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# A Quantitative and Qualitative Study of Lifestyle and Obesity in Asian Adolescents in New Zealand

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**Shirin Foroughian**

*A thesis submitted in fulfillment of the requirements for the degree of Doctor of  
Philosophy [Population Health], The University of Auckland, 2010.*

## **Abstract**

*Overweight and obesity in childhood is a major and growing public health concern with short and long term physical and psychological consequences. Historically obesity was seen as a non-Asian phenomenon, hence this research focused on looking at issues of overweight and obesity in twelve to eighteen year old Asians in New Zealand. Particular emphasis was given to investigating the nutritional and exercise behaviours of young New Zealand Asians, in order to suggest a health promotion approach to empower and improve the health of young people.*

*The research was based on both quantitative (structured individual interviews and anthropometry measurements with 821 students) and qualitative approaches (semi-structured interviews with 12 focus groups comprising 46 students) of South Asian, East Asian and European ethnicity who lived and attended high schools in South Auckland.*

*The findings suggest that being overweight is a concern faced by Asian adolescents at the same level as European adolescents. The results show no significant difference in mean body mass index or mean waist to height ratio amongst the three ethnic groups; and no difference in fat mass between South Asian and European adolescents when using same cut-off points for all ethnicities. Additionally, there are a number of other risk factors affecting the weight status of Asian adolescents including: missing breakfast or lunch; consumption of junk food such as chips, biscuits, chocolates and pies while at school or at home before dinner; purchasing food from school canteens or dairies; discrimination of traditional foods at school; high consumption of sugary drinks, fried and fast foods; having access to more food and more variety than in their traditional cultures; lack of exercise and opportunities to be active; and hours spent watching television or playing computer or electronic games. There are also a number of factors that play a protective role for all adolescents in maintaining a healthy weight including: having breakfast and lunch; bringing food from home; walking to school; and doing sports at school or being involved in an organised or team sport.*

*Empowering and culturally appropriate 'educational and physical activity interventions' for young people and their families are recommended; but to deal with the issue of obesity in Asian adolescents, family, school, community and government all have to play a role.*

## **Dedication**

To my loving and supportive parents

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## Glossary

<b>%BF</b>	<b>PERCENTAGE BODY FAT</b>
<b>A</b>	<b>AGE (Y)</b>
<b>AQoL</b>	<b>ASSESSMENT OF QUALITY OF LIFE</b>
<b>BIA</b>	<b>BIOELECTRICAL IMPEDANCE ANALYSIS</b>
<b>BMI</b>	<b>BODY MASS INDEX</b>
<b>CF</b>	<b>CONSENT FORM</b>
<b>CMDHB</b>	<b>COUNTIES MANUKAU DISTRICT HEALTH BOARD</b>
<b>CVD</b>	<b>CARDIOVASCULAR DISEASE</b>
<b>DBP</b>	<b>DIASTOLIC BLOOD PRESSURE</b>
<b>DOHAD</b>	<b>DEVELOPMENTAL ORIGINS OF HEALTH AND DISEASE</b>
<b>DVD</b>	<b>DIGITAL VIDEO DISC</b>
<b>E</b>	<b>ETHNICITY</b>
<b>FOAD</b>	<b>FOETAL ORIGINS OF ADULT DISEASE</b>
<b>FFM</b>	<b>FAT FREE MASS</b>
<b>FM</b>	<b>FAT MASS</b>
<b>H</b>	<b>HEIGHT (CM)</b>
<b>HDLC</b>	<b>HIGH DENSITY LIPOPROTEIN CHOLESTEROL</b>
<b>HEHA</b>	<b>HEALTHY EATING HEALTHY ACTION</b>
<b>IOTF</b>	<b>INTERNATIONAL OBESITY TASK FORCE</b>
<b>LBD</b>	<b>LET'S BEAT DIABETES</b>
<b>LTSA</b>	<b>LAND TRANSPORT SAFETY AUTHORITY</b>
<b>MOH</b>	<b>MINISTRY OF HEALTH</b>
<b>NCNS</b>	<b>NATIONAL CHILDREN'S NUTRITION SURVEY</b>
<b>NHMRC</b>	<b>NATIONAL HEALTH AND MEDICAL RESEARCH COUNCIL</b>
<b>NZHS</b>	<b>NEW ZEALAND HEALTH SURVEY</b>
<b>OPIC</b>	<b>OBESITY PREVENTION IN COMMUNITIES</b>
<b>P</b>	<b>P-VALUE</b>
<b>PA</b>	<b>PHYSICAL ACTIVITY</b>
<b>PDA</b>	<b>PERSONAL DIGITAL ASSISTANT</b>
<b>PedsQoL</b>	<b>PAEDIATRIC QUALITY OF LIFE</b>
<b>PEOPLE</b>	<b>PLANNING AND EVALUATION OF PEOPLE-LED ENDEAVOURS</b>
<b>PIS</b>	<b>PARTICIPANT INFORMATION SHEET</b>
<b>R</b>	<b>RESISTANCE</b>
<b>SAS</b>	<b>STATISTICAL ANALYSIS SYSTEM</b>
<b>SBP</b>	<b>SYSTOLIC BLOOD PRESSURE</b>
<b>SE</b>	<b>STANDARD ERROR</b>
<b>SES</b>	<b>SOCIOECONOMIC STATUS</b>
<b>SPARC</b>	<b>SPORT AND RECREATION NEW ZEALAND</b>
<b>TBCA</b>	<b>TANITA BODY COMPOSITION ANALYSER</b>
<b>TBW</b>	<b>TOTAL BODY WATER</b>
<b>TG</b>	<b>TRIGLYCERIDE</b>
<b>TV</b>	<b>TELEVISION</b>
<b>W</b>	<b>WEIGHT (KG)</b>
<b>WC</b>	<b>WAIST CIRCUMFERENCE</b>
<b>WHO</b>	<b>WORLD HEALTH ORGANIZATION</b>
<b>WHR</b>	<b>WAIST TO HEIGHT RATIO</b>
<b>Z</b>	<b>IMPEDANCE (<math>\Omega</math>)</b>

# Chapter 1. Overview

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This research is focused on looking at issues of overweight and obesity in Asian adolescents in New Zealand. This chapter presents a brief overview of the aims of the thesis, the population of study, the researcher's background, and the thesis structure.

## **1.1. Aims of Thesis**

Whilst the topic of obesity has been, and continues to be, widely studied, there have been few studies undertaken on Asian adolescents, particularly in New Zealand. The limited evidence in this situation has resulted on a lack of focus on Asian adolescents from most health policies and intervention programmes related to the prevention and management of obesity in New Zealand, on the mere assumption that Asians are not overweight. This research is an attempt to investigate the position of Asian adolescents in relation to being overweight or obese, with the hope of decreasing this gap of knowledge in the public health system. For as long as we talk about improving the health of the New Zealand population, we cannot ignore the ever growing Asian population.

The global picture of overweight and obesity shows that children (aged 5 – 17 years) are becoming more vulnerable around the world. Prevalence of overweight and obesity in children has escalated over the last 20 years with at least 155 million school-age children worldwide being overweight or obese, according to the latest estimates from the International Obesity Task Force (Lobstein, Baur, & Uauy, 2004).

It is evident from this report and other literature that overweight and obesity in childhood is a major and growing global public health concern. The World Health Organization describes the prevalence of obesity as an epidemic (World Health Organization, 2008) and the New Zealand case is no exception. The 2006/07 New Zealand Health Survey found that 8.3% (or one in twelve children) aged 2 – 14 years were obese, and 20.9% (or one in five children) were overweight (Ministry of Health, 2008).

Overweight and obese children are more likely to grow into overweight adults, and experience detrimental developmental and mental health, as well as non-

communicable diseases such as diabetes and cardiovascular disease later in their life (World Health Organization, 2008). Therefore it was important to explore the area of obesity in children and adolescents because overweight, obesity, and their related conditions are preventable, thus making this age group a very desirable group for targeting prevention.

Childhood obesity is a global concern but it is also increasingly affecting more low- and middle-income countries (World Health Organization, 2008). According to World Health Organization (2008), more than 75% of overweight and obese children live in low- and middle-income countries. Although this may not directly affect New Zealand but it has great impact on Asian populations: for those who still live in their home countries and those who have immigrated to a new country like New Zealand and experience various resettlement issues. Asian adolescents who emigrate are potentially more at risk by becoming in contact with an obesogenic (obesity promoting) environment of the type found in New Zealand, which may lead to weight concerns and its related health issues later in their lives (Swinburn & Egger, 2004).

World Health Organization (2008) states that the primary causes of the rising levels of childhood obesity are increased intake of energy-dense foods that are high in fat and sugars but low in vitamins, minerals and other healthy micronutrients, in addition to decreased levels of physical activity. In New Zealand, the 2002 National Children's Nutrition Survey identified five areas as important causes of obesity including missing breakfast, purchasing school food from dairy, consumption of soft drinks (e.g. coke), physical inactivity, and watching a lot of television (Ministry of Health, 2003b).

This thesis is an extension of the Obesity Prevention In Communities (OPIC) project, and intends to explore the topic of weight increase in young Asians by interviewing and measuring a sample of 12 to 18 year old adolescents attending seven high schools in South Auckland and comparing them with European adolescents.

Particular emphasis in this research has been given to the impact of lifestyle on the nutritional and exercise behaviours of young New Zealand Asians, which

are likely to affect their weight. Topics such as food patterns, activity patterns, family and school environment, knowledge and opinion of body weight will be addressed to illustrate the lifestyle of young Asians in New Zealand.

## 1.2. New Zealand’s Asian Community

In New Zealand, ethnicity is self-defined and people can belong to one or more ethnic groups (Statistics New Zealand, 2008). According to Statistics New Zealand, Asian ethnicity is one of the six major categories used in New Zealand to identify ethnicity including European, Māori, Pacific peoples, Asian, MELAA (Middle Eastern, Africans and Latin Americans), and Other.

European ethnic group are people who identify with at least one European ethnicity, for example New Zealand European, English or Dutch (Statistics New Zealand, 2008).

Asian people are the New Zealanders who identify themselves as belonging to one or more Asian ethnicities. The largest ethnicity among Asian people in New Zealand is Chinese, followed by Indian, Korean, Filipino, Japanese, Sri Lankan, Cambodian and Thai (Statistics New Zealand, 2008).

According to the latest census (2006), there are currently 354,552 people living in New Zealand who identify themselves as Asian, who comprise about 9.2% of total New Zealand population (4,027,947 people in 2006). Moreover the results from 2006 census shows that not only is the New Zealand Asian population rising, but the Asian ethnic group has had the biggest percentage growth since 2001 - by 48.9% (Statistics New Zealand, 2008).

According to New Zealand Statistics, the Asian population has doubled in the last 10 years:

**TABLE 1.1. ASIAN POPULATION IN NEW ZEALAND**

YEAR	1996		2001		2006
		→		→	
POPULATION	173,502		238, 176		354,552



New Zealand's Asian population is expected to grow and double to over 600,000 by 2021 comprising 13% of New Zealand population, which will be almost equal to Maori population and will exceed the number of Pacific Island people (Statistics New Zealand, 2008).

Bearing in mind the growth that the Asian population in New Zealand is experiencing, we can no longer continue to ignore this ethnic group in our planning, interventions, or policies in relation to obesity prevention and maintaining a healthy and active lifestyle.

### **1.3. The Researcher's Background**

The researcher is a trained New Zealand nutritionist with postgraduate degree in health promotion and community development. She is an immigrant herself and is closely identified with the general background of the ethnic groups being studied, which makes her appropriate for this study.

In this project, the researcher was closely involved in data collection and anthropometry measurements, data entry, parts of data cleaning, and data analysis of the quantitative part of this study, in addition to managing the data collection for OPIC's follow up study over the following three years. All aspects of the qualitative part of the study were developed and carried out by the researcher (for details please refer to Section 3.2).

### **1.4. This Research**

As previously stated, this research will look at the problem of obesity and being overweight among young Asians in New Zealand. The intention is to interview and measure a sample of Asian and European adolescents who attend high schools in Auckland.

The specific aims of this research are:

- To determine if overweight/obesity is a problem in New Zealand Asian adolescents

- To identify the nutritional and exercise behaviours of young New Zealand Asians and to understand the factors influencing these behaviours
- To investigate understanding and knowledge of heart health among young New Zealand Asians
- To suggest a health promotion/community development model to empower and improve the health of young New Zealand Asians

## **1.5. Thesis Structure**

This thesis includes seven chapters:

Chapter One presents an overview of the research. Chapter Two (Literature Review) provides a theoretical base and support for the study. Chapter Three (Methodology) explains both the quantitative and qualitative methodology used in the research and how the information needed for this study was gathered. Chapter Four (Quantitative Results) presents the quantitative results of the study from surveys and anthropometric measurements, and Chapter Five (Qualitative Results) presents the qualitative results of the study from focus group interviews. Chapter Six (Discussion) provides a discussion of the results, and suggests a possible health promotion approach and a simple model to a healthy lifestyle for the population of study. Chapter Seven (Conclusion) provides overall conclusions from the whole research project.

The next chapter presents a brief overview of the literature to provide background and theoretical support for this research.

# Chapter 2. Background and Literature Review

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The focus of this research is the topic of ‘childhood overweight/obesity’ and its influencing factors among young Asians in New Zealand. The available literature on obesity and weight related issues is extensive and to outline them in complete detail is beyond the scope of this thesis. Therefore, the following selected areas are covered.

First, a brief contextual background of the two major ethnic groups involved in this study (Chinese and Indians) is presented (Section 2.1). Second, the issue of childhood overweight/obesity is defined and outlined, including the available New Zealand statistics (Section 2.2). Third, the issue of overweight/obesity in Asian adolescents is investigated (Section 2.3). And fourth, health promotion theories and practices that support the recommendations made as a result of this research are illustrated (Section 2.4).

## 2.1. Asians’ Backgrounds



**Figure 2.1. Map of Asia and Australasia (from Google Earth)**

The diversity of New Zealand’s population continues to increase and Asians in New Zealand have progressed from being a small group ignored as ‘Other’ twenty years ago to being a diverse, vibrant and significant sector of New

Zealand society (Workshop Organising Team, 2005). However, Asians have their own unique issues and needs but are often invisible in government policies. To cater for this, it is important to understand the definitions of the term 'Asian' in New Zealand (discussed in Chapter One) and their backgrounds before any attempt to improve the accuracy and utility of policy development, health and social research, community engagement and other programmes that use this term.

Chinese and Indian people have settled in New Zealand since the 19th century but there has been a general lack of information and interest in the status of these communities, as reflected by the scarcity of health data available until very recently (Rasanathan, Craig, & Perkins, 2006).

The New Zealand definition of the term 'Asian' contains half the peoples of the world and it is obvious that 'Asian' does not constitute a genuine ethnicity (Rasanathan, Craig et al., 2006). The simple definition of 'Asian' refers to anyone originating from the Asian continent, which includes peoples with origins from Afghanistan in the west to Japan in the east and Indonesia in the south (Statistics New Zealand, 2008).

It needs to be noted that the diversity of 'Asian' people in New Zealand needs to be considered as they are not a single ethnic group. This may include ethnicity, settlement history, English language ability, acculturation, and socio-economic status. Using 'Asian' as a category in research, can result in masking the needs of different groups within this population (Rasanathan, Craig et al., 2006). Rasanathan et al. (2006) suggest that there is an evidence of this phenomenon in health in New Zealand where 'Asians' are generally considered to have good health whereas Indians for example have one of the highest rate of cardiovascular diseases in the world (Reddy, Shah, Varghese, & Ramadoss, 2005).

This section explores the food, recreation, and family life backgrounds of the Chinese and Indian peoples who comprise most of the populations of interest in this study. All the information and maps in this section are cited directly from the Cultural Profiles Project (Citizenship and Immigration Canada, 1998-2002).

The aspects of life described in this document may not apply in equal measure to everyone from the profiled country, but each cultural profile provides an insight and overview of life and customs in each country.

## China

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**Figure 2.2. Map of China (from the Cultural Profiles Project)**

China is the world's fourth largest country (by area) and home to one-quarter of the global population. Countries on China's borders are: Kazakhstan, Mongolia and Russia in the north; Korea and the East and South China Seas in the east; Vietnam, Laos, Burma (Myanmar), Bhutan, Nepal and India in the south; and Pakistan, Afghanistan, Tajikistan, and Kyrgyzstan in the west. Within China are also disputed territories, such as Taiwan and Tibet, and colonies such as Hong Kong and Macau.

### ***Food in China***

Chinese cuisine is diverse. Over 2,000 years ago, the Chinese were printing cook books, importing food ingredients, dining in restaurants and developing sophisticated cooking techniques.

Chinese people are fond of fresh food and prefer to shop daily. When both parents work, pre-cooked foods are the norm. Lunch is usually eaten at work or bought from school canteens. Dinner is the main family meal.

