women of the total sample were current cigarette smokers. The high prevalence of smoking among the male Australian-Lebanese may be attributed to the fact that becoming an active smoker in this culture is usually viewed as a mark of passage from childhood to adulthood and is an important part of male socialization in Lebanon. The percentage of Australian-Lebanese smokers is higher than in the 1989 NHF-RFPS, where 24% of the men and 21% of the women were current smokers.

In this study the largest number (40%) of smokers were in the oldest age group (45-69 years) and were mostly men. The female smokers were in the middle aged group (34-44 years) and in the youngest (20-34 years) age group. This pattern might be explained by the fact that, in the past, there were social inhibitions in the Lebanese culture against smoking by women. However, with the start of the Lebanese war social taboos vanished as people developed an attitude where nothing other than survival really mattered.

No differences were seen in the levels of education among smokers. In contrast, earlier studies from Finland (Pekannen et al., 1994) observed increasing educational differences among smokers and non-smokers, favouring those with the least education being smokers. Educational differences in health behaviour have been attributed to the acquisition of knowledge regarding health damaging behaviour. However, in this study, it seems that effects beyond those of knowledge, education and social class were involved. It is hypothesised that sociocultural influences play a major role in the smoking behaviour of the Australian-Lebanese. It is common practice for the Lebanese to offer cigarettes as an indication of good will, hospitality and friendship. Lebanese families, even when they may not smoke themselves, provide a range of cigarette brands to offer around to their guests with a cup of coffee. At weddings, funerals and special occasions, this range increases in variety to cater for all sorts of tastes. To refuse an offered cigarette is viewed as rejection of goodwill and hospitality, and for many it is easier and more socially acceptable to accept the offered cigarette. This socially correct behaviour can turn polite social smokers into regular dependent

smokers. Often people will tell you to "take a cigarette with your coffee. Do not inhale just blow out the smoke'. This is heard in all Lebanese households. The participants in this study made similar comments during interviews.

Offering a cigarette is not only a sign of hospitality and friendship but also a gesture of accepting the person into adulthood. The literature on smoking indicates that 80% of adults who have ever smoked began smoking regularly before they were 19 years old (IUAC, 1990). In the present study, 50 (25%) participants started smoking before the age of 19 years, 22 (11%) before the age of 25 years and the rest 7 (3%) between the ages of 25-29 years.

The social environment of the Australian-Lebanese in Melbourne is adversely affecting their health behaviours through observational modelling of a risky health behaviour which is socially acceptable and therefore results in reinforcement of smoking habits. Chapman (1995) stated that if a person's family, friends, and colleagues at work are mostly smokers, there are many expectations and cues for that person to become a smoker, and fewer opportunities to foster negative attitudes towards smoking. This is clearly the case among Australian-Lebanese. Once they become addicted to the habit, it becomes difficult for them to stop, even though they might later become aware of the damaging effects of smoking on their health. Twenty one percent of the smokers in this study believed that smoking was not harmful to their health. This is an indicator of denial and rationalisation of the behaviour of smoking.

According to the principles of the Social Learning Theory, smoking is a learned behaviour that can be unlearned. The individual needs to participate actively in acquiring behaviour-changing skills. Bandura (1982) asserts that *self-efficacy* is predictive of health care compliance. If individuals are confident in their capability to perform healthy behaviours, they are more likely to fulfill that self-perception than those who are less confident. Eight men and seven women (22%) were confident that, if they wanted to quit smoking they could do so permanently. Twenty six (39%) were not confident that they could 'give up smoking permanently'. Of those who said they were not confident that they could quit smoking 23 (34%) belonged to the lower educational levels while only 3 (4%) had university education.

Smoking in this NESB group may also be associated with the stressors of life they face in their new country. Men more than women identified themselves as stressed at both home and work. Stress is an outcome of the process of adapting to the new environment as many of the Lebanese immigrants came from small villages and village communities to big cities. As well, social isolation due to separation from family and friends, low socioeconomic status or a drop of socioeconomic status post immigration due to non recognition of qualifications, coupled with an inability to speak the language of the host country, are all contributing factors that will lead smokers to increase their smoking as a means of relief from these pressures that are placed upon them in their new country.