In general, the Chinese eat an extremely wide variety of meats and vegetables. The one exception is dairy products, which are not part of the everyday diet, but soybean products provide protein and calcium. They use strong flavours such as onions and garlic, and like wheat noodles and rice. Lamb is popular in Muslim populations but pork is preferred elsewhere in China. Cooking styles differ in different regions and can be divided into four main groups.

### ***Sports and Recreation in China***

Table tennis, basketball and soccer are the most popular sports in China. Chinese people have won numerous Olympic medals in gymnastics, women's volleyball and table tennis.

China has developed dozens of movement-based arts, many of which have become popular worldwide, like tai chi. Younger people may try one of the more strenuous and martial styles of tai chi.

Most people spend leisure time with family and friends. Watching television is a favourite everywhere. In warm weather, Chinese like to relax outdoors by playing games, flying kites, reading or practising musical instruments. Young people in cities like discos with live bands playing Western music and many cafeterias and restaurants offer karaoke.

### ***Family Life in China***

The extended family is the basis of Chinese family life. In urban areas, housing units are small and can only accommodate a nuclear family. Unmarried adult children, remain at home until married. Chinese seniors are respected for their wisdom and experience and are usually cared for by their families.

In rural areas, houses are larger and usually several generations live under one roof. Every member, young or old, contributes to the family's welfare. But increasing unemployment has forced people to move to urban areas.

Traditionally, Chinese women were expected to be submissive but communist policies gave women equal rights and equal protection. Both urban and rural women work outside the home, and at home women are mostly treated as equal partners by their husbands, who help with housework and cooking.

## India

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**Figure 2.3. Map of India (from the Cultural Profiles Project)**

Located in southern Asia, India is a vast country. To the northwest is Pakistan, while China, Tibet, Nepal and Bhutan lie to the north and northeast. To the east is Myanmar and Bangladesh. Southeast is the Bay of Bengal, while the ocean and island country of Sri Lanka lies to the south, and the Arabian Sea to the southwest.

### ***Food in India***

Indian cuisine has become popular around the world. However, what the world knows as Indian cooking is a blend of different regional styles.

The most popular forms of Indian cooking involve curries and bean dishes prepared in dozens of ways. These dishes are highly flavoured with spices and



are served with a grain like rice, wheat, millet or corn. Yoghurt, savoury pickles and chutneys are also common accompaniments. Bread can be soft chapattis or rotis in the west, thick fried parathas in the north and central regions, and dhosai (rice and wheat flour crepes) in the south. Dairy food is popular in a variety of forms, including milk, butter or ghee, yoghurt, and cheese or paneer. Popular drinks are Falooda (made from milk, nuts, cream and vermicelli strands) and lassi (made from iced yoghurt), spiced tea and coconut water.

Religion affects Indian eating patterns. Hindus do not eat beef, and Muslims are forbidden to eat pork and pork products. All Jains and some Hindus are strict vegetarians. Indians follow restricted diets for pregnancy and mourning. There is also a selected system of fasting related to religious practices.

### ***Sports and Recreation in India***

India's national passions are cricket and films. Many Indian families enjoy spending the evening sitting together and watching movies and shows on television.

Children like active games, many of which do not require elaborate equipment. Throwing and batting games are popular. String tops, marbles, cards and kites are favoured by young boys, and girls prefer jacks and crafts. Popular with both genders are kho kho and khabbadi (two varieties of tag). Other popular sports include soccer, horse racing and field hockey. Board games also have a long history in India, and chess is another popular game that has originated from India.

### ***Family Life in India***

Living conditions vary greatly in India. Every region of India has its own character and traditions and family life is equally varied. Religion, caste and regional differences influence family structure. Although traditional roles are changing, there are important values shared by most Indian families. Many live in an extended family, in which every member has their own role, often determined by age and gender. Elders use their experience and wisdom to help guide younger family members. Children are cherished and can look forward to

continual family support throughout their lives. In return, children are expected to respect family wishes.

Traditionally men have held the primary responsibility for financially supporting their families, although many women, especially in rural areas, contribute to the family's income. Even if they have careers, women are largely responsible for maintaining the household (e.g. cooking) and caring for their children and aged relatives.

The next section of this chapter looks at relevant literature around the issue of childhood overweight and obesity.

## **2.2. Childhood Overweight/Obesity**

Achieving a healthy body weight and composition is of importance in preventing disease and promoting wellbeing. Health risks are associated with being both overweight and underweight. Efforts to achieve a healthy body weight should begin in childhood (Garrow, James, & Ralph, 2000). Identifying children at risk and modifying risk factors are important health promotion actions (Worthington-Roberts & Williams, 2000).

The prevalence of childhood obesity is rising at an alarming rate, and paediatric obesity has become an important public health issue globally, and one of the major public health challenges of the 21st century (Morgan, Tanofsky-Kraff, Wilfley, & Yanovski, 2002; World Health Organization, 2008).

Obesity has been the most important nutritional disease in the developed countries of the world, where its prevalence has increased particularly rapidly over the last two decades. However, even in underdeveloped countries (e.g. low- and middle-income countries), where traditionally nutritional problems are related to under-nutrition, overweight and obesity are increasing at an alarming rate (Ebbeling, Pawlak, & Ludwig, 2002; World Health Organization, 1998b, 2008).

Worthington-Roberts and Williams (2000) state that an excessive rate of weight gain and deposition of fat occurs when energy intake exceeds energy

expenditure. Overtime, this situation can lead to obesity. Garrow et al. (2000) suggest that obesity is a condition in which body fat stores are enlarged to an extent, which impairs health. In the Ministry of Health report (Ministry of Health, 2003a) obesity has been described as 'a normal response to an abnormal environment' (Swinburn et al., 1997).

Obesity in children, same as adults is a result of excess body fat but the exact definition of obesity in children is more complicated than in adults and to be accurate it needs to consider age and body fatness and have cut-off points that correlates with poor health (Kopelman, Caterson, & Dietz, 2005).

Morgan et al. (2002) suggests that childhood obesity can be defined as body mass index (BMI) more than 95th percentile for age and sex, whereas, overweight is defined as BMI more than 85th percentile, and when using these cut offs, more than one quarter of all children and adolescents are either overweight or obese.

The current obesity definition in children is based on age-specific BMI cut-offs to classify children's weight status as thinness grades 1-3, healthy weight, overweight or obese and it is approved by the International Obesity Task Force (IOTF) (Cole, Bellizzi, Flegal, & Dietz, 2000; Cole, Flegal, Nicholls, & Jackson, 2007).

Obesity in childhood causes a wide range of serious complications, and increases the risk of premature illness and death later in life, raising public-health concerns (Ebbeling et al., 2002). Overweight and obese children are likely to grow into obese adults and more likely to develop non-communicable diseases such as diabetes and cardiovascular diseases at a younger age (World Health Organization, 2008).

There is increasing recognition that obesity has a direct and causal relationship with many of the major non-communicable diseases for which it was previously classified merely as an associated condition. In June 1998 the American Heart Association announced that it was upgrading obesity from a 'contributing risk factor' to a 'major risk factor' for coronary heart disease, as 'it is a lifelong disease, not a cosmetic issue or a moral judgement' (Garrow et al., 2000).

Children with a BMI greater than the 85th percentile with the complications of obesity or with a BMI greater than the 95th percentile with or without complications should undergo evaluation and possible treatment. These complications include hypertension, sleep disorders, and insulin resistance.

The emphasis on obesity prevention and treatment in children has been reinforced by the belief that body size affects the socialization of children and may lead to the development of a negative body image, associated with subsequent eating disorders (Swinburn et al., 1997).

Therefore, the concern regarding childhood obesity relates to three issues:

1. A link between childhood and adult obesity
2. The adult obesity-chronic disease link with chronic diseases including hypertension, elevated blood cholesterol levels, ischemic heart disease, stroke, cancer, diabetes and osteoporosis (Ernst & Obarzanek, 1994; Kennedy & Goldberg, 1995; Shea et al., 1994).
3. Apart from the chronic debilitating conditions that lead to disability and death in young people, obesity can also drastically reduce an individual's quality of life by causing psychological and social disorders e.g. low self-esteem, discrimination, and depression, which can lead to poor social functioning, impaired academic success and reduced fitness and health (Hill & Silver, 1995; Kumanyika et al., 2002).

Overweight and obesity are important risk factors for a wide range of medical and psychosocial problems. The main risks and consequences of obesity include:

- Morbidity (i.e. disability)
- Reduced insulin sensitivity (i.e. diabetes)
- Coronary heart disease (e.g. hypertension, stroke)
- Cancer (e.g. breast, endometrium, uterus, cervix, ovary, and gallbladder cancer in women and colon, rectum, and prostate cancer in men)
- Osteoarthritis
- Gallstones
- Reproductive disorders (e.g. disorders of menstrual function or fertility)
- Sleep apnoea
- Psychological and social disorders (e.g. low self-esteem, discrimination)

While childhood obesity is associated with a number of conditions including hypertension, dyslipidaemia, chronic inflammation, increased blood clotting, hyperinsulinaemia, type 2 diabetes and glucose intolerance (Ebbeling et al., 2002) the health hazards of the obese person, which have been listed above, become increasingly evident as the person becomes older. Heart disease, hypertension, stroke, osteoarthritis, cancer and gallstones are all conditions which occur mainly in older people, so the obese young person may not experience these as a threat (Garrow et al., 2000) but the magnitude of these conditions re-emphasises the importance of the prevention and management of childhood obesity.

At the same time, the psychological and social penalties of obesity fall mainly on the child and young adult. There is compelling evidence that our society discriminates against fat people (Wadden & Stunkard, 1985). This is particularly damaging to the psychological wellbeing of obese children, who are believed by their peers at school to be lazy, dirty, stupid, ugly, cheats and liars. Social discrimination continues into adult life and obese people are often anxious or depressed (Garrow et al., 2000).

Obese children and adolescents may also experience cardiovascular complications as a result of being overweight or obese. These include hypertension (e.g. high blood pressure), cardiac abnormalities (e.g. ventricular hypertrophy, and cardiac failure), blood vessel structure and function (e.g. increased intimal-medial thickness and reduced vascular compliance), heart rate variability and related respiratory complications (Kopelman et al., 2005). These are all in addition to more complicated cardiovascular diseases that they may experience as an adult.

It is evident from the literature that obesity is a major and growing global public health problem. New Zealand along with many other countries is considered to be in the throes of an obesity epidemic. More than 1000 people die each year from obesity-related health problems (Ministry of Health, 2001), which is more than double the annual road toll (New Zealand Land Transport Safety Authority, 2003). The annual cost of obesity to the New Zealand health sector was conservatively estimated to be around \$135 million per year in 1991 (Swinburn

et al., 1997). The World Health Organization has estimated that the cost of obesity for a country is 2–7 percent of the annual health budget, which equates to \$303 million in New Zealand (World Health Organization, 2000b).

Stefanogiannis et al. (2007) investigated the burden of disease and mortality in New Zealand due to selected nutrition-related risk factors including high total blood cholesterol, high systolic blood pressure, high BMI and inadequate vegetable and fruit intake in 1997. Approximately 4500 deaths (17% of all deaths) in 1997 were attributable to high cholesterol, 3500 (13%) to high blood pressure, 3000 (11%) to high BMI and 1500 (6%) to inadequate vegetable and fruit intake. These risk factors were estimated jointly to contribute to approximately 11 000 (40%) deaths annually in New Zealand.

Mhurchu et al. (2007) reported that in 1997, 3154 deaths (11% of all deaths) in New Zealand were due to higher-than-optimal BMI (>21 kg/m<sup>2</sup>). This amounted to 83% of diabetes deaths, 24% of ischaemic heart disease deaths, 15% of ischaemic stroke deaths and 4% of all cancer deaths. In conclusion, these results quantify the importance of higher-than-optimal BMI as a major modifiable cause of premature death in New Zealand.

### **2.2.1 Australasian Studies of Childhood Obesity**

In New Zealand one of the most prevalent health consequences of overweight and obesity is type 2 diabetes. The likelihood of developing type 2 diabetes rises steeply with increasing body fatness. Approximately 85 percent of people with diabetes can be classified as type 2; of these, 90 percent are obese (Ministry of Health, 2003a). People with type 2 diabetes are at high risk of a range of disabling conditions, including heart disease, hypertension, amputation, stroke, renal failure and blindness. In New Zealand cardiovascular disease (heart, stroke and blood vessel disease) is the leading cause of death, accounting for 40% of all deaths in 2000 and obesity is a risk factor for a number of diseases including coronary heart disease (Hay, 2004).

A study by the University of Queensland's Centre for Burden of Disease and Cost Effectiveness showed that almost 38 per cent of Australians die each year

from heart disease and found that excess weight accounted for 7.9 per cent of those deaths, or up to 10500 lives. Of the deaths, 7000 were due to cardiovascular disease, with a further 2000 due to diabetes. The research also estimated that 70 per cent of diabetes sufferers would die of cardiovascular disease (Australia and New Zealand Obesity Society, 2006).

There has been a rise in obesity in New Zealand from 9% in males and 11% in females in 1977 to 20% and 22% respectively in 2003 (Ministry of Health, 2003a). There is also evidence that the prevalence of obesity is increasing in children and young people in New Zealand.

In 1977 a study of 0-13 year olds found that 23% had weights above the 90th percentile, with Pacific Islander children over-represented (Anderson, Gorman, & Lines, 1977).

A study of Christchurch children aged 10–14 years found that body weight increased in both boys and girls from 1991 to 2000 and fitness levels deteriorated significantly during the same period. Boys increased by a mean of 1.2 BMI units and girls by 1.1 BMI units (Calvert, Ross, & Hamlin, 2001).

In another study, Tyrrell et al. (2001) looked at a total of 2273 Auckland school children, aged 5-10.9 years. The results showed that 14.3% of children were obese using the recommended definition of obesity (BMI greater than 95th percentile). Obesity rates varied with ethnicity and were higher in Pacific Island (24.1%) and Maori (15.8%) than in European children (8.6%). Obesity rates also varied with age, with the highest rates in older children. This study showed high rates of childhood obesity in Auckland school-children, irrespective of the definition used. It also showed that obesity rates varied with ethnicity and age.

The 2002 National Children's Nutrition Survey was a cross-sectional population survey on a randomly selected sample of 3,275 New Zealand children aged 5 to 14 years from 172 schools throughout the country. Information was obtained on food and nutrient intake, frequently eaten foods, eating patterns, physical activity patterns, and dental health. Measures of body size and nutrition related clinical measures of iron, zinc and iodine status were obtained. The primary purpose of the survey was to provide information that could be used to improve,

promote and protect the health status of children in New Zealand (Ministry of Health, 2003b). The results showed that 31% of children were either overweight or obese. Pacific children's levels of overweight/obesity were 62%, Maori 41% and New Zealand European and others 24%.

The 2006/07 New Zealand Health Survey collected information on 4921 children aged from birth to 14 years and 12,488 adults aged 15 years and over and it measured self-reported physical and mental health states, modifiable risk and protective factors for health outcomes, and the use of health care services (Ministry of Health, 2008). The 2006/07 New Zealand Health Survey found that overall 8.3% or one in twelve children (aged 2 to 14 years) were obese, and 20.9% or one in five children were overweight, which shows there has been no change in the average BMI for children since 2002, despite numerous initiatives and intervention programmes being offered during the same time. The 2006/07 New Zealand Health Survey also showed the prevalence of obesity by ethnic groups, which was 5.9% in Asian children compared to 5.5% in European children.

The Asian Health Chart Book 2006 reviewed the health of Asian ethnic group by examining the 2002/03 New Zealand Health Survey. It showed that Indians (15+ years) appear to have a higher prevalence of obesity than Europeans when using ethnic-specific cut-points that defines obesity as BMI greater than 25, compared to the standard cut-point of 30 (Ministry of Health, 2006). These results suggested that Asian people (other than Chinese) have higher rates of obesity than European New Zealanders if ethnic-specific cut-points are used to define obesity. Moreover, the report indicated that duration of residence is significantly associated with likelihood of being obese (defined using ethnic-specific cut-points), suggesting that acculturation is associated with weight gain in adulthood among Asian New Zealanders (Ministry of Health, 2006).

Except for the 2006/2007 New Zealand Health Survey, no other study has looked at Asian children in New Zealand as an independent group. Even the 2006/2007 survey has used the same criteria to define and compare obesity in Asian and European children. At the time this research started (2005) there was



no data or research available on the status of overweight and obesity in young New Zealand Asians.

### **2.2.2 Causes of Childhood Obesity**

It needs to be noted however that the risk of developing obesity is determined by both genetic and environmental factors. Therefore, whether a child becomes obese depends on their genetic susceptibility and the presence of environmental fattening stimuli, such as low social class, single parent families, single child families, excessive television viewing and inactivity (Gibson, Edmunds, Haslam, & Poskitt, 2002).

Another area to be mentioned are the potential effects on obesity of foetal under-nutrition followed by adult over-nutrition. Low birth weight is known to be associated with the onset of obesity later in life, Moreover low birth weight, thinness and short body length are associated with increased risk cardiovascular disease and type 2 diabetes (Barker, 1999). The foetal origins hypothesis states that these diseases originate during foetal development and if the mother who is carrying the foetus is experiencing under-nutrition, the foetus makes adaptations to this environment, and is in turn programmed for the rest of adult life to deal with under-nutrition even when this is no longer present, hence causing cardiovascular, metabolic or endocrine problems (Barker, 1999). In the case of Asians many have experienced malnutrition during foetal life and this is an additional risk factor for this population in relation to obesity.

Having said that, although obesity has underlying genetic causes, the dramatic recent increase must be due to behavioural and lifestyle reasons and the idea of environmental fattening stimuli is widely supported by the literature. Current environmental factors are conducive to more sedentary lifestyles at work and during leisure hours. For many people, lives are busier with more disposable income. For others, working hours are longer, often with little or no disposable income, making less time available for leisure or other physical activities. Loss of cooking skills, easier access to food outlets, larger portions or serving sizes and easier access to pre-prepared foods which tend to be higher in fat, salt and sugar lead to a greater exposure to an energy-dense diet (Kumanyika et al.,

2002). Moreover media influences, particularly television advertising, are very strong, and especially effective on children (Borzekowski & Robinson, 2001; McLellan, 2002). Calvert et al. (2001) also suggest that increases in weight and decreases in physical fitness might be the result of higher levels of television watching, and greater use of computers and video games. All of these issues are quite relevant to the migrated Asian population.

Healthy lifestyle, including diet and healthy eating and physical activity has been shown to improve heart health for those who have had heart trouble, those at risk of it or those who want to prevent it (Jolliffe et al., 2001). An analysis of the 2002-2003 New Zealand Health Survey showed that Asian people are less likely to be physically active (Rasanathan, Ameratunga et al., 2006), and physical inactivity has been identified as a risk factor for coronary heart disease (Jolliffe et al., 2001).

The 2002 National Children's Nutrition Survey showed that during the week 27% of children watch more than two hours of television or videos per day and 40% play computer or video games. The percentage of children watching more than 20 hours of television or videos during weekdays increased with age. In addition no weekend physical activity was reported by 13% of children and this proportion was highest (23%) in girls aged 11-14 years (Ministry of Health, 2003b).

The 2006/07 New Zealand Health Survey showed that 64.1% of children aged 5-14 years usually watched two or more hours of television a day, 47% of children usually use active transport (e.g. walking or biking) to get to and from school, 70.9% of children ate fast food in past seven days, and 63.6% of children had fizzy drink in the past seven days.

In addition to the lack of physical activity and watching a lot of television, the 2002 National Children's Nutrition Survey identified several eating behaviours as the main causes of obesity in New Zealand children. These included high intake of energy dense foods containing saturated fats and sugars such as hot chips and sweet drinks (e.g. Coke and Sprite), missing breakfast and

purchasing school food from the canteen or shops outside the school (Ministry of Health, 2003b).

As discussed above, the prevalence of childhood obesity that is increasing worldwide is raising a number of public health concerns. First, childhood obesity is a strong predictor of adult obesity; second, the low long term success rate and the high social cost of the treatment of obesity suggest that attention should be paid to the prevention of obesity early in childhood (Barba et al., 2001).

Aside from obesity's associated risks, there are psychosocial and emotional burdens carried by obese children and their families, and clinicians are encountering many of these children in their clinics everyday, albeit to address medical conditions other than obesity but which are indirectly caused or exacerbated by obesity. Hence, the issue of obesity continues to slip below the radar and fails to be directly addressed (Holtz, Smith, & Winters, 1999). Our failure to prevent or manage the global epidemic of obesity stems from too narrow a view of what causes obesity, and how obesity causes increased mortality and morbidity (Garrow et al., 2000).

Since many obese children grow into obese adults with high risks for complications (morbidity and mortality) and a low quality of life, more assertive prevention/treatment methods for the potentially overweight/obese children needs to be foreseen. A preferred approach in the treatment of obesity is the prevention of its development as the success in promoting and sustaining fat loss is limited (Gillanders & Tustin, 1992). However, when childhood obesity is present, dietary changes and increased physical activity should be initiated for long-term effect (Epstein, 1995, 1996).

Obesity is a complex and multi-factorial disease and thus far the importance of not just overweight/obesity but rather childhood overweight/obesity and its consequences and risk factors have been established. The available New Zealand statistics support the international trend toward an increasing prevalence of childhood obesity observed in Western countries and verifies the presence of an 'obesogenic' environment in New Zealand. The environment that all immigrants including young Asians are now exposed to.

The following sections look at the international literature in regard to the issue of overweight and obesity among Asian adolescents.

### **2.3. Asians and Weight Related Issues**

Compared to obesity studies conducted on other populations, there is very little study done on the issue of overweight/obesity in Asian adolescents. There is also little information on food habits and dietary changes of this population in their home countries where the prevalence of overweight and obesity has been growing in recent years.

There are even fewer studies available that have investigated the weight status of Asians after resettlement in western countries. Although little information is available, there is general consensus that Asian populations have also started experiencing lower rates of under-nutrition and higher rates of over-nutrition in both their home countries and in the migrated countries.

The search strategy for locating articles for this section from variety of databases (e.g. MEDLINE, PsycINFO, PubMed, Google Scholar) to examine the trend of obesity in Asian populations is presented in Appendix One.

According to the International Obesity Task Force (IOTF) there are very limited data available on the prevalence of overweight and obesity in children living in World Health Organization Asia region as presented in Table 2.1 (International Obesity Task Force, 2009). All these countries (except for Thailand) have used the IOTF cut-off points to measure overweight and obesity in children.

**TABLE 2.1. CHILDHOOD OVERWEIGHT AND OBESITY PERCENTAGE IN ASIA**

COUNTRY		YEAR OF SURVEY	AGE RANGE (Years)	BOYS (%)	GIRLS (%)
Who South East Asia Region	India	2002	5-17 (boys) 5-15 (girls)	12.9	8.2
	Korea	2003	7-17	16.1	9.9
	Nepal	1997	5-17	0	0
	Sri Lanka	2003	10-15	1.7	2.7
	Thailand <sup>1</sup>	1997	5-15	21.1	12.6
WHO Western Pacific Region	China	1999-2000	11 & 15	14.9	8
	Japan	1996-2000	6-14	16.2	14.3
	Singapore	1993	10 & 15	20.4	14.6
	Taiwan	2001	6-18	26.8	16.5
	New Zealand	2000	11 & 12	30	

As it can be seen the data presented above is not up-to-date, it does not cover all age groups in children and adolescents, and not all figures are based on nationally representative studies. Moreover the same cut-off points have been used for all countries, which is not an appropriate way of measuring overweight and obesity in Asian children and adolescents. This issue will be discussed further in this section.

The following studies have investigated the prevalence of overweight and obesity in Asian children in their home countries as well as the migrated countries such as United States, England, Australia and New Zealand.

<sup>1</sup> In Thailand the cut-off criteria to define overweight/obesity in children has been based on the national cut-off points of 85<sup>th</sup> centile (NHANES); other countries have used the International cut-off points (IOTF).

### **2.3.1 Studies of Asian Children living in Asian Countries**

Ke-You and Da-Wei (2001) reviewed the magnitude of under-nutrition and over-nutrition in Asian countries including China, Bangladesh, India, Malaysia, Philippines, Thailand, Vietnam, Mongolia, Kazakhstan, and Fiji by using any available data. Their findings suggest that in general, the prevalence of under-nutrition is declining in this region and more recent studies show a reduction in the number of underweight children. At the same time the problem of over-nutrition is emerging in this region in both developed and developing countries. In a 10 year period from 1982 to 1992, the prevalence of obesity in China in young adults has increased from 10% to 15% for urban areas and from 6% to 9% for rural areas, and from 1985 to 1995 the prevalence of being overweight in school aged children has increased from 3.4% for boys and 2.8% for girls to 7.2% and 9% respectively. The data also showed a five percent increase in overweight and obesity in Indians within five year period from 1989 to 1994. These findings suggest that over-nutrition has become a growing problem in this region, and many Asian countries will now face double challenges in dealing with both under-nutrition and over-nutrition and their health consequences. To tackle the issue of over-nutrition, they are recommending mass education on healthy diet practices. Although this study was about young adults and not children specifically, but because of the limited availability of the data on children and the magnitude of the problem of obesity it was considered important to be included (Ke-You & Da-Wei, 2001).

Ji and Cheng (2008) have explored the prevalence of childhood obesity in China in 2005 claiming that China has now joined the world epidemic of childhood obesity where 32.5% of males and 17.6% of females are either overweight or obese in the big cities. They suggest that the prevalence of childhood obesity in urban China and affluent rural areas has reached the same rate as developed countries. They believe this growing problem is caused by dietary and lifestyle changes in modern China including consumption of fast food, more use of automobiles, lack of exercise, and watching a lot of television (Ji & Cheng, 2008).

Li et al. (2008) have analysed data from three National Nutrition Surveys conducted in China in 1982, 1992 and 2002 (1982 China National Nutrition and stated that the prevalence of overweight and obesity in young Chinese was low in 1982 but the data show a rapid increase since then (Li et al., 2008).

Melby et al. (2008) state that although the role of nutrition in Asian countries like Japan only used to be in preventing diseases associated with deficiency, it is now also in preventing lifestyle diseases such as cardiovascular disease so they are simultaneously dealing with continuing under nutrition and increasing obesity and lifestyle diseases (Melby, Utsugi, Miyoshi, & Watanabe, 2008).

A study by Kim et al. (2005) in South Korean schoolgirls found that 22.3% of girls aged from 8 to 18 were overweight or obese (Kim et al., 2005).

Bhardwaj et al. (2008) have discussed that India has the highest number of patients with type 2 diabetes and that obesity is an important predisposing factor for the development of insulin resistance and coronary heart disease. They state that the prevalence of overweight or obesity in children in New Delhi has increased from 16% to 24% over the last five years and this causes major concerns for India (Bhardwaj et al., 2008).

Other studies have looked at both the prevalence of childhood overweight and obesity, in addition to investigating some of the lifestyle factors affecting the weight status of young Asians. These include dietary habits and fast food consumption, physical activity and hours spend watching television, socio-economic status, income, and education, as well as migration, acculturation and duration of residency in the new country,

Bhardwaj et al. (2008) suggest lifestyle changes and high levels of physical activity are important prevention strategies.

Xu et al. (2008) examined the relationship between television viewing and BMI in adolescents in mainland China, and found that those who watched TV for more than seven hours per week had a 1.5 times greater probability of being overweight, compared to those who watched TV for seven hours per week or less. In addition, the results suggested a linear relationship between TV viewing

time and BMI, after adjusting for other factors such as age, gender, area of residency, pocket money, and level of physical activity. Therefore, they concluded that viewing TV (even as little as one hour per day), might increase the likelihood of being overweight in Chinese adolescents in China (Xu, Li, Ware, & Owen, 2008).

Zhai et al. (2009) studied the nutrition transition in China from 1989 to 2004, covering 16,000 individuals from all age groups. Based on recorded weights and 24 hour food recalls collected over these years they found that while child under-nutrition has decreased, being overweight has increased, and in general, child height and weight have increased during this period. They also reported that consumption of all animal foods (except milk) and the proportion of animal protein and fat as daily energy intake had increased, while cereal intake had decreased. Moreover, vitamin A and calcium intake did not increase and remained low (Zhai et al., 2009).

Wang et al. (2009) reported, based on India National Family Health Surveys from 1992-2006, that the prevalence of overweight and obesity in India (including in children) has increased over the past decade, especially in urban areas and in groups with high-socioeconomic status (Wang, Chen, Shaikh, & Mathur, 2009).

Kaur et al. (2008) have investigated the prevalence of childhood overweight and obesity in a group of 5-18 year olds children from low, middle and high income groups in Delhi. Over 16,000 children participated and overweight and obesity were assessed by measuring BMI and triceps skin fold thickness (TSFT) and using international cut off points appropriate for age and gender. The results showed that the prevalence of obesity and overweight in the low income group was 0.1% and 2.7% respectively, in the middle income group was 0.6% and 6.5%, and in the high income group was 6.8% and 15.3% based on their BMI measurements. Using the TSFT criteria, the prevalence of obesity was a bit higher (1.2% in low income, 2.5% in middle income, and 9.3% in high income groups). The findings suggest that the prevalence of overweight and obesity was higher in children from the high income group compared to the middle and low income groups, possibly due to change of dietary pattern and less physical



activities associated with higher income levels (Kaur, Sachdev, Dwivedi, Lakshmy, & Kapil, 2008).

Jafar et al. (2008) have investigated the trends in nutritional status of children in urban Pakistan by analysing the data on the nutritional status of children aged 5 to 14 years from the 1990-1994 National Health Survey of Pakistan and the 2004-2005 Karachi Survey. They have used data from children in the United States as the reference, which is the same as the international definition of overweight and obesity (BMI above 85<sup>th</sup> or 95<sup>th</sup> percentile). They concluded that despite a high burden of under-nutrition in Pakistani children, there has been an increase in the number of overweight and obese children and this was inversely correlated with the level and frequency of physical activity in children (Jafar et al., 2008).

Lu et al. (2008) measured the prevalence of overweight and obesity and its related cardiovascular disease risk factors in 291 female adolescents aged 15 and 18 years in Taiwan. They measured height, weight, systolic (SBP) and diastolic blood pressure (DBP), uric acid, cholesterol, triglyceride (TG) and high-density lipoprotein cholesterol (HDL-C) of 15-18 year old females. The prevalence of obesity (BMI $\geq$ 25.3) was 9.28% and overweight (BMI $\geq$ 22.7) was 21.31%. The results showed that being overweight or obese was associated with higher SBP, DBP, uric acid and TG, and lower levels of HDL-C. They recommend interventions should focus on encouraging healthy dietary habits and exercise. It needs to be noted that this study used a lower cut-off point to determine overweight and obesity in Taiwanese adolescents compared to international standards, but yet was able to show an association between overweight and obesity and cardiovascular disease risk factors (Lu et al., 2008).

Chen et al. (2008) examined a sample of 883 adolescents aged 12-16 years in Taiwan to assess body shape dissatisfaction. They found that body shape dissatisfaction was prevalent in Taiwanese adolescents, especially in girls. It was suggested that this is linked to the degree of being overweight in boys and girls, as well as in girls who are not overweight or obese (who are dissatisfied with their thinness). The study concludes that although most young people want to be thin, some boys would prefer to be larger and this indicates a relationship

between body shape dissatisfaction and weight status in eastern cultures like in Taiwan (Chen, Fox, & Haase, 2008).

### **2.3.2 Studies of Asian Children living in Western Countries**

The following studies have looked at the issue of overweight and obesity in Asians who have migrated to Western countries.

Jebb et al. (2004) analysed 1997 National Diet and Nutrition Survey of young people in Great Britain and found that Asian children aged 4-18 years were four times as likely to be obese as white subjects (Jebb, Rennie, & Cole, 2004).

Taylor et al. (2005) have examined the prevalence of overweight and obesity in minority ethnic groups in the United Kingdom through a school based survey of 11-14 year old adolescents using the International Obesity Taskforce cut-off points. The results indicated significant differences in BMI among ethnic groups, yet showing high levels of overweight in all ethnic groups. They found that Indian males were at higher risk of being overweight than British European males. They found no association between BMI and measures of socio-economic status in Asian population concluding that the epidemic of childhood obesity is observed in all socio-economic groups, and no group is exempt (Taylor et al., 2005).

Popkin and Udry (1998) used data from the American Adolescent Health Survey from the National Longitudinal Study of Adolescent Health to look at the obesity patterns of their ethnic subpopulations including Asian- Americans and the effects of acculturation on these patterns. It needs to be noted that they used the 85<sup>th</sup> percentile cut-off to measure obesity, which is equivalent to the international definition of being overweight that is BMI more than 85<sup>th</sup> percentile, whereas obesity is defined as BMI measurements above the 95<sup>th</sup> percentile for age and gender. In either case, they showed that 20.6% of all Asian-Americans were overweight or obese, although East Asians (i.e. Chinese and Filipino) had a lower percentage of obesity. They also reported that Asian-American adolescents born in the United States are more than twice as likely to be obese as first generation residents, showing that adolescent obesity increases

significantly in second and third generation immigrants, indicating the effects of acculturation on weight gain (Popkin & Udry, 1998).