The smoking behaviour in this sample is consistent with the findings of a study of estimates of smoking behaviour in an immigrant Lebanese community in Sydney (Rissel, Ward & Jorm, 1999). This study confirmed that the prevalence of

smoking among the Lebanese community exceeds that for the general New South Wales population. The Sydney Lebanese community study also found that smoking does not decline with aging, suggesting that smokers have not been quitting. These findings support the view that smoking is a major element of this community's culture.

According to the Transtheoretical Model, quite a high (21%) proportion of current smokers in this study were 'not planning to quit smoking'. Fourteen (21%) of the smokers in this sample were in the pre-contemplation stage, 6 (9%) were in the contemplation stage but only 3 (4%) were in the preparation stage.

Consistent with tenets of the Health Belief Model, smokers take action to change their smoking behaviour if they believe that they are personally susceptible to a disease such as CHD, or if the benefits of making the behaviour change outweigh the costs of making the change. The Christian and Muslim Lebanese in general are quite religious and have a strong belief in the will of God. Most of the subjects in this sample had a fatalistic view of their health and causes of disease and were accepting of the will of 'Allah' (God). A very common response of smokers in this sample was if 'God wants me to get heart disease then I cannot prevent it, whether I smoke or not.' This health-related belief is characterised by a sense of an external locus of control placing faith in a 'powerful other' whose will transcends the ordinary person's experience, thereby removing from them responsibility for their own actions. Researchers have found correlation between motivation and the concept of destiny (Roster, 1966; Colon, 1992). Their findings indicated that individuals who have less motivation to engage in healthy

behaviours have a higher belief in fate or destiny. Further research is needed to explore the reasons for this belief.

8.3 Lifestyle Factors

Dietary Habits, Alcohol Intake, Physical Activity and Obesity

Overeating is a health condition that is common in this sample and needs addressing. Food which has a symbolic value as well as a nutritional value is much cheaper in Australia than it is in Lebanon thus, most families who related the abundance of food with high social status and prestige in their village communities, are now able to obtain it and consume it signaling a higher social status as a result of immigration.

The Theory of Reasoned Action has been utilized to assess the *subjective norm,* for example, the intention of changing the diet to predict the behaviour. Participants in this study had no intention of changing their traditional Lebanese diet. However, there was an intention of changing into low fat and low sugar diet among the higher educated and the higher income group who reported using low fat and low sugar products. They also reported consuming more fruits and vegetables than those who were lower educated and in the lower socioeconomic group.

Ninety five percent of the sample did not follow a special diet and identified that their usual diet consisted mainly of Lebanese food, which they all believed to be very healthy. They also indicated that they prefer to continue eating it and have no intentions to change their diet especially, since all the ingredients for the Lebanese cuisine can be found in major cities like Melbourne.

Results of the multiple logistic regression showed that men had a higher probability than women of adding salt to cooked food. This may be related to their reduced sense of taste as a consequence of heavy smoking. The probability of higher salt intake by men might also explain their elevated blood pressure levels.

Eating fat on meat and fatty take-away foods is a cause for health concern in this group. Fried foods were consumed once or twice a week by most of the sample. Consumption of fruits and vegetables was very high among this population group. However, the intake of milk and dairy products was quite low, which could lead to a high incidence of osteoporosis in later years.

The Australian-Lebanese are social drinkers. Muslims do not drink alcoholic beverages at all, as it is against their religious beliefs. The Islamic religion forbids Muslims from drinking. This explains the significant difference between alcohol drinking habits of Christians and Muslims ($p<.0001$), with Christians often drinking alcohol and Muslims hardly ever drinking alcohol. The middle aged group (35-44 years) consumed the highest number of alcoholic drinks. Only one man was classified as an intermediate or high-risk drinker, compared with 6% of men in the national data (NHF, 1990). However, none of the women in the present study were in this category, compared with 5% of Australian women. Men consumed more alcoholic drinks than women. This is a cultural practice where women should not be seen as drunk or consuming a lot of alcoholic drinks (even among Christians). On the other hand, it is acceptable for a man to have a few drinks and even get drunk. In the multiple logistic regression analyses, no demographic variables were found to be associated with the consumption of alcohol in this sample.

This study indicates a higher prevalence of obesity in both Australian-Lebanese men and women compared with the 1989 population of the National Heart Foundation Risk Factor Prevalence Study (NHF, 1990). In the latter study, 60% of the men and 50% of the women were overweight or obese. In the present study, about 62 (71%) men and 75 (67%) women were overweight or obese. Most were in the older age group (45-69 years). In general men had a higher prevalence of being overweight and obese than women. This pattern was similar to the national figures from the National Heart Foundation Risk Factor Prevalence Study of 1989 (NHF, 1990).