Lauderdale and Rathouz (2000) examined BMI of adults in the six largest Asian-American groups; Chinese, Filipino, Indian, Japanese, Korean, and Vietnamese. They used data from the 1992-1995 American National Health Interview Survey to calculate BMI and classify individuals as overweight or obese. The height and weight measurements were self reported and adjusted for age and gender. They also explored the number of years those individuals have lived in the United States. In general, the percentage of Asian-Americans classified as obese was low compared to the total population. However, more years of residency in the United States were associated with higher risk of being overweight or obese. They suggest that while the analysis found a lower percentage of Asian-Americans being overweight at this stage, they also showed that this figure is expected to increase with more American born Asians and with longer duration of residency in the United States (Lauderdale & Rathouz, 2000).

Unger et al. (2004) have examined the association between acculturation and obesity related behaviours such as physical activity and consumption of fast food among Asian-Americans by comparing the frequency of physical activity and fast food consumption in the first year after immigration with the following year. They found a significant effect from acculturation, with a lower frequency of physical activity, and a higher frequency of fast food consumption, in the second year after immigration. They suggest that acculturation is a risk factor for obesity related behaviours among Asians and therefore health promotion programmes are needed to encourage physical activity and healthy eating in Asian adolescents (Unger et al., 2004).

Schaefer et al. (2009) have explored associations between physical, socioeconomic, and cultural characteristics of a multi-ethnic sample including Asian-American females. The study included physical measurements such as weight, height, BMI, and percent body fat. Acculturation was measured using the Acculturation Rating Scale for Mexican-Americans (ARSMA) and it was modified for Asian-Americans. The results showed that Asian-Americans were

more acculturated than Mexican-Americans, and percent body fat among Asian-Americans was higher in participants with lower socioeconomic status. They suggest that income and acculturation may contribute toward chronic disease in Asian-Americans (Schaefer et al., 2009).

Ahn et al (2008) have analysed the 2003 California Health Interview Survey to investigate the association between being overweight or obese in adolescents and risk factors such as socioeconomic status, acculturation, and behavioural and environmental factors. They found that 15% of Asian adolescents were either overweight or at risk of being overweight. Moreover, they showed that for boys older age, lower education of parents, and longer residence in the United States were associated with being overweight; and for girls, lower education of parents, and poor dietary habits were associated with being overweight. They indicate that the high prevalence of being overweight in ethnic groups among California adolescents calls for a need for culturally specific interventions to prevent this problem (Ahn et al., 2008).

Khunti et al (2007) measured levels of physical activity in South Asian and European in secondary school students in the United Kingdom through a questionnaire survey. The results showed low levels of physical activity in both groups, although European children were more likely to have walked to and from school compared to South Asians. They indicated that almost half of all children spent four or more hours watching television or playing computer games every day. They also found a low level of active behaviours during school breaks, especially in girls (Khunti et al., 2007).

Kandula and Lauderdale (2005) analysed the 2001 California Health Interview Survey to investigate the level of physical activity in Asian-Americans, and found that they were much less likely to meet the recommended levels of physical activity, than non-Asians, resulting in significantly lower estimated weekly energy expenditure by Asian-Americans. The researchers also observed that the level of physical activity in Asian-Americans increased with an increase in the years they had lived in the United States (Kandula & Lauderdale, 2005).

Findings of the Youth 2000 survey, which is a national secondary school youth health survey in New Zealand indicated that only 35.5% of female participants reported being physically active on at least three occasions per week, compared to 56.9% of male participants. Watching television was reported as the most popular daily activity for all students, but New Zealand born Asians or those who had lived in New Zealand for more than five years, were more likely to watch television more than five hours a day (Rasanathan, Ameratunga et al., 2006).

Findings of Youth 2000 also showed that many Asian students did not eat breakfast (21.4% of females and 12% of males). Moreover, New Zealand born Asians or those who had lived in New Zealand for more than five years were more likely to miss breakfast. Students reported having more takeaways in the weekends, with 32.1% having had takeaways at least twice during the previous weekend. In addition, 32.5% of students reported having had takeaways twice or more during the previous school week (Rasanathan, Ameratunga et al., 2006).

Wahlqvist (2002) has investigated the history of Asian migration to Australia since 1788 and its effect on Australia's food and health patterns. This includes Chinese, Afghans, Vietnamese, and other South-East Asian groups. He talks about the interaction and food exchange between both South-East Asia and Australia over thousands of years and how each wave of immigration has injected additional cultural food elements in Australia and has caused a change in health measures for both migrants and the host citizens. He claims that whilst Asian migration has provided Australia with health benefits in regards to food and eating habits, there have been threats to the migrant population in regard to nutrition-related health, especially in a population that is susceptible to abdominal obesity, type 2 diabetes, and cardiovascular disease. Advantages of these migrations to Australia's food include the diversification of the food supply and its associated health protection, food security and sustainability, development of garden markets offering new and fresh foods and groceries, and development of new cooking skills. However the food acculturation is bi-directional, and this means that Asians in Australia have adapted to the western

lifestyle with a decrease in energy expenditure and an increase in consumption of energy dense foods such as increased fat and sugary drinks, in addition to a decrease in certain health protective foods and beverages such as lentils, soy, greens, and tea (Wahlqvist, 2002).

In an analysis of the 'Obesity Prevention In Communities' (OPIC) survey, Faeamani (2007) has investigated the association between obesity and quality of life of adolescents in New Zealand. The results indicated that Asian students reported poorer physical and emotional function scores compared to European students, but for school function, Asian groups scored the highest among all ethnic groups in New Zealand (Faeamani, 2007).

Cho and Juon (2006) have investigated the social, behavioural, and cultural factors associated with obesity risk in Korean-Americans in California by analysing the 2003 California Health Interview Survey, where the interviews were conducted over the phone. The sample included adolescents aged 12-17 years but the results were presented for adolescents and adults together showing that approximately 50% of Korean Americans were overweight or obese. They also showed acculturation (westernised lifestyle such as sedentary lifestyle) was associated with higher BMI among Korean Americans, and so the length of residence in the United States was strongly associated with higher body mass index. They also argued for the use of World Health Organization body mass index criteria for Asian populations, claiming that at comparable BMI levels Asian Americans have a higher prevalence of high blood pressure, heart disease, and type 2 diabetes than Europeans (Cho & Juon, 2006).

There are many studies that suggest Asians have smaller body frames and hence the current classification systems for obesity screening in Asian adolescents, is poor (Deurenberg-Yap, Niti, Foo, Ng, & Loke, 2009; Jafar, Chaturvedi, & Pappas, 2006; Naser, Gruber, & Thomson, 2006). It is suggested that population specific cut-off points for BMI is necessary to accurately measure risk of obesity in this population.

Lin et al. (2006) claim that the International Obesity Taskforce definition of obesity underestimates the association of excess weight and disease in Asian

populations such as Taiwanese. They examined BMI of over 3000 Taiwanese from their 1993-1996 Nutrition and Health Survey to investigate the association between BMI and disease. They found that based on the international definition of overweight and obesity, overweight was associated with one disease (hypertension) and obesity was associated with four diseases (hypertension, diabetes, gout and thyroid disease). However, after using lower cut-off points to define overweight and obesity, overweight was associated with four diseases (hypertension, diabetes, gout, arthritis), and obesity was associated with three diseases (hypertension, diabetes and gout) (Lin, Liu, Chang, & Nowalk, 2006).

Ko et al (2001) suggest that Asians have smaller body frames than Caucasians and therefore does not find the cut-off values that are used to define obesity in western countries appropriate for the Asian population. They recommended a BMI of 23 kg/m<sup>2</sup> to define overweight and 26 kg/m<sup>2</sup> to define obesity in Hong Kong Chinese (Ko et al., 2001).

Ko et al. (2008) have used four different criteria to measure childhood obesity in 11-18 year olds Chinese population in Hong Kong. These criteria include the International Obesity Taskforce (IOTF) 2000 criterion, the Group of China Obesity Task Force (COTF) 2004 criterion, Centres for Disease Control and Prevention (CDC) 2000 Growth Charts, and the 1993 Hong Kong Growth Survey (HKGS) charts. They found that the mean prevalence of overweight varied from 9.8–13.9% and obesity varied from 2.7–15.8% according to different criteria. They stated that the IOTF, COTF and CDC criteria showed similar rates of overweight and obesity in Hong Kong Chinese adolescents in most age groups but the rates of obesity based on the HKGS criteria were much higher, therefore calling for a need for population specific criteria to measure overweight and obesity (Ko et al., 2008).

Rush et al. (2004) suggest that the relationship between percent body fat and BMI is different for European, Pacific Island and Indian men because of differences in their muscularity. As Indians have more abdominal fat than European and Pacific Island men, the use of similar international cut-off points to measure the prevalence of obesity in Asian Indians are not appropriate. In another study Rush et al. (2007) showed that Indian women have higher central

fat mass compared to Pacific, Maori, and European women in New Zealand. Indian women also showed low appendicular skeletal muscle mass and bone mineral content. Once again they suggest that the relationship between percent body fat and BMI varies with ethnicity because of differences in central fatness and muscularity (Rush et al., 2004).

Duncan (2004) suggested that the standard BMI cut-offs are not appropriate for all populations as research indicates that the associations between BMI, percent body fat, and health risks can vary across different ethnicities and stated that in New Zealand, this area is largely unexplored in both young people and Asian populations (Duncan, Schofield, Duncan, Kolt, & Rush, 2004). Furthermore, Duncan (2008) examined BMI and percent body fat of 5-16 year old South Asian girls in order to classify their weight status. The International Obesity Taskforce criteria was used but adjusted for ethnicity. The results showed that the adjusted BMI cut-off points for overweight and obesity ranged from 3.3 and 3.9 kg/m<sup>2</sup> respectively lower than the IOTF criteria for South Asian girls.

The World Health Organization Expert Consultation (2004) has addressed the debate about new cut-off values for BMI to determine weight status in Asian populations and whether this is necessary or not. WHO has reviewed scientific evidence that suggests Asian populations show different associations between BMI, percent body fat, and its related health risks, than do European populations. WHO concluded that 'the proportion of Asian people with a high risk of type 2 diabetes and cardiovascular disease is substantial at BMIs lower than the existing WHO cut-off point for overweight (> or =25 kg/m<sup>2</sup>)'. However, WHO experts recommended that at the moment the available data do not indicate a clear BMI cut-off point for overweight and obesity in all Asians and the cut-off point for observed risk varies from 22 kg/m<sup>2</sup> to 25 kg/m<sup>2</sup> in different Asian populations, and for high risk it varies from 26 kg/m<sup>2</sup> to 31 kg/m<sup>2</sup>. To date no agreed cut-off points have been identified for each Asian population separately and so WHO BMI cut-off points should still be retained as international classifications, but each country could make decisions about the



definitions of increased risk for their population (World Health Organization Expert Consultation, 2004).

Kolsgaard et al. (2008) have looked at the ethnic differences in the prevalence of metabolic syndrome between Norwegian and South Asian children and adolescents by examining patients aged 6-17 years living in Norway. Metabolic syndrome was defined as the presence of at least three obesity risk factors such as high levels of waist circumference, blood pressure, fasting triglycerides, glucose, and HDL cholesterol. They showed that the prevalence of metabolic syndrome was significantly higher in the Asian immigrant population, suggesting that ethnic minorities have an increased sensitivity to adiposity and hence need more aggressive prevention and treatment than others (Kolsgaard et al., 2008).

Misra et al. (2007) have discussed metabolic syndrome in children with a focus on South Asians by doing a literature search. They state that the metabolic syndrome in children is an important marker of diabetes and coronary heart disease in adults, hence recommending the screening of high-risk populations. They indicate that obesity and percent body fat are important determinants of insulin resistance and the metabolic syndrome in children. They reported excess body fat and thicker truncal subcutaneous fat observed in South Asian children as predisposing factors in development of insulin resistance is of major concern, which needs public health interventions and education (Misra, Khurana, Vikram, Goel, & Wasir, 2007).

As it can be seen there are many studies on obesity which include an Asian population, but most do not contain original data and have reviewed and analysed the available statistics (e.g. National Health or Nutrition Surveys). Moreover, the majority of these studies have investigated the prevalence of childhood obesity in Asian populations and only a few have looked at the role of lifestyle or nutritional and physical activity patterns as overweight and obesity risk factors. This limited international data is consistent with New Zealand data, and thus there is scope for further studies. There are more studies available about adults, and there are more studies on Indians compared to Chinese populations. However a surge in the number of publications on the topic of obesity in Asian populations since 2005 indicates the urgency of the issue to be

addressed. Table 2.2 gives a summary of the studies presented so far on lifestyle in Asian children living in Western countries.

**TABLE 2.2. SUMMARY OF STUDIES OF OBESITY RISK FACTORS IN ASIAN CHILDREN LIVING IN WESTERN COUNTRIES**

AUTHOR (YEAR) COUNTRY	SAMPLE/METHOD/FINDINGS
Popkin and Udry (1998) USA	<p><b>Sample/Method</b> N=1641 Asian adolescents in grades 7-12 Data: American Adolescent Health Survey from the National Longitudinal Study of Adolescent Health International Obesity Taskforce cut-off points (BMI more than 85<sup>th</sup> percentile) was defined as obese</p> <p><b>Findings</b> 20.6% of all Asian-Americans were overweight or obese Asian-American adolescents born in the US are more than twice as likely to be obese as first generation residents Adolescent obesity increases significantly in second/third generation immigrants indicating the effects of acculturation on weight gain</p>
Lauderdale and Rathouz (2000) USA	<p><b>Sample/Method</b> N=254,153 Asian adults aged 18-59<sup>2</sup> Data: 1992-1995 American National Health Interview Survey (NHIS) Height and weight measurements were self reported and adjusted for age and gender</p> <p><b>Findings</b> The total Asian male population is 57% overweight The total Asian female population is 38% overweight More years of residency in the US were associated with higher risk of being overweight or obese</p>
Unger et al. (2004) USA	<p><b>Sample/Method</b> N= 619 Asian-American students in grades 6-7 Data: a self-administered paper survey Compared the frequency of physical activity and fast food consumption in the first year after immigration with the following year</p> <p><b>Findings</b> There was a significant effect from acculturation, with a lower frequency of physical activity, and a higher frequency of fast food consumption, in the second year after immigration</p>

<sup>2</sup> Lauderdale & Rathouz (2000) and Kandula & Lauderdale (2005) studies are of adults but nevertheless they represent the parents of young Asians

AUTHOR (YEAR) COUNTRY	SAMPLE/METHOD/FINDINGS
Kandula and Lauderdale (2005) USA	<p><b>Sample/Method</b> N= 3291 Asian-Americans aged 18-59* Data: 2001 California Health Interview Survey</p> <p><b>Findings</b> Asian-Americans were much less likely to meet the recommended levels of physical activity The level of physical activity in Asian-Americans increased with an increase in the years they had lived in the US</p>
Cho and Juon (2006) USA	<p><b>Sample/Method</b> N=492 Korean-American youth aged 12-17 and adults aged 18-81<sup>3</sup> Data: 2003 California Health Interview Survey</p> <p><b>Findings</b> Acculturation was associated with higher BMI among Korean Americans The length of residence in the US was strongly associated with higher body mass index</p>
Ahn et al. (2008) USA	<p><b>Sample/Method</b> N= 409 Asian-American adolescents aged 12-17 Data: 2003 California Health Interview Survey IOTF cut-offs (BMI&gt;85<sup>th</sup> percentile) was defined as overweight/ obese</p> <p><b>Findings</b> 15% of Asian adolescents were either overweight or at risk of being overweight For boys, older age, lower education of parents, and longer residence in the US were associated with being overweight For girls, lower education of parents, and poor dietary habits were associated with being overweight</p>
Schaefer et al. (2009) USA	<p><b>Sample/Method</b> N= 71 Asian-American females in grade 6 Data: Adequate Calcium Today (ACT) project, a school randomized intervention project Physical measurements included weight, height, BMI, and % body fat International Obesity Taskforce cut-off points (BMI more than 85<sup>th</sup> percentile) was defined as overweight or obese and dual energy X-ray absorptiometry (DXA) was used to measure body composition Acculturation was measured using the Acculturation Rating Scale for Mexican-Americans (ARSMA) modified for Asian-Americans</p>

<sup>3</sup> The sample number of 492 includes adolescents and adults, but the results are for adolescents only