Overweight and obesity in this sample are attributed to the lack of physical activity as well as to high caloric intake due to the accessibility of food in large amounts in Australia.

Cultural factors also play a major role in food consumption, since the Lebanese entertain with food which constitutes a very important part of their life. They are proud of their cuisine and like to share it with others as a sign of respect and hospitality.

The role of physical activity in improving cardiovascular health is well established, as it reduces obesity, improves blood lipid levels and controls hypertension (Bouchard, et al, 1990). Recent research on exercise duration indicates that moderate intensity physical activity including occupational, nonoccupational, or tasks of daily living (such as brisk walking, cycling, swimming home repair and yard work) is beneficial for cardiovascular health. Three ten-minute sessions at least five days per week has been reported as sufficient to increase fitness and protect against CVD (ACSM, 1990; DeBusk, et al, 1990). Children and adults should set a goal of accumulating at least 30 minutes of

moderate intensity physical activity on most and preferably all days of the week. Data indicate that obese children and adolescents have a high risk of becoming obese adults. Obesity in adulthood is related to CHD, hypertension and diabetes. Thus, the prevention of childhood obesity has the potential of preventing CVD on adults.

Analysis indicated that the youngest age group (20-34 years) and the most educated engaged most in vigorous and less vigorous exercise. Walking was the most commonly reported exercise, especially among the youngest age group (20-34 years) and the oldest aged group (45-69 years), of whom respectively 36 (51%) and 24 (40%) reported walking 3-4 times per week. This finding may be explained by the inability of the youngest individuals to purchase a car. Thus they had to rely on walking to catch public transport in order to move from one point to the other. Similarly, older men and women tended to live in the suburbs of Brunswick and Coburg, walking to do their shopping. They usually did not own a car. In particular, this applied to older women who never learnt how to drive when they migrated to Australia, as 30 years ago driving was viewed to be a skill that is more for men than women in Lebanon.

The Australian-Lebanese reported a significantly higher prevalence of leisure-time inactivity than Australian-born men and women in all the categories of leisure physical activity; vigorous, less vigorous, gardening, housework and walking. Given that 53% of the subjects had children aged 1-14 years, child and family responsibilities were significant barriers to exercise. However, when asked about their levels of confidence to exercise during leisure time for a period of six months, 18 (20%) men and 27 (24%) women were very confident that they would be able to maintain regular physical activity, but 16 (18%) men and 26 (23%) women were not confident. Sixty eight

subjects (34%) reported not having enough time to exercise while 38 (19%) revealed that they hated to exercise alone. While others reported that since the streets are usually empty of people they hated walking alone as they did not feel safe. This is typical of the Lebanese who like doing activities in groups and dislike solitary activities. It is very common in Lebanon, especially during the summer months, when most city people resort to the mountain villages to escape the heat, to see groups of people walking from one village, usually after a light dinner at sunset. Sixteen (8%) subjects identified the sudden change of weather as another barrier to physical activity, since Lebanese-born are used to a climate with four very well defined seasons for which Lebanon is renowned. Eighty six (43%) indicated that they did more physical activity during the summer months. Almost all subjects (84%) were aware of the importance of physical activity to their cardiovascular health in particular and their health and well-being in general even though many presented several of the reasons mentioned above as posing significant obstacles.

We can conclude from the above discussion that physical activity is more likely to be initiated and maintained if the individual perceives a net benefit, chooses an enjoyable activity, feels safe doing the activity, can easily access the activity on regular basis, can fit the activity into daily schedule, feels that the activity does not generate a financial burden, and feels competent in doing the activity.

8.4   Multiple Risk Factors

When compared with 1989 NHF-RFPS findings, the analysis of the present study indicated that a high proportion of Australian-Lebanese had one or more of the three classical CHD risk factors (high blood pressure, high cholesterol and smoking).

Thirteen percent of the men and 10% of women in this study had two to three risk factors as compared with 8% of the men and 5% of the women in the NHFRFPS of 1989. Further 45% of the men and 12 % of the women had one risk factor compared with 42% of the men and 8% of the women in the 1989 NHF study. The 1989 NHFRFPS findings indicated that the prevalence of CHD risk factors increased with age and was mainly seen in those between 50-54 years of age (NHF, 1990). In this Australian-Lebanese study, the prevalence increased with age but it started at a younger age range of 30-49 years.

8.5   Knowledge of Coronary Heart Disease Risk Factors

Awareness of coronary heart disease risk factors appeared quite high among this sample of Australian-Lebanese. The proportion of individuals recognising that such factors as smoking, overweight and high cholesterol levels contributed to coronary heart disease was high. However, few reported attempts to change their behaviour towards smoking and weight reduction.

Lack of exercise, high blood pressure, and heredity were also identified as important CVD risk factors by almost half of the sample. Stress at work, stress at home and personality were also identified as major contributors to coronary heart disease. The high percentage of stress at both the workplace and home, and its relationship to CHD, needs to be further investigated in this group as it could be related to acculturative stress and cultural resistance that might have passed unnoticed in this sample.

8.6   Summary

There is increasing acknowledgement that unhealthy behaviour is frequently maintained by cultural and social processes and that attempts to influence health behaviour which ignores such processes will be largely unsuccessful (Herzlich, 1973, Caplan, 1993). There is a clear need to understand the social and cultural contexts in order to interpret the relationship between social class, health and ethnicity.

Among the Australian-Lebanese, socio-economic status is attributed to financial gain as opposed to educational qualifications, academic achievements and prestigious positions. Thus, there is a large group of 'well to do' Australian-Lebanese who have no formal education. The findings of this study revealed that participants who had no formal education irrespective of their economic status had a lack of knowledge about blood pressure, cholesterol and did not exercise. Smoking and obesity were other prevalent risk factor behaviours in this population group that were not correlated to the level of education or socioeconomic status.

Stress was experienced by both men and women and was verbalised by many participants of this study to be related to the process of migration, lack of proficiency of English language, loss of social status, lack of support of family and friends and social isolation. All of these factors combined produce perceptions of powerlessness, depression, lack of self-confidence and anxiety which will encourage adoption of unhealthy behaviours (such as smoking, lack of physical activity and overeating). These factors will adversely impact on the health status of this population group and would require appropriate interventions and strategies to counteract their negative effects on the general well being of this group. This study similar to other national and

international studies showed that aging plays a role in increasing the risk of CHD which is another area that needs specific attention as this population ages.

In conclusion, we have no data from Lebanon to compare the prevalence of risk factors among the Australian-Lebanese to the Lebanese in Lebanon. Thus, it cannot be clearly stated that the Australian-Lebanese are disadvantaged and more at risk in their new adopted country than their counterparts in Lebanon.

Chapter Nine will outline the recommendations and future directions that need to be undertaken to improve the 'cardiac wellness' of this ethnic community and will also discuss the limitations of this study.

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CHAPTER NINE

CONCLUSIONS

9.1 Recommendations

Evidence from both epidemiologic and clinical studies documents the relationship between predisposing risk factors for coronary heart disease (CHD) and subsequent coronary events (Kannel, 1990). CHD is a serious health problem for the Australian-Lebanese in Melbourne. The findings from this study clearly demonstrate the prevalence of several CHD risk factors such as, hypertension, obesity, elevated cholesterol, cigarette smoking, and a sedentary lifestyle. All these risk factors are compounded with the stress of immigration to a new country, difficulties in accessing health care facilities, poor English language and low socioeconomic status for many of the participants. Thus, awareness of these prevalent risk factors and an understanding of the related cultural beliefs, behaviours and health practices of this population group are important in the development of successful health promotion programmes that will reduce their CHD risk factors and promote healthy lifestyle behaviours.

Given the complex nature of behaviour change processes, the most appropriate theoretical approach for the planning of a successful health promotion programme for this population group is an integrative one, incorporating a number of frameworks identified in previous research as well as utilizing data findings of this study. Understanding the various health behaviour models as a basis for predicting behaviours, assessing health beliefs and practices and identifying barriers to compliance with health regimes should facilitate the development of practical principles that can guide and improve efforts to promote the health of the Australian-Lebanese.

Interventions for health promotion can be implemented through several different strategies, incorporating family, community-based and school-based involvement and role modelling.