	<p><b>Findings</b></p> <p>Asian-Americans were more acculturated than Mexican-Americans Percent body fat among Asian-Americans was higher in participants with lower socioeconomic status</p>
<p>Jebb et al. (2004) UK</p>	<p><b>Sample/Method</b></p> <p>N= 81 Asian children aged 4-18 Data: 1997 National Diet and Nutrition Survey of young people International Obesity Taskforce cut-off points (BMI more than 85<sup>th</sup> percentile) was defined as overweight or obese</p>
	<p><b>Findings</b></p> <p>25.9% of young Asians were overweight Asian children were four times as likely to be obese as white subjects (13.6% vs. 3.5%)</p>
<p>Taylor et al. (2005) UK</p>	<p><b>Sample/Method</b></p> <p>N=479 Asian adolescents aged 11-14 Data: the Research in East London Adolescents Community Health Survey (RELACHS), a longitudinal school-based survey International Obesity Taskforce cut-off points (BMI more than 85<sup>th</sup> percentile) was defined as overweight or obese Participants answered three questions to determine their socio-economic status (parents' employment, having a car, number of people per room at home)</p>
	<p><b>Findings</b></p> <p>High levels of overweight in all ethnic groups Indian males were at higher risk of being overweight than British males No association between BMI and measures of socio-economic status in Asian population was found except for car ownership</p>
<p>Khunti et al. (2007) UK</p>	<p><b>Sample/Method</b></p> <p>N= 2732 South Asian and 447 European students in secondary schools aged 11-15 Data: a cross-sectional baseline lifestyle survey involving diet and exercise questionnaires</p>
	<p><b>Findings</b></p> <p>Low levels of physical activity in both groups, although European children were more likely to have walked to and from school compared to South Asians Almost half of all children spent four or more hours watching television or playing computer games every day but South Asian students spent more time Low level of active behaviours during school breaks, especially in girls</p>

AUTHOR (YEAR) COUNTRY	SAMPLE/METHOD/FINDINGS
Wahlqvist (2002) Australia	<p><b>Sample/Method</b> Investigation of the history of Asian migration (Chinese, Afghans, Vietnamese and other South-East Asian groups) to Australia since 1788 and its effect on Australia's food and health patterns</p> <p><b>Findings</b> Asians in Australia have adapted the western lifestyle with a decrease in energy expenditure and an increase in consumption of energy dense foods such as increased fat and sugary drinks In addition consumption of certain health protective foods and beverages such as lentils, soy, greens, and tea has decreased</p>
Rasanathan, Ameratunga et al. (2006) New Zealand	<p><b>Sample/Method</b> N=922 Asian adolescents aged 13-17 Data: Youth 2000 Survey, a national youth health survey</p> <p><b>Findings</b> Only 35.5% of female Asian participants reported being physically active on at least three occasions per week, compared to 56.9% of male participants New Zealand born Asians or those who had lived in New Zealand for more than five years, were more likely to watch television more than five hours a day Many Asian students did not eat breakfast New Zealand born Asians or those who had lived in New Zealand for more than five years were more likely to miss breakfast Asian students reported having more takeaways in the weekends 32.5% of Asian students reported having had takeaways twice or more during the previous school week</p>
Faeamani (2007) New Zealand	<p><b>Sample/Method</b> N=446 Asian adolescents and 445 European adolescents aged 12-18 Data: Obesity Prevention In Communities (OPIC) Survey to investigate association between obesity and quality of life of adolescents</p> <p><b>Findings</b> Asian students reported poorer physical and emotional function scores compared to European students For school function, Asian groups scored the highest among all ethnic groups in New Zealand</p>

There are many more studies available on obesity which include Asian populations but are not related to lifestyle; for example markers of obesity, biomedical studies of obesity, or management of obesity through surgery. There

were also many studies marked as research in Asian populations which actually were of Middle Eastern population such as Israel or Turkey.

As it has been mentioned before, there has been an increase in the number of obesity related studies in Asian populations but most of these studies have investigated the prevalence of obesity and only a few have looked at the lifestyle factors especially in those who have migrated to Western countries. This thesis is hoping to contribute to this gap of knowledge by providing in-depth information on nutritional and exercise behaviours of young New Zealand Asians and the factors influencing these behaviours.

What is clear from the available literature is that the prevalence of obesity in children and adults in Asian population is increasing, which demonstrates the impact of environmental factors on the development of obesity, in particular for those who have migrated to western countries like New Zealand.

The subject of food, health and migration needs to be introduced into public health work, but professionals need to be conscious of how religious beliefs, socio-cultural, historical, ecological, economical and psychological influences may guide food choices.

The next section looks briefly at some of the health promotion theories that need to be taken into account when planning such programmes and policies.

#### **2.4. Health Promotion Theories, Models and Examples**

Health promotion is about raising the health status of individuals and communities. In this context, promotion of health means improving health by advancing, supporting, encouraging and placing the status of health higher up on personal and public agendas (Green & Raeburn, 1988).

The World Health Organization first defined health in 1946 as “a state of complete physical, mental and social well-being, not merely the absence of disease or infirmity” (World Health Organization, 1948, 1998a). Health is a positive state of being with physical, cultural, psychological, economic and

spiritual attributes, not simply the absence of illness” (Marks, Murray, Evans, & Willig, 2000).

Major determinants of health are social, economic and environmental aspects, which are often beyond individual or even collective control (Ewles & Simnett, 1995). Therefore, a fundamental aspect of health promotion is that it aims to empower people to have more control over aspects of their lives, which affect their health.

In 1974 the Lalonde Report recognised that major health problems cannot be solved by medical care alone, and the attention also needs to be given to individual lifestyle. Lalonde’s Health Field Model suggests four factors for health determinants and inequalities: biological factors, environmental factors, health services factors, and lifestyle factors (Bullen, 2003).

The 1986 Ottawa Charter, opened the door for the beginning of modern health promotion and emphasised that social structures and policy determinants of health with a broadened scope from health education and lifestyle approaches must be attended to (World Health Organization, 1986).

Modern public health standpoints are concerned with the collective responsibility for health, the role of the state in projecting and promoting the general public’s health, prevention strategies especially population strategies for primary prevention, socio-economic determinants and risk factors, a multi-disciplinary basis, and collaborative partnerships with the populations served (Bullen, 2003).

The Ottawa charter (1986) stresses the original WHO definition of good health, which is achieved when “an individual or group must be able to identify and to realize aspirations, to satisfy needs, and to change or cope with the environment”. Health is also viewed as a resource for everyday life, which implies that it is equivalent to having sufficient energy, stamina and physical capacity to meet the demands of daily living (Green & Raeburn, 1988).

The definition in the Ottawa charter (1986) of health promotion is “the process of enabling people to increase control over, and to improve, their health” (World Health Organization, 1986).

The aspects of health that lend themselves to the enabling process are given by the five action areas of the Ottawa charter for health promotion (1986). These include: First, building healthy public policies including widespread public consultation as well as the setting up of mechanisms for advocacy. Second, creating supportive environments so that people can undertake their own projects or take a significant part in the planning process. Third, strengthening community action which requires full and continuous access to information, learning opportunities for health, and funding support. Fourth, developing personal skills or changes in lifestyle, which require information and resources to be available in such a way that people can manage and control their own activities. And fifth, reorienting health services that are probably the principal avenue through which resources can be routed to make an enabling approach possible (Green & Raeburn, 1988). Therefore, health promotion can be defined in practical terms as the combination of educational, organizational, economic and environmental support for action conducive to health (Green & Raeburn, 1988).

Enabling is a key word in the definition of health promotion given in the Ottawa charter. It is derived from the verb to enable, defined in The Collins Shorter English Dictionary (1994) as “to provide (someone) with adequate power, means, opportunity, or authority (to do something)”. As a concept in health promotion, it signifies that people are able to hold power in health matters (Green & Raeburn, 1988).

Empowerment is defined in practical terms as involving control over life affairs, at the community, group and personal level. This control is established by a process of strength-building, and accomplished through people having access to the knowledge, skill, material and political resources to give them control over, and the ability to undertake, the decisions and activities they consider to be appropriate in a health promotion context (Green & Raeburn, 1988). The



dominant principle in all this is the availability of appropriate resources and avenues for people to take an active role in all aspects of health.

Health promotion initiatives are of two types. Bottom-up, which is set by people themselves identifying issues they perceive as relevant; and Top-down, which is set by health promoters who have the power and resources to make decisions and impose their own ideas of what should be done (Bullen, 2003). The point is that people can deal effectively with their own health promotion needs and activities if they have information and skills, along with the financial, professional and organizational resources to put them to use; while professionals will always be required to assist with these processes and to provide information and assistance for most aspects.

In addition, Raeburn and Rootman (1998) state that in health promotion, one is not dealing with people in a clinic or laboratory, but in real life, in the community. So the community should be the centre of health promotion. Health promotion works successfully through concrete and effective community action in setting priorities, making decisions, planning strategies and implementing them to achieve better health; and at the heart of this process is the empowerment of communities (Raeburn & Rootman, 1998). Laverack (2004) also states that empowerment is at the heart of health promotion and power is at the core of empowerment. This power needs to be shared with the community in working for and with them.

Raeburn and Rootman (1998) suggest the use of the PEOPLE System, that is, the “Planning and Evaluation of People-Led Endeavours” system. It is a simple systems-oriented organizational framework designed to help community people who want to plan, run and evaluate their own community projects. The philosophy behind the PEOPLE system is People-centeredness, Empowerment, Organisational and community development, Participation, Life quality and Evaluation.

Health education programmes also provide opportunities for people to learn about health and to undertake voluntary changes in their behaviour. Such programmes may include providing information, exploring values and attitudes,

making health decisions and acquiring skills to enable behavioural changes to take place. They involve promoting self-esteem and self-empowerment so that people are enabled to take action about their health (Ewles & Simnett, 1995). Primary health education is directed at healthy people with the aim of preventing ill-health from arising in the first place. Most health education for children and young people falls into this category, dealing with physical health and social education on topics such as hygiene, contraception, nutrition, social skills and personal relationships, aiming to build up a positive sense of self-worth in children. Primary health education is concerned not merely with helping to prevent illness, but with positively improving the quality of health and thus the quality of life. This could be done through schools, communities, patient education, self-help groups, health services, mass media advertising and so on. What is important here is that accurate and valid information is being shared and it is being conveyed in a way that attracts the target group's attention and motivates them to make necessary lifestyle or behavioural changes.

Ewles and Simnett (1995) suggest that in health promotion specific combinations of knowledge, attitudes and skills (competence) are needed to do a particular job. These may include 'managing, planning and evaluating, communicating, educating, marketing and publicising, facilitating and networking, and influencing policy and practice.

In all cases health promoters must be conscious of the fact that there are wide differences in the health status of different groups of people, and that generally those in poorer social and economic conditions are the least healthy (Ewles & Simnett, 1995). This could be the case for many ethnic groups coming to New Zealand, including Asian groups, and there is a danger that health promotion activities might only reach the better-off, who have the time, money and education to make use of health information and take health action. Those who are trapped in poor financial circumstances and those with greatest needs are more likely to be ignored. Therefore health promoters need to be sensitive to this point, and in general health, promotion needs to be sensitive to the social, ethnic, economic, and cultural backgrounds of the people it is working with and for.

Last but not least, health promotion is part of the work of many professions including health, education and community workers. Health promotion should not exclude other workers nor the public from the business of health promotion. Health promotion is about empowering people to take more control over their own health.

This research will look at the issue of overweight and obesity among young Asians in New Zealand and it intends to base its recommendations on the concept of empowerment.

A large number of studies in this field provide valuable insight into the types of health promotion interventions that could be carried out in immigrant populations. However, the majority of these studies are case-studies without a control group and only a few have investigated the effectiveness of the interventions employed (e.g. no available pre- or post-intervention data). The aim of these studies may not be the same as this research (i.e. overweight and obesity in Asian adolescents) but nevertheless it presents potential strategies that could be used in designing a culturally appropriate health promotion intervention (McIntosh, Jason, Robinson, & Brzezinski, 2004).

Hyman & Guruge (2002) conducted a literature review on effective theoretical models and health promotion strategies for women who are recent immigrants to Canada. The literature suggested a need for interventions that are culturally appropriate. This involves developing health messages and materials that are “consistent with the characteristics, needs and cultural beliefs of that group”, rather than just translating health promotion materials written in the English language to other languages. They also recommend health promotion practitioners to involve the community in the planning, design and delivery of the intervention, to use an empowerment philosophy, be dynamic, as immigrants’ attitudes, beliefs and behaviours change as part of the acculturation process, and to use community “link leaders”, leadership and the media (Hyman & Guruge, 2002).

One example of empowering is with the Chinese immigrant community in the United Kingdom (Chen, 1999). After collecting the demographics of the Chinese

population living there it was found that the majority of them work in the food catering trade. This suggested that any health promotion programme needs to suit the busy schedules of this group. Therefore a convenient social setting in London's Chinatown created the London Chinese Health Resource Centre, which provides linguistically and culturally competent services to empower the Chinese community. This is an important point when addressing overweight and obesity in Asian adolescents in New Zealand, as any successful programme will need to include their families as well and hence needs to consider the whole family's needs and schedules, otherwise any attempt in changing lifestyles such as dietary habits will be hard to achieve.

Another example is the production of a health service information booklet for the Chinese-speaking community in Sydney, Australia (Hua, Orr, & Wen, 2002). Several Chinese community organisations, the Chinese-Australian Medical Association and the Health Promotion Unit worked together to develop specific material for this booklet. The booklet had well-known Chinese cartoon characters and all the information was assessed for clarity, applicability and cultural appropriateness using focus groups. The booklet was launched by Chinese community leaders and the event was organised by a well-recognised Chinese community organisation. The booklet was then distributed through libraries, Chinese grocery stores, Chinese organisations, Chinese radio stations and Chinese bookstores. However, simply providing information is not enough in making lifestyle changes and this needs to be done in addition to other measures.

Edwards, Ciliska, Halbert, and Pond (1992) developed culturally sensitive health promotion resources for students in the English as a Second Language (ESL) classes. The aim was to have a preventive and promotive health focus incorporated in ESL classes. The health promotion activities included topics around immunization, nutrition, sexuality, stress, winter-time health, the health care system, occupational safety, tobacco use, and home safety. This is an example that could be employed by schools in New Zealand, in ESL classes or in other classes such as health or physical education (Edwards, Ciliska, Halbert, & Pond, 1992).

Ahmad, Shik, Vanza, Cheung, George and Stewart (2004) conducted a study to advance the understanding about popular health promotion strategies and factors associated with the successful transfer and uptake of health messages among Chinese and Indian immigrant women. This was done through eight focus groups with immigrant women who came to Canada within the last five years. Both Chinese and Indian women discussed and identified sources of information (e.g. social networks, workshops at community centres or religious places, doctors, library, internet, hotlines, brochures and magazines), barriers (e.g. language, inadequate time and work demands), facilitators (e.g. trust in the advisor), credibility (e.g. ability to understand the message and the relevancy of the message), and ways to improve access. Although several sources of health information were available in the new country, Indian and Chinese immigrant women identified most of the strategies as not effective because of the barriers to accessing and understanding the health messages as well as limited prior exposure to such health promotion initiatives. These women were more familiar with getting health information through doctors, elders, and written materials in their own language. Ahmad et al. (2004) suggest that existing health promotion models need to change from “a one-way information flow to a two-way dialogue model” to be effective. This study shows the need for health promotion strategies to be tested for the population of interest (Ahmad et al., 2004).

Another community-based preventive programme (Sadler, Nguyen, Doan, Au, & Thomas, 1998) focused on cancer prevention to learn about the cultural, linguistic and economic barriers to participating in preventative health programmes. The Asian grocery store was used as the site to provide the health education campaign where Asians with different degrees of acculturation, socioeconomic levels and ages could be reached. Volunteers were recruited and trained in disseminating cancer information at grocery stores. They translated materials and posters with ethnically appropriate graphics, used multilingual signs to announce that the program was free, used multiple visual and hands-on teaching aids. The volunteers used culturally acceptable dress, salutations, body language and verbal style and represented both genders. The volunteers were young and this was accepted by most of the target groups with elders taking pride in ‘their children’. The repeated exposure to the educational

booth at the grocery store was also useful. This initiative was considered successful because of the number of requests for more literature from the grocery stores and resulted in a formation of partnerships between the Asian grocery store managers and the researchers.

There are many ways to convey a health message, but as it has been explained, what is important is the need to involve the ethnic community in the identification of health problems, as well as in the design and implementation of health promotion programmes (Ahmad et al., 2004; Edwards et al., 1992; Grzywacz, McMahan, Hurley, Stokols, & Phillips, 2004; Hyman & Guruge, 2002; Kuramoto & Nakashima, 2000; Meyer, Torres, Cermeno, MacLean, & Monzon, 2003; Thompson, 1987). McIntosh *et al.* (2004), state that this approach empowers the members of the community through development of social capital, and the promotion of a sense of ownership of the intervention. One way of involving the community of interest in identifying the problem is through focus groups with the members of the community. In one programme (Meyer *et al.*, 2003) migrant women were trained to carry out the research in their communities to assess the health needs of immigrant women, increasing. The programme concluded that combining participatory research with health promotion activities contributes towards increased empowerment of immigrant communities.

The next chapter provides a description of the methodology undertaken in this research.

## Chapter 3. Methodology

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Chapter three presents the methodologies employed in this research. These involved both a quantitative (structured individual interviews and measurements with 821 students) and a qualitative approach (semi-structured focus groups with 46 students) of South Asian, East Asian and European ethnicity.

This Chapter is divided into three sections: the first explains the Obesity Prevention in Communities (OPIC) Project and the thesis (Section 3.1). The second section looks at the quantitative approach (Section 3.2), and the third looks at the qualitative approach (Section 3.3) undertaken in this research. Each of the second and third sections describes the preliminary procedures (3.2.1 & 3.3.1), sampling methods (3.2.2 & 3.3.2), the study population (3.2.3 & 3.3.3), procedures for data collection (3.2.4 & 3.3.4), the interview guidelines (3.2.5 & 3.3.5), and the interview procedures (3.2.6 & 3.3.6). At the end of each section the method of data analysis utilized in this research will be explained (3.2.7 & 3.3.7).

### **3.1. The Project and The Thesis**

The aim of this research is to determine whether or not Asian adolescents in New Zealand experience similar overweight or obesity related issues that young Europeans do. In order to do so, the research needs to identify young New Zealand Asians' nutritional and exercise behaviours, and the factors influencing these behaviours, to be able to suggest an appropriate health promotion model to empower and improve the health of young New Zealand Asians.

#### **3.1.1 The OPIC Project**

The Obesity Prevention in Communities (OPIC) project is a four country study of obesity prevention in communities, which took place in New Zealand, Australia, Fiji, and Tonga in order to build and evaluate the evidence for community-based obesity prevention in young populations, as there is insufficient evidence about what interventions work. In total over 17,150 high school students in New Zealand (n=4215), Australia (n=3163), Fiji (n=7237), and Tonga (n=2535) participated in the baseline survey of this study in 2005 and 2006 (Utter et al., 2008). The project involved a series of analytical and



intervention studies in young populations. At first, students were surveyed and measured at their schools by the use of anthropometry measurements (e.g. weight and height), and questionnaires to collect information such as demographic variables, food and nutrition behaviours, physical activity and leisure time activities, family, home, school and neighbourhood environment, perception and attitudes about body size, knowledge, and quality of life. The project then used a quasi-experimental design to develop the interventions to compare students attending intervention schools with students at control schools from 2005 – 2008, aiming to provide crucial evidence for public health action to prevent obesity.

OPIC received funding from Health Research Council (New Zealand), National Health & Medical Research Council (Australia), and the Wellcome Trust (United Kingdom) for a period of five years.

### **3.1.2 The Thesis**

The data used in this thesis are from the OPIC baseline surveys carried out in 2005 and 2006, to determine the weight status of young Asians in New Zealand and to investigate their nutritional and physical activity behaviours (quantitative approach). The emphasis on Asian students was because of the ever rising number of Asian immigrants in New Zealand and the lack of evidence as to where they stand in terms of overweight and obesity and hence being excluded from available policies and intervention programmes. The analysis of OPIC baseline survey informed the second part of this thesis, by assisting to develop an interview guideline that was used to facilitate focus groups with East Asian, South Asian, and European adolescents (qualitative approach). This was done to explore the significant findings of the quantitative part in more detail. The health promotion approach suggested at the end of the thesis draws on both parts of the research.

The following two sections will further describe the quantitative and qualitative approaches carried out in this research.

## **3.2. Quantitative Methodology**

The OPIC baseline survey is cross-sectional, from which the data for this thesis are taken. The baseline data provide the initial results in this quasi experimental study. A quasi experimental design is a non-randomised research method that shares characteristics of true or natural experiments that allows for some generalisation about the population. However, the quantitative data in this thesis are observational, and were collected by measuring and recording many characteristics (such as being overweight/obese, or dietary and exercise patterns) of the subjects at one point in time.

### **3.2.1 Preliminaries**

Ground work for the OPIC project started in 2004 with several meetings between the researchers and the participating schools. School representatives included principals, school nurses, physical education and other teachers. The meetings were hosted by different schools to develop a working relationship between the researchers and the school, to establish logistics and support for the survey process and possible interventions, and to clarify the expectations of both researchers and schools.

At the same time, the project investigators began designing the questions and working on the questionnaire format. This was piloted prior to the baseline data collection for all the age groups who were to participate, involving 85 students from four Auckland schools, to assess the clarity of the questions and the time it took to complete. The students completed the questionnaires from 15 to 25 minutes, allowing at least 20 minutes for anthropometric measurement to be completed in the remainder of the class period.

Ethics approval was applied for and approved by the University of Auckland Human Participants Ethics Committee on 2 December 2004 to 1 December 2007 for a period of three years, Reference Number 2004/429.

### **3.2.2 Sampling Method**

In New Zealand, the OPIC project chose South Auckland (Manukau City) as the site of the study because of its large Pacific population and high prevalence of obesity. Since the aim of the project was to target a population that was at high-risk, the inclusion criterion was mainly focused around seven high schools with a high proportion of Pacific Island students, which happened to be schools with a low decile rating<sup>4</sup> (1 or 2 deciles schools). Carrying out the project in one area assisted in minimising costs, and logistical issues with the intervention, in addition to minimising any confounding socioeconomic status.

The sampling method used by the OPIC baseline survey was school based. This was acceptable by schools and students as the whole school was participating in the research project, as opposed to a selected number of students. This also contributed to a better response rate for the research and minimised costs. As a result, all students from year 9-13 were invited to participate on a volunteer basis, with parental consent if they were younger than 16 years old.

Out of all students who participated, 866 identified the ethnic group they most belong to as 'European', 'Chinese', 'Indian', or 'other'. With the help of school's database or a phone contact made to the household of the students who identified themselves as 'other' (n=210), these participants were also assigned to the specific ethnic group they belonged to. Those who identified their ethnic group from South or Latin America, African origins, Middle East, Maori or the Pacific regions (n=45) were excluded from the sample for this thesis. The remainder were assigned to the European, East Asian, or South Asian groups accordingly.

### **3.2.3 Study Population**

The study population consisted of 4215 students from seven high schools with low decile rating of one or two in South Auckland, of which 821 were classified

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<sup>4</sup> School's decile indicates the extent to which it draws its students from low socio-economic communities. Decile 1 schools are the 10% of schools with the highest proportion of students from low socio-economic communities (Ministry of Education, 2008)

as European (n=485), East Asian (n=115 from China, Cambodia, Philippine, Taiwan, Thailand, and Vietnam), or South Asian (n=221 from India, Pakistan, and Afghanistan).

### **3.2.4 Data Collection Procedure**

In early 2005, research staff arranged meetings with the schools and a timetable for data collection at each school was organised. Class lists from each school were obtained and, depending on the number of students, the interviewing schedule was planned for one to three weeks for each school to be conducted during school hours (typically five classes per day).

Participant information sheets and consent forms were sent to the schools to be forwarded to the students about four weeks before the research team visited the school (See Appendix Two to Six). Students who were under 16 years old, also received a participant information sheet and a consent form for their parents to sign and return at the time of interview. Students who were 16 years old or older and only needed their own signature to participate in the study could do so either prior to or at the time of interview.

At the same time, all OPIC research staff received training in administering questionnaires and anthropometry to ensure the quality and consistency of data collection. All necessary stationery and measuring equipment were purchased and the questionnaires and other forms were photocopied.

### **3.2.5 Interview Guideline**

The baseline data were collected using the methods described below.

#### ***Personal Digital Assistant (PDA)***

The first method used Hewlett-Packard (HP) Personal Digital Assistants (PDAs) to collect lifestyle information. PDAs (also referred to as palmtop computer) utilised in this study used a software programme developed by the World Health Organisation (WHO) for health research surveys called eSTEPS (Yu & Yu, 2004). The OPIC project is the first major study internationally that has used this

programme. The questionnaire format was first designed by using the eSTEPS software (version 1.0.1), and then downloaded onto the PDA and administered through the eSTEPS programme. At the end of each day, the collected data were transferred to a central computer and imported into the statistical software and the Excel spreadsheet. This is a very efficient method of data collection and it saves time, costs, and errors associated with manual data entry, double data entry, and data cleaning. The students found this method fun and easy to use.

The questions were developed using several surveys including New Zealand 2002 National Children's Survey (Parnell, Scragg, Wilson, Schaaf, & Fitzgerald, 2003), Australian 1995 National Nutrition Survey (AusStats, 1998), and National Health and Medical Research Council (NHMRC) Dietary Key Indicators Study (National Health and Medical Research Council, 1997). Table 3.1 summarises the information collected with the PDA, with the full PDA questionnaire given in Appendix Seven.

**TABLE 3.1. SUMMARY OF LIFESTYLE INFORMATION COLLECTED ON THE PDA**

Demographics	Year at school; ethnicity; country born in; years in NZ; gender; date of birth; church attendance; frequency of church attendance; household composition
Food and Nutrition Behaviours	Breakfast; morning tea; lunch; fruit and vegetables; sugar sweetened drinks; takeaway foods; snacks at home or outside of home; bread; fried foods; confectionary
Physical Activity and Leisure Time Activities	Walking/biking to/from school; activity in school breaks; after school; rules, access and viewing TV, video, computer games; TV dinners
Perception and Attitudes of Body Size	Perceptions, descriptions and actions about body weight, shape and size
Family, Home, School, and Neighbourhood Environment	Perceived safety in neighbourhood; church and church leader support for healthy eating and physical activity
Health Knowledge	Skipping breakfast; sugar-sweetened drinks; TV and weight gain; fruit and vegetable consumption and weight

One of the limitations of administering questionnaires with the use of PDA is the small screen size that limits the amount of text (number of words in each

question) that fits on the screen. Therefore for larger questions a paper questionnaire was used.

### ***Paper Questionnaire***

The second method of data collection used for the baseline survey was a self-completion paper questionnaire on where students answered questions on quality of their life – Paediatric Quality of Life (PedsQoL) (Varni, Seid, & Rode, 1999) and Assessment of Quality of Life (AQoL) (Richardson, Day, Peacock, & Iezzi, 2004). This questionnaire was divided into four sections. Table 3.2 summarises the information collected in this questionnaire and the full version is presented in Appendix Eight. Except for the anthropometry measurements, information from the paper questionnaire was not used for the purpose of this thesis.

**TABLE 3.2. SUMMARY OF QUESTIONS COLLECTED ON THE PAPER QUESTIONNAIRE**

Confidential and demographic information	school name, participant's name, date of birth, contact details, parent(s) or guardian(s) name(s)
Church/temple/mosque attendance	This section was used to collect information to locate the churches that students attend for the intervention programmes. This thesis is not directly concerned with this section
Paediatric Quality of Life and Assessment of Quality of Life Questions (PedsQoL and AQoL)	The information from this section was analysed by other researchers and was not widely used for the purpose of this thesis
Anthropometric data	Height, weight, waist circumference, Bio-Impedance Analysis (BIA) measurements

The information collected on the front page of the questionnaire (demographics) was crucial for matching the right paper questionnaire with the right PDA questionnaire, as well as being able to contact the participants if needed for further clarifications and follow ups.

## ***Anthropometry Measurements***

All anthropometry measurements were taken while participants were wearing only one layer of light clothing. Shoes were removed for height measurements, and socks or stockings were removed for the BIA.

### *Height*

Height was measured using a portable stadiometer recorded in centimetres (cm) and rounded to the nearest 0.1 cm. The stadiometer consisted of a platform, a tall aluminium pole attached to the rear of the platform with measurement units printed on it, and a plastic extension to rest on top of the cranium that slid up and down on the pole. The student was asked to stand on the platform with both feet flat facing away from the pole, looking straight ahead, with a straight back, and arms relaxed to the side. The participant was asked to take a deep breath and hold it for a couple of seconds during which the plastic extension was lowered on the pole to the same level as the participant's head. The participants was then asked to step down the platform and the number on measurement units on the pole were recorded in the space provided on the last page of the paper questionnaire. The student would then be directed to the next measuring station.

### *Waist Circumference*

Waist circumference was measured using a plastic 'Figure Finder' measuring tape (Copywrite 2003, Novel Products Inc, Rocton, Illinois, USA). The student stood with both feet flat on the ground, left hand placed on the right shoulder and positioned side-on to the measurer. The measuring tape was placed around the student's waist in a horizontal line level with the umbilicus (indicated with a finger by the student) and a mirror was used to make sure the tape was straight. The measurer would pull the tape tight without compressing the skin, while the student was talking or breathing normally. The measuring procedure was repeated twice to minimise errors, the figure was rounded to the nearest 0.1 cm and recorded on the last page of the paper questionnaire.

### *Weight and Bio-Impedance Analyser (BIA)*

Weight or body mass was measured digitally using a Tanita Body Composition Analyser (TBCA) scale, model BC-418. The students was asked to stand on the machine and look straight ahead; and after a few seconds when the figure shown on the screen had settled, weight would be manually recorded in kilograms to the nearest 0.1 kg, on the last page of the paper questionnaire.

Before the student was asked to stand on the Tanita machine, the measurer would enter the gender, age, and height of the student into the machine. While the student was standing on the machine for the weight measurement, with bare feet touching its metal plates and holding the two handles, the Tanita analyser would calculate body composition measurements and print the relevant details (such as BMI, fat%, fat free mass, and water measurements) on paper. The whole process would take a few minutes, and the paper was stapled to the last page of the paper questionnaire. As another researcher from the OPIC project is doing a validation study for the calculations created by TBCA for different ethnic groups, results from this measurement are only briefly referred to in the results chapter.

### **3.2.6 Interview Procedure**

Each day, five to six members of the research team were present at schools to carry out the interviews and the measurements. Just prior to the interview taking place, a classroom or the school hall was set up for the interviews with individual desks and seating arrangements. A paper questionnaire and a PDA were placed on each desk. Each PDA was set up by the research staff with correct date, name of country, school name, and a specific survey identification number. The same identification number and school name was also written on the corresponding paper questionnaire on each desk by the research staff.

Students were interviewed with their entire class (one visit for each student at the school) over a class period during school hours normally between 9 am and 3 pm. Each period or the interview session usually took around 50 minutes for



the whole class (on average 30 students) to complete two questionnaires and the anthropometry measurements.

Once the students had entered the room and were seated, the interview procedure was briefly described, a reassurance on the confidentiality of the study was given, and it was explained to them that if they do not wish to participate, this will have no effect on their school results. They were also encouraged to ask questions if they did not understand the survey questions or procedure. The students would then start answering the questions on the PDA by reading the questions on the screen and using a stylus to select their responses on the touch screen. As each student completed answering the questions on their PDA, a research staff member would double check that all the questions had been answered, collect the PDA, and ask the student to complete the paper questionnaire, which was also checked by a staff member on completion.

While students were answering their questionnaires, a research staff member would call them one by one for the physical measurements to be taken in a private area in the room separated from the rest of the class by screens. After the measurements were taken the students would return to their seats to continue working through the questionnaires.

At the end of each class interview session, research staff made sure that each student had completed both questionnaires and the measurements, as well as signing the appropriate consent form and/or handing in their parents signed consent form.

### **3.2.7 Data Analysis**

Most of the quantitative analyses were carried out on a statistical software package called Statistical Analysis System (SAS Version 9.1 series released in 2003 by the SAS Institute Inc. North Carolina, USA).

Univariate analyses (using the FREQ procedure) of all the variables were carried out to show the distribution of variables and outcomes, and to identify

statistically significant differences between South Asian, East Asian, and European participants by using chi-square test.

The tables presented in the results are unadjusted frequencies (unless otherwise stated). To compare the three ethnic groups studied for this thesis, analyses were conducted to correct for the design-effects of clustered sampling, but because of the sample size and its distribution – number of East and South Asian students within classes and schools including no Asian student in some cases – it was not possible to correct all p-values (p) for the clustered design effect with SAS. An attempt was made to correct the p-values with a different statistical software package for the analysis of correlated data called SUDAAN (Version 10.0.0, Research Triangle Park, NC). After running the analysis through SUDAAN and discussing the results with statisticians in the Section of Epidemiology & Biostatistics, University of Auckland it was decided that the p-values were not consistent or reliable. Therefore, in order to avoid falsely rejecting the null hypothesis because of under-estimating standard errors caused by any design effect arising from the clustered sampling, it was decided to set the statistical significance at  $p < 0.01$ .

Because the distribution of gender and age did not vary among ethnic groups, they were not considered potential confounders and did not need to be adjusted for when comparing ethnic groups.

In regards to ethnicity, students were able to select one ethnic group they most identified with out of 11 available options, including 'NZ European', 'other European', 'Chinese', 'Indian', and 'Other'. All Europeans were collapsed into one group, the Chinese ethnicities represent the East Asian group, and the Indian ethnicities represent the South Asian group. Those who selected their ethnic group as 'Other' were further investigated and if appropriate were assigned to one of these groups (See Appendix Nine).

Some of the continuous variables (e.g. money spent at school on food or time spent watching television) or categorical variables (e.g. frequency of occurrences that are similar such as 'almost everyday' and 'most days') were

compressed into fewer categories/options to simplify the analysis and the interpretation of results (See Appendix Ten).