The Lebanese family traditionally plays a very important role in providing emotional and material security to its nuclear members as well as to its extended complex kinship group. The model example of a Lebanese family would be the parents, children, grandparents, and unattached dependent relatives under one roof. In Australia this pattern may be seen only in second generation Australian-Lebanese families. CHD risk-reduction interventions should involve all family members, as each generation can benefit differently from the specific interventions and strategies which are planned for initiating and maintaining lifestyle changes.

Risk factor screening and education concerning smoking, blood pressure, cholesterol, dietary intake and physical activity are of great importance. Such health education programmes should be planned for different age groups, so that they are age specific. The style and language of programs should be appropriate to deliver health messages. A proper assessment by health professionals of the stages of behaviour change which individuals have reached is relevant in order to tailor specific health promotion strategies. For example, individuals in the pre-contemplation and contemplation stages need interventions focusing on fostering feelings of self-efficacy. Specific information and behavioural strategies would be required to move them from one stage to the other.

Activities of great importance involving women as the primary food preparers would include dietary counselling so that cultural foods can be prepared using less fat and less salt. The women in this study were the primary persons making decisions about family meals and undertook the responsibility for food shopping and cooking. It is not very common in the Lebanese culture for men to participate in the kitchen, which is seen as the woman's domain.

The Lebanese family is traditionally patriarchal, and men play the role of the head of the family. The perceptions of the male's absolute authority which are reinforced by custom should be used in promoting healthy living by leading through example. The men should serve as role models for their children in promoting a healthy lifestyle. Smoking-cessation, weight reduction programmes and involvement in physical activity should be encouraged through specifically tailored health promotion programmes that are run separately for men and women in this group.

Children and adolescents should be educated on leading a heart-healthy lifestyle which includes regular exercise and choices of healthy foods. They should also be educated about the dangers of smoking. Children who learn early about healthy lifestyles are likely to become healthy adults and will serve in the future as role models in promoting a healthy lifestyle that can be passed from one generation to the next.

Local doctors were identified by the participants in this study as a source for health information. Doctors should encourage members of this community to undertake screening tests for hypertension and cholesterol and advise them to quit smoking. It is important for family doctors (Mullins, Livingston, & Borland, 1999) to educate the Australian-Lebanese public on the hazards of smoking and discuss with them the short-

term health hazards such as (bronchitis, reduced appetite and the effects of passive smoking on other family members) and the long-term hazards such as (emphysema, CHD and lung cancer).

Community-based interventions for CHD risk reduction that are culturally relevant and geographically accessible to attract maximum participation are recommended. These programmes should be developed involving individuals and groups from the Australian-Lebanese community as well as using influential role models in the community (for example, nurses, doctors, teachers and community leaders of village organisations). Role modelling, when performed by individuals who are respected and admired in the community is an effective method of changing health behaviours of the community. Many of the Australian-Lebanese belong to village communities and organise social functions. Organizing social activities and social functions in a health-promoting manner should be encouraged. For example, the food offered should be low in sodium and fat content. Vegetables and fruits should be offered instead of sweets. Smoking should be banned at such functions and people should be encouraged to dance as a form of low intensity exercise.

Another method of reaching out to this population is to utilise the Arabic speaking schools that are run by both the Christian and Muslim religious groups. School-based interventions can start children on the road to a healthy lifestyle before they develop poor health habits. Providing physical education and nutritional programmes that promote heart-healthy lifestyles that can be maintained throughout a lifetime is paramount. It is very important to involve parents and the school community at large to ensure the success of such health promotion programmes.

Health promotion programmes should be disseminated widely through the print and telecommunications. These areas were identified by this sample as a means of obtaining health information. The SBS Arabic radio programme, and SBS television and printed material such as pamphlets in the Arabic language on a range of health issues should all be utilized to their fullest extent.

It is expected that education, social and family support will serve to promote important psychosocial attributes such as self-efficacy which has been associated with healthy behaviour. Given that in the present study around half of the participants attributed their failure to achieve a healthy lifestyle to a lack of will power a focus on enhancing empowerment through developing a strong sense of self-efficacy should serve as a major intervention for this group. This aspect is highlighted in the HBM and the Social Learning Model as a necessary component in any attempt to achieve behaviour change. Individuals in this population group should be empowered to take responsibility of own health actions.

9.2   Limitations

This study was constrained by certain limitations. Using a convenience sample rather than a population-based sample was a major disadvantage in that it did not generate a representative sample of all Australian-Lebanese residing in Melbourne. A randomly selected and a larger sample would have been preferable to draw conclusions from. However, inferences and generalizations can nevertheless be made from this sample about the knowledge, common health behaviours, beliefs and attitudes towards risk factors for heart disease in the Australian -Lebanese population in Melbourne.