Many of the questions asked the participants to give the answer for 'the last 5 school days'. These questions included school days in the previous week (excluding the weekend) depending on what day the student was participating in the survey, hence to make it clear for the students those five days were given to them (written on the whiteboard in front of them).

Once the body mass index (BMI) measurement (weight in kg/(height in m)<sup>2</sup>) was calculated, the International Obesity Task Force (IOTF) age- and gender-specific cut-offs were used to classify each child's weight status as underweight, normal weight, overweight or obese by using the LMS Growth Microsoft Excel module (Cole et al., 2000; Cole et al., 2007). The so-called Cole criteria estimate the adult equivalent BMI for children and adolescents where BMI<17 is considered underweight, 25<BMI<30 is overweight, and BMI≥30 is obese. The Cole criteria are in effect adjusted for age and gender using data predominantly from European children. It was decided not to adjust them further (i.e. reduce the cut-off figures) based on Asian ethnicity, as cut-offs for Asian children are still being debated, and appropriate cut-offs for them have not been agreed upon to date.

The mean values from the anthropometry measurements (e.g. mean weight and mean height) are presented with standard errors (SE). The standard error of the mean is the standard deviation (a measure of the variability of the population) of the sample means over the total sample of the data.

Fat-free mass (FFM) and fat mass (FM) calculations were done by another OPIC researcher who was working on the BIA validation study (Sluyter, Schaaf, Scragg, & Plank, 2009) using the equations shown here.

Fat Free Mass prediction equation (kg):

$$\text{For boys FFM} = 0.607H^2/Z + 1.542A + 0.220H + 0.096W + 1.836E_b - 47.547$$

$$\text{For girls FFM} = 0.531H^2/Z + 0.182H + 0.096W + 1.562E_g - 15.782$$

Where H = height (cm); Z = impedance ( $\Omega$ ); A = age (y); W = weight (kg); E = ethnicity;  $E_b/E_g = 0$  for Europeans and Asians.

Fat Mass (kg) = Weight – Fat Free Mass (FFM)

These predictions provide additional information in terms of anthropometry measurements.

Next, explains the second part of the thesis, which involved focus groups through a qualitative approach.

### **3.3. Qualitative Methodology**

The second aim of this research was to gain a better understanding of the factors influencing young New Zealand Asians' nutritional and exercise behaviours. This was done by facilitating 12 focus groups involving different ethnic groups, genders, and age groups.

Qualitative research is a form of explanatory research involving small samples of respondents and semi-structured data collection methods. It provides an efficient approach to gathering and analysing information using a range of open-ended interviewing techniques (Wham, 2002). This form of data collection needs a small number of interviews. Its database may be too small to justify statistical analysis, but the information generated is not of lesser importance or value than quantitative research (Pope, Ziebland, & Mays, 2000; Wham, 2002).

The qualitative method was considered useful in this research as it could produce more in-depth data to assist the interpretation of the quantitative results. The qualitative method in this research is based on semi-structured focus groups including transcribed recordings of interviews, and a brief observation of the study sample.

#### **3.3.1 Preliminaries**

Before planning the second part of the research, an initial analysis of the quantitative baseline data was carried out in order to determine the significant results and any gaps in the findings that needed clarification.

Based on these initial findings four main areas were considered to be important including food patterns, activity patterns, influencing or environmental factors, and knowledge and experience. In addition to these, it was important to investigate young people's opinion on good ways to get young people to eat healthy and become physically more active, as the last aim of this research was to suggest a health promotion approach to empower and improve the health of young people.

Prior to organising the focus groups, a literature review was also conducted to gain better understanding of the issue of overweight and obesity in Asian adolescents in New Zealand.

The next step was to develop an interview guideline to provide a structured guide to the interviews. This involved a series of open ended questions, which were designed in line with the initial findings and the literature review. This was then reviewed and further developed with the assistance of research advisors, one of whom made sure that the questions were culturally appropriate for the Asian focus groups. The draft interview guideline was tested before conducting the actual focus groups by interviewing four young people from the ages of 12 to 17 years old, from both Asian and European backgrounds. These were conducted as individual interviews and at the end of each interview the participant was asked to make comments about the questions. In general, the pilot interviews went well and the feedback was constructive. As a result, the interview guideline was refined with minor adjustments to the wording of some of the questions to ensure their clarity and that they were understood correctly by the participants. Another review and adjustment of the questions was made after conducting the first two focus groups. The final version of the guideline is presented in Appendix Eleven.

The next step was to decide where the focus groups could be held. The first choice was one of the participating schools in the OPIC project. However, intervention programmes had already started in four of these schools and that made them inappropriate for the purpose of this research. Of the remaining three schools, two were receiving intervention programmes from the Counties Manukau District Health Board (CMDHB) called Let's Beat Diabetes (LBD),

which addresses type 2 diabetes and obesity. However, one school with a large number of students with multicultural backgrounds was receiving no intervention programme. This school was approached and a meeting was set up with the school principal to consult on the possibility and appropriateness of the focus groups to be carried out at their school, and to ascertain their willingness to support this research. In that meeting a brief overview of the research was explained, questions were answered, and as requested, more details (e.g. interview guideline and sampling criteria) were sent to the school. Shortly after, a positive response was received from the school, and one of the Deans was appointed as the liaison person to assist organising the focus groups. A second meeting was held at the school with the nominated dean, where the interview process was explained, participant information sheet and consent forms were given, and the dates for the 12 focus groups were organised.

Ethics approval for the second part of the research was applied for and approved by the University of Auckland Human Participants Ethics Committee on 6 December 2006 to 6 December 2009 for a period of three years, Reference Number 2006/455.

### **3.3.2 Sampling Method**

As previously discussed, this study focuses on young New Zealand Asians and compares them with young Europeans in addressing the issue of overweight and obesity. Since the first (quantitative) stage of this research was focused on high school students, it was decided to keep the same age group as the population of interest (13 – 18 year olds) for the qualitative survey.

Next, the ethnic groups had to be identified and the best option was to model the first stage of the research by dividing the participants into South Asian (e.g. Indians), East Asian (e.g. Chinese), and European groups.

The criteria for selecting participants were that they belonged to one of the ethnic groups being studied in this research, and were between the ages of 13 – 18 (inclusive). Another criterion for the selected participants was that they had to be able to speak English.

Accordingly, purposive sampling was conducted to identify participants who fitted the above criteria. This included network sampling and snowball sampling (Pope et al., 2000), as described below.

### *Network Sampling*

As explained before, one of the schools that participated in the OPIC project, but was not receiving any intervention programmes, was selected for and approached to participate in this study. To identify the participants, information about the study was sent to the selected school including the criteria to recruit participants as follow:

**TABLE 3.3. STRUCTURE OF FOCUS GROUPS**

SENIOR STUDENTS (16-18 YEARS OLD)	ETHNICITY →	EUROPEAN	EAST ASIAN	SOUTH ASIAN
	Male	4 – 5 <sup>5</sup>	4 – 5	4 – 5
	Female	4 – 5	4 – 5	4 – 5
JUNIOR STUDENTS (13-15 YEARS OLD)	ETHNICITY →	EUROPEAN	EAST ASIAN	SOUTH ASIAN
	Male	4 – 5	4 – 5	4 – 5
	Female	4 – 5	4 – 5	4 – 5

The school principal and the dean used the school roll to extract the name of all students who met the above criteria. They then talked to those students (at school assembly and individually) and invited them to participate in the focus groups. Most of these students had already participated in the OPIC baseline or follow-up survey and were familiar with the project. As a reminder the students received a written notice a few days prior to the interview with the date, time, and location of it. The students were asked to register their interest through school's dean, and the list of participants was sent to the researcher. Those interested also received the participant information sheet to read themselves, or to take home to their parents or caregivers if they were younger than 16 years old, along with the consent form for them to sign.

<sup>5</sup> Number shown in each cell represents the number of students required for each focus group

### *Snowball Sampling*

In this technique, the study subjects recruit future subjects through their acquaintances; hence the sample appears to grow like a snowball. In this case, the researcher asked participants of the first focus groups (the senior students) if they thought there was anyone else at the school who was interested and that could join one of the future focus groups. Some indicated that a few of their friends or siblings at the school who fitted the criteria may also be interested and they would let them know.

Thus, in total 46 participants were recruited for this study and the researcher believes that all the available potential participants in the selected school were interviewed, given the sampling criteria.

### **3.3.3 Study Population**

It is not possible to personally identify the participants due to confidentiality issues. However a general description of the participants is presented here.

This consisted of 46 students who participated in one of the 12 focus groups including 23 male and 23 female, with 23 participants in each of the age groups (13-15 years and 16-18 years), and including the following ethnic groups: 17 Europeans, 16 South Asians (Indians), 13 East Asians (Chinese, Cambodian, Filipino, Thai, and Vietnamese).

This appears to cover a fair representation of the Asian community. However, the results of the research are not intended to be generalised for the entire Asian population. The intention is to gain an initial understanding of the determinants of young Asians' nutritional behaviours in order to suggest nutrition promotion initiatives targeted at this population for future actions.

It also needs to be noted that there was no special relationship between the participants and the researcher.



### **3.3.4 Data Collection Procedure**

The overall interview process consisted of the following steps, which are further elaborated on in different sections of this chapter. The first step involved planning the interview guideline. The second step involved recruiting the interviewees. The third step involved conducting 12 focus groups with 46 high school students. The fourth step involved transcribing and analysing the interviews using a general inductive approach to qualitative data analysis, including getting feedback on the analysis from others. The fifth step was to present the findings to a group of students from the same school for feedback on the analysis.

### **3.3.5 Interview Guideline**

The interview guideline was intended to provide a structured guide to the interview, involving a series of open ended questions. The aims of this guideline included the following: to establish a rapport or relationship with the person being interviewed, to find out possible determinants of young Asians' nutritional and exercise behaviours, and to find out what they feel needs to happen to make a positive difference in young Asians' lives in these matters.

The following presents the description of the structure and content of the interview guideline, under the headings that appear on the guideline.

#### *Introduction and Gathering of Demographics*

The entry process and relationship building between the researcher and the interviewees are critical aspects of the interview. In the beginning of the interviews some time was spent to introduce the researcher and her background, both personally and academically, and to describe the study and its philosophies. This was followed by gathering of demographics.

The introduction was positively received by the participants. The interview guideline in Appendix Eleven presents a brief outline of this introduction, but it is not as comprehensive as what was actually covered at the interviews.

## *Opening*

The opening question was aimed to balance out the power relationship between interviewer and interviewees. The participants were asked to talk about their favourite foods and drinks as this opening was guaranteed to generate responses by all of the participants by giving them confidence to talk about themselves by responding to a simple question.

This question was also aimed at indirectly identifying major food and drink preferences of young Asians, without starting the interview by talking about their actual habits and leading to the possibility of participants talking only about their healthy habits and giving potentially biased responses, as they were aware of the topic of the study.

At this stage, the researcher explained that the study was about young people and their nutritional and exercise habits, and asked the participants to consider not only themselves, but also other young people from the same age group, gender, and ethnicity when providing answers.

## *Interview Questions*

The following is a summary of the rationale and content of the questions asked. It needs to be noted that these questions were flexible and the prompts were used only when needed, for example, if no one was talking, or when the participants had not addressed that topic.

### PART ONE: Food Patterns

The next set of question asked the participants to talk about their food habits while they are at school, immediately after school, and for the rest of the day. East and South Asian participants were also asked to talk about their traditional food habits.

- What are your favourite foods and drinks? (Prompt: sugary drinks, takeaway food, etc)
- What do you usually eat during school and where do you get it from?
- What do you usually eat after school and where do you get it from?

- What is the traditional diet of East/South Asians back in the country of origin? And in New Zealand?

According to Wham (2002), although children learn their taste preferences quite rapidly over time, food preference acquirement is a life long process, and bearing in mind the population of study, it was important to look at the effects of immigration on their food habits.

Although the most accurate way of looking at dietary intake is a seven day diet record, or 24 hour food recall and alike, this was not seen feasible for the purpose of this study as it would need more time for the collection and detailed analysis of their diet. However, it was still important to explore young peoples' nutritional habits; therefore the researcher decided to draw conclusions based on her skills as a nutritionist.

#### PART TWO: Activity Patterns

- What are your hobbies? What do you do in your spare time or for fun? (Prompts: TV/video/computer games/sports/etc)
- Do you get any exercise? What sort? How much?
- Are there any cultural considerations that might influence your physical activities/recreation?

The benefit of regular physical activity is well proven. Along with many other health benefits, physical activity helps control weight and goes hand in hand with eating behaviours. This section attempted to identify how much, and what kinds, of physical activity young Asians and Europeans were involved with (including recreational activities), and if there were any barriers for them in doing so.

#### PART THREE: Influencing Factors

- How do you decide which food you eat every day? (Prompts: friends/school/teachers/money/cultural considerations/etc)
- Does your family have an influence on your food choice?
- Do you tend to like particular food if you are happy or sad? Or for special occasions?

This section attempted to explore the factors affecting food choice in young Asians.

Young people interact with the outside community, in particular school, and these factors collectively influence their eating behaviours. According to Wham (2002), cultural factors also affect food intake and food choice. Hence, it was important to identify if, and what, cultural factors contribute to young Asians' nutritional patterns. Studies have shown that low socio-economic groups are least likely to purchase foods that meet dietary guidelines recommendations (Wham, 2002). An attempt was made to see if this affected the Asian community who participated in this study. Media, including television, radio, magazines, outdoor signs, pamphlets, and internet are very effective in conveying messages to consumers. Considering both advantages and disadvantages from these influences, the topic needed to be explored further.

Parents are able to shape their children's eating patterns. Birch suggests that overly restrictive and rigid parental control tends to hinder children's ability to self-regulate (Birch, 1996). Therefore, how parents handle their food intake has a profound impact on their children's food acceptance, preference, and intake patterns; and it was important to understand parental influences on food choice.

This section also attempted to explore if there are any psychological factors relevant to food choice. Although the subject of food and mood is divisive, it is believed that moods and eating affect one another. Schachter's theory (1970) states that anxiety affects gastric motility and blood sugar levels, hence affecting eating in individuals of normal weight (Wham, 2002). Further, research by the American Psychiatric Association in 1987 concluded that people who are depressed usually eat less than normal people, although depressed people sometimes eat excessively (Wham, 2002).

#### PART FOUR: Knowledge and Experience

- How would you rate young people's (East Asians/South Asians/Europeans') knowledge of healthy food and what to eat?
- Where do you think they get their knowledge from?
- What do you know about heart health and its contributing factors?

- Where do you get this information from?

Knowledge or education has great influence on one's eating behaviour. We assume that those with better knowledge of nutrition are more likely to make healthy choices. Therefore, this section attempted to determine young peoples' levels of nutrition knowledge and to learn if they are aware of the relationship between healthy eating and exercise and heart disease. It was also important to identify where they receive this knowledge from, in order to be able to judge its reliability.

#### PART FIVE: Opinions on Practice

- What would be a good way to get young people to eat healthy and become physically more active?
- How can we engage the individuals and the community in these intervention programs?

Since the research is based on the concept of empowerment, which involves getting a collective sense of control and developing capacity, the participants were asked about their opinion on what would make a difference to young Asians' experiences of healthy eating and healthy action.

#### PART Six: Others

- Is there anything else you would like to discuss in relation to a healthy lifestyle and maintaining a healthy weight?

The last question was an open question to offer a final opportunity to the participants to share any comments on topics that had not been covered.

### **3.3.6 Interview Procedure**

As mentioned previously, the participants were approached through school, and they had received the participant information sheet (PIS) (See Appendices Twelve to Sixteen) to introduce the researcher and the research. Those who were interested in participating were invited to one of the 12 focus groups based on their age, gender, and ethnicity. All interviews were held at a class room in the school.

Before starting the interview, the researcher introduced herself and the research. The participants were given the PIS one more time and informed that they did not have to take part in this interview if they did not feel comfortable, or refuse to answer any particular question. They were reminded that they could ask questions about the research at any time during the interview, and withdraw from the research at any time up to 31<sup>st</sup> of July 2007 without giving a reason. At this stage, signed consent forms from the participants were collected and the participants were asked to fill out a form to collect their demographic details (See Appendix Seventeen).

As it was mentioned on the PIS, the participants were requested that the interviews be audio-taped. However they were assured that they could ask to have the recorder turned off at any time. This was not an issue with any of the focus groups.

As this was a focus group, anonymity of the students participating in the same group could not be guaranteed, but complete confidentiality and anonymity outside the focus group was assured and it was explained that the participant's name would not be used, and their data would only be identified by code. Moreover, they were assured that the school or their teachers will not have access to the audio-tapes or the transcriptions of the interviews. The participants were also given numbers on a sticker that they were asked to wear and throughout the interviews they were only referred to by numbers and no name were mentioned in any of the recordings. They were also asked to refer to themselves with numbers while the interview was being taped.