Another limitation of this study was the exclusion of objective measures of blood lipids. In this study crude estimates only were collected based on self-reported levels. Blood lipids were not obtained since the researcher did not have the necessary laboratory or financial resources. The time frame for this study also did not allow for the collection of fasting blood samples from all household members as it would have restricted the time for the visits and the number of interviews that could have been conducted given that only one person, the researcher, was available to collect the data. Many of the interviews were carried out in the evenings and weekends only, when participants were available in order to complete the data collection in the allotted time frame.

Another possible shortcoming of the present study was the method used to collect dietary information. Dietary intake was based on the reported frequency of eating certain types of food, either on a daily or weekly basis and was confined to responses to a specific questionnaire.

Food models could not be utilised to indicate neither the quantity nor the types of foods consumed, since these models are based on Anglo-Saxon types of foods only. It would have been preferable to utilise food frequency logs with a three-day or weekly intake record to fully assess dietary intake. However, such an approach would undoubtedly have proven to be an extremely difficult task given the nature of the Lebanese cuisine, with its many dishes consumed at each meal-time. In addition, following the latter method of assessing dietary habits would have increased the interview time further and probably would have reduced the number of participants included in the study.

Valid assessment techniques of physical activity are vital. It seems that a clearer conception of appropriate physical activity for cardiovascular health is necessary as well as valid assessment tools. A more detailed and specific questionnaire to measure physical activity at work, as well as during leisure would perhaps have yielded a more accurate picture of physical activity levels in this population group. Physical activity was self-reported. Instruments such as the use of pedometers that are expensive were not available to provide more objective measures of the activity of participants. Many participants who worked in laborious and strenuous work in the home and in their jobs would have undertaken enough levels of strenuous physical activity and did not want to do more during leisure time. They did not see exercise as an important issue. Although individuals took short walks to collect their shopping, the carrying of the shopping bags were not considered by many participants to be physical activity. Information about these physical activities had to be extracted from the participants but was not presented in the data which was confined to responses to a specific questionnaire. Unfortunately this degree of detail did not become apparent till much later and for all participants. This is an important aspect for future research on issues of real-life activity that should be considered.

9.3   Future Directions

Similar studies should be conducted in other major cities in Australia to compare data and to find out if similar trends emerge among Australian-Lebanese in cities other than Melbourne. The same can be said about rural as well as urban areas. It would also be ideal if a similar study could be conducted in Lebanon to compare the health knowledge, attitudes, barriers and risk factors among the Lebanese in present-day Lebanon.

A health promotion program tailored to meet the needs of this particular ethnic group and based on models of behaviour change should be carefully designed, implemented and evaluated. CVD risk factors should be assessed at baseline and after three years following the health promotion program to determine whether a reduction in risk factors amongst this population has been achieved.

In conclusion it is believed that culturally specific tailored health promotion programmes based on the data from this study, to increase the participation of this group in physical activity and to reduce their high caloric intake, and to specifically aim to reduce their smoking habit will improve their health and reduce their risks of cardiovascular disease.

Nurses have a long and impressive commitment in treating patients with CHD. They have been the primary source of teaching and councelling of patients and their families at the bedside in relation to CHD and its risk-reduction. Nurses have directed cardiac rehabilitation programmes and have been involved in many public health initiatives in the assessment of cardiovascular risk factors.

Nurses now play a pivotal role in the development of cardiac-wellness programmes. Nurses who work with people of varied cultures need to integrate cultural considerations in their assessment of different ethnic groups and in the development and planning of creative, motivational and culturally relevant health promotion programmes for the community. They could play an instrumental role in the implementation of such programmes supporting this specific non-English speaking background community in

order to help them reduce their risky behaviours and assist them in achieving a healthier lifestyle and maintaining it. Pender's Health Promotion Model is one of the successful nursing health promotion models that could be used to design a culturally appropriate health promotion programme for this population group.

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Appendix 1a and 1b
Explanatory Letter to the Participants in
English and Arabic

Appendix 2a and 2b
Consent Form in English and Arabic

Appendix 3a and 3b
Questionnaire in English and Arabic

Appendix 4
Semi-Structured Interview