The interviews were then undertaken and audio-taped (using an Olympus Digital Voice Recorder DS-2200) and brief notes were also taken. All the interviews were conducted in English and the participants were all fluent in English. The interviews were professional but friendly and informal. If the researcher needed more details about any question or topic, she would ask more questions to ensure clear understanding as well as attempting to summarise each section to make sure the participants', and her, understanding of the responses were in agreement.

At the end, the participants were thanked for their participation and given a movie voucher as a token (they were not aware of this gift at the time they were invited and were registering to take part in the study).

The interviews took between 40 to 50 minutes each and were conducted over a period of six weeks.

Audio files were sent to a research assistant to be transcribed after each interview. Transcription files were identified by codes (i.e. number of focus groups), as participants' names, demographic details, and consent forms were held separately in a locked cabinet on university premises, accessible only by the researcher and her supervisors.

This was then followed by the data analysis that is described below.

### **3.3.7 Data Analysis**

Qualitative research software called NVivo 8 (developed by QSR International) was used to assist with qualitative data analysis. Unlike statistical software that uses numbers to analyse the data, qualitative software does not analyse the data directly but rather helps with accessing, managing and analysing detailed textual information, in this case the transcripts from the focus groups. NVivo 8 also helps with sorting and arranging the information, exploring trends, and making comparisons. In general, qualitative data analysis (QDA) software helps increase the focus on specific text and details, makes comparisons and cross tabs easier, and allows for faster re-analysis (e.g. for trustworthy checks).

Initially, transcripts from all focus groups were imported into the programme. At the same time seven sets was created to help with comparison between ethnicities (European, South Asian, and East Asian adolescents), genders (males and females), and age groups (junior and senior students). Transcripts from each focus group was then added to three different sets based on the ethnicity, gender, and age of the participants.

The method used for the analysis of the transcripts was the general inductive approach (Thomas, 2006). This method is frequently used in health and social

science research, and is a systematic, efficient, and convenient procedure for analysing qualitative data where the analysis is guided by specific objectives. Inductive analysis develops themes from the raw data for example focus group transcripts.

Thomas (2006) outlines three underlying principles for the use of the general inductive approach. First, being able to condense large raw data into a brief summary format; second, to establish clear links between the research objectives and the findings derived from the raw data; and third, to develop a model or theory about the underlying structure or processes that are evident in the raw data.

In a general inductive approach, the first step is the transcription of the interviews into text or raw data. The transcripts are read several times so the researcher is familiar with the content and is able to identify text segments that contain similar meaning units (e.g. themes). Next, the themes are put into categories that are given a name and a description. The categories may be linked to other categories (Thomas, 2006).

As explained before, the audio-tapes were first transcribed into text data and imported in to the QSR NVivo 8 software. Then the raw data were read in detail from a printout to get an understanding of what they were about. Then an attempt was made to identify the themes by reading the transcripts from QSR NVivo 8.

The themes were developed by noting recurring topics such as consumption of takeaway foods, sugary drinks, role of family, school support, etc. These themes (also called 'nodes' in NVivo) were created in the programme, appropriate text was then selected and added to that theme. Each time a similar text was read, it was highlighted and added to one of the existing themes, or when needed a new theme was created.

Each section of the interview guideline consisted of two to four questions, the main themes were organised under each section and these constitute the main results that are presented in Chapter Five. The themes within sections were prioritised by the number of times they occurred (e.g. number of times



mentioned in focus groups), or their perceived importance. The 'Main Themes' are summarized at the end of each section in the results chapter and example quotes are given from the focus groups to illustrate meanings associated with the main themes.

Matrix coding query or a cross tabulation (cross tab) analysis was used to show the joint distribution of two or more variables; in this case to make comparison between ethnic groups or different genders and age groups in relation to the main themes. This was done with the help of QSR NVivo by selecting the themes that were being compared and putting them in rows and selecting the required sets (e.g. Europeans, South Asians, and East Asians) and putting them in columns, then running the query. A table is created that shows the percentage coverage of the selected themes among different groups (in this case ethnic groups).

A further analysis was also done using the main themes driven from all questions to find links or relationships between the sections (e.g. risk factors and protective factors contributing to a healthy weight). This analysis identifies the common themes, which occurred frequently across different sections.

Given that the research findings are interpretations made by the researcher from the raw data, the results are influenced by the researcher's assumptions and experiences. Different researchers may determine different findings and therefore the trustworthiness of the findings needs to be verified. This can be done by a range of techniques. In this research, trustworthiness was assessed by consistency checks or 'Independent Parallel Coding' and credibility checks or 'Stakeholder Checks' (Thomas, 2006).

Independent parallel coding involves an independent coder who is given the research objectives and some of the raw data, and is asked to create categories or themes. In this research, the researcher had the assistance of one of the supervisors who coded parts of interviews from the first two focus groups, these themes were then compared with the set of themes created by the researcher.

Consistency checks can also involve having another coder to take the themes or category descriptions and find the matching text that they feel belongs in

those categories. The researcher asked the assistance of an experienced qualitative researcher to check the coding and there was an agreement that the categories (i.e. main themes) were selected appropriately.

Stakeholder checks involve people with an interest in the research like the participants to comment on the categories and the interpretations made. In this study the researcher visited the participating school later in the year and had a meeting with a few of the students who had participated in the focus groups. A summary of the results were presented and the students were requested to provide feedback. The responses from the participants indicated that the findings were representative of what they had said. Therefore the researcher believes that the coding and interpretation is trustworthy.

Next chapter (Chapter Four) presents the quantitative results from the analysis of the anthropometric measurements and individual interviews described in this chapter.

# Chapter 4. Quantitative Results

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This chapter summarises the results obtained from the Obesity Prevention in Communities (OPIC) Survey (See Appendix Seven), which was carried out in seven high schools in Auckland. The results compare the responses of South Asian, East Asian, and European adolescents by using the chi-square test to compare the distribution of their responses. The p-value ( $p$ ) is used to demonstrate the probability of the results and a p-value of less than 0.01 indicates a statistically significant outcome that is unlikely to have occurred by chance. As discussed in the methodology chapter a p-value of less than 0.01 has been chosen to deal with any design effect arising from the clustered sampling.

This chapter has eight sections: the demographics variables of the population of study (Section 4.1), anthropometric measurements (Section 4.2), the nutritional habits (Section 4.3), and the activity patterns of young Asians and Europeans (Section 4.4). Environmental factors are reported in Section 4.5, student opinions about body weight and shape in Section 4.6, and the knowledge of South Asian, East Asian, and European adolescents in relation to nutrition, physical activity, and obesity risk factors in Section 4.7. At the conclusion of this chapter (Section 4.8), a summary of the significant findings is presented.

#### **4.1. Demographic Variables**

The demographics characteristics of the South Asian, East Asian, and European adolescents are presented in Table 4.1. The total sample size was 821, including 485 Europeans, 221 South Asians, and 115 East Asians, with an even gender representation (48% male and 52% female) and age ranging from 12 to 20 years old. The distribution of gender and age did not vary between ethnic groups ( $p > 0.01$ ) indicating that they were not potential confounders and did not need to be adjusted for when comparing ethnic groups.

Most of the European adolescents (85%) were born in New Zealand, as opposed to 18% of South Asian and 40% of East Asian adolescents. Those who were not born in New Zealand have lived here between 0-16 years with the majority of Asian adolescents having lived here for less than 5 years.

In terms of household composition, most children lived with two parents. However, a higher percentage of South Asian adolescents (87%) lived with two parents compared to East Asian (61%) and European adolescents (69%). In addition, there was a lesser proportion of South Asian adolescents (1%) who don't live with their parents compared to East Asian (6%) and European adolescents (5%). The most common number of household residents was 4-5 people for over half of the adolescents in all groups (57%), with 31% of South Asian, 23% of East Asian, and 22% of European adolescents living in households with more than six residents.

Most of the European adolescents (73%) did not belong to a church, temple or mosque. In contrast, 67% of South Asian adolescents belonged to a Temple (or a Mosque) and 56% of East Asian adolescents belonged to a Temple (or a Church).

**TABLE 4.1. DEMOGRAPHICS – ETHNIC COMPARISONS OF PARTICIPANTS IN THE OPIC STUDY**

VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
Gender				0.81
Male	101 (46)	57 (50)	233 (48)	
Female	118 (54)	58 (50)	250 (52)	
Age (years)				0.03
12 & 13	63 (29)	31 (27)	117 (24)	
14	40 (18)	24 (21)	99 (20)	
15	51 (23)	12 (10)	101 (21)	
16	30 (14)	21 (18)	100 (21)	
17 +	37 (17)	27 (24)	68 (14)	
Ethnicity				-
South Asian	221 (27)	-	-	
East Asian	-	115 (14)	-	
European	-	-	485 (59)	

VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
Born in NZ				<0.0001
Yes	17 (18)	20 (40)	328 (85)	
No	75 (82)	30 (60)	57 (15)	
How long lived in NZ <sup>6</sup>				0.0001
0-1	19 (25)	13 (43)	8 (14)	
2-3	19 (25)	2 (7)	4 (7)	
4-5	18 (24)	8 (27)	12 (21)	
6+	19 (25)	7 (23)	33 (58)	
Household Composition				<0.0001
Live with two parents	192 (87)	70 (61)	336 (69)	
Live with one parent	26 (12)	38 (33)	125 (26)	
Don't live with parents	3 (1)	7 (6)	24 (5)	
Household size				0.10
2-3	28 (13)	18 (18)	101 (22)	
4	59 (27)	26 (27)	150 (32)	
5	63 (29)	31 (32)	115 (25)	
6	39 (18)	11 (11)	64 (14)	
7-8	20 (9)	9 (9)	29 (6)	
9 or more	8 (4)	3 (3)	10 (2)	
Belong to a Church, Temple or Mosque				<0.0001
No	73 (33)	51 (44)	352 (73)	
Belong to a Church	13 (6)	24 (21)	120 (25)	
Belong to a Temple	83 (38)	37 (32)	8 (2)	
Belong to a Mosque	52 (24)	3 (3)	5 (1)	

## 4.2. Anthropometry

This section compares the difference between various body measurements in different ethnic groups. These measurements include weight, height, waist

<sup>6</sup> Excludes missing data (Refer to Section 6.4)

circumference, fat mass, and the categories of weight status based on the Body Mass Index (BMI) of South Asian, East Asian, and European adolescents.

Table 4.2.1 presents the mean values, with standard error (SE), from the physical measurements. All means have been adjusted for gender and age.

Mean body weight, measured in kilograms (kg), differed significantly ( $p=0.002$ ) between both Asian groups and the European group. Mean weight was highest in European adolescents (64 kg), followed by South Asian (57 kg), and East Asian adolescents (55 kg).

Mean body height, measured in centimetres (cm), showed a similar difference between Asian ethnic groups and Europeans ( $p=0.0004$ ). Mean height was greater in European adolescents (167 cm), compared to South Asian (164 cm) and East Asian adolescents (161 cm).

Mean waist circumference, measured in centimetres (cm), showed no difference between South Asians and Europeans ( $p=0.1$ ) but there was a significant difference between East Asians and Europeans ( $p=0.001$ ). Mean waist circumference was greater in Europeans (81 cm), followed by South Asians (78 cm), and East Asian adolescents (76 cm).

Consequently, there was no difference in mean waist to height ratio between South Asians and Europeans ( $p=0.43$ ), or between East Asians and Europeans ( $p=0.03$ ). Mean waist to height ratio was 0.48 for South Asians and Europeans, and 0.47 for East Asians.

BMI is calculated by dividing an individual's body weight (in kg) by the square of his/her height (in metre). Mean BMI did not differ between South Asians, East Asians and Europeans ( $p=0.03$ ). Mean BMI in Europeans was  $22.8 \text{ kg/m}^2$  ( $SE=0.4$ ), followed by East Asians ( $21.3 \text{ kg/m}^2$ ,  $SE=0.3$ ), and South Asians ( $21.2 \text{ kg/m}^2$ ,  $SE=0.2$ ).

Bioimpedance measurement is a measure of electrical resistance that can be used to estimate body fat. The means for fat free mass (FFM), estimated in kg, from bioimpedance was lower in both Asian groups than Europeans ( $p=0.0002$ ), putting the European adolescents in a healthier position. Means for fat mass (in

kg) showed no difference between South Asians and Europeans (p=0.06) but a significant difference between East Asians and Europeans (p=0.004). The mean fat mass was greater in Europeans (20.6 kg), followed by South Asians (17.9 kg), and East Asians (16.5 kg). Having said that, the mean values presented here are adjusted for age and gender but not for ethnicity. Considering that Asian adolescents have lower BMI values (i.e. lower weight and height), the lower mean fat mass shown here does not put young Asians in a healthier position. In addition fat percentage showed no significant difference between East Asian (30%), South Asian (31%), and European adolescents (32%).

**TABLE 4.2.1. MEAN LEVELS OF ANTHROPOMETRY VARIABLES, FOR ETHNIC GROUPS, ADJUSTED FOR AGE AND GENDER**

VARIABLE	SOUTH ASIAN N=221	EAST ASIAN N=115	EUROPEAN N=485	P-VALUE
	Mean (SE)	Mean (SE)	Mean (SE)	
Mean weight (kg)	57.2 (0.6) <sup>7</sup>	55.3 <sup>8</sup> (0.9)	63.7 (1.2)	0.002
Mean height (cm)	163.7 (0.5)	160.8 (0.3)	166.6 (0.3)	<0.0001
Mean waist circumference (cm)	78.0 <sup>9</sup> (0.6)	75.7 <sup>10</sup> (0.5)	80.7 (1.2)	0.001
Mean waist to height ratio	0.5 (0)	0.5 (0)	0.5 (0)	0.04
Mean BMI (kg/m <sup>2</sup> )	21.2 (0.2)	21.3 (0.3)	22.8 (0.4)	0.03
Fat Free Mass (kg)	39.2 (0.3)	38.8 (0.3)	43.2 (0.5)	0.0002
Fat Mass (kg)	17.8 <sup>11</sup> (0.4)	16.5 <sup>12</sup> (0.8)	20.6 (1.0)	0.011
Fat Percentage <sup>13</sup> (%)	31	30	32	-

<sup>7</sup> P – value for South Asians vs. Europeans = 0.005

<sup>8</sup> P – value for East Asians vs. Europeans = 0.001

<sup>9</sup> P – value for South Asians vs. Europeans = 0.1

<sup>10</sup> P – value for East Asians vs. Europeans = 0.001

<sup>11</sup> P – value for South Asians vs. Europeans = 0.06

<sup>12</sup> P – value for East Asians vs. Europeans = 0.004

<sup>13</sup> Fat % = Fat Mass / Weight



Weight status is shown in Table 4.2.2. The Cole criteria were used to define weight status and the results are adjusted for age and gender. East Asian adolescents were less likely to be classified as obese (5%) than South Asians (8%), and Europeans (12%). Similarly, East Asians were less likely to be classified as overweight (19%) than South Asians (21%), and Europeans (23%). South Asians had a greater proportion of adolescents classified as being underweight (18%) than East Asians (11%), and Europeans (4%).

In general, East Asian adolescents had a greater proportion classified within the normal weight range (65%) compared to Europeans (61%) and South Asians (53%).

Regardless of the above differences between the three ethnic groups, high proportions – 35% of European, 29% of South Asian, and 24% of East Asian adolescents – were classified as being overweight or obese.

It also needs to be noted that these categories are based on the weight status definitions of the International Obesity Taskforce (IOTF), which uses the same cut-off points for Europeans and Asians. According to the current literature that Asian children experience obesity related health problems at lower BMI, have smaller figures, and higher percent fat mass, Asian adolescents will need lower cut-off points for appropriate classifications of overweight and obesity, which may ultimately show higher percentage of overweight and obesity in Asian groups presented here. This will be discussed further in Chapter Six.

**TABLE 4.2.2. WEIGHT STATUS BY ETHNIC GROUP**

VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
Weight status				<0.0001
Obese	18 (8)	5 (5)	59 (12)	
Overweight	45 (21)	21 (19)	108 (23)	
Normal weight	115 (53)	72 (65)	293 (61)	
Underweight	40 (18)	13 (11)	20 (4)	

### **4.3. Nutrition**

This section describes nutritional habits of Asian and European adolescents including breakfast and meals consumed during school time, after school foods, and other dietary habits such as intake of fruits and vegetables or takeaways.

#### **4.3.1 Food Patterns: Breakfast & School Meals**

This section explores nutritional habits of young Asian and Europeans before and during the school time, including breakfast, morning tea, and lunch. Table 4.3.1 illustrates the frequency and sources of these meals.

The majority of the Asian and European adolescents ate breakfast before school starts, but there was a significant difference between these groups ( $p=0.003$ ), with 81% of young South Asians having breakfast before school starts on four to five days during the week, compared to 77% of Europeans, and 60% of East Asians. However, while only 12% of East Asians did not eat breakfast at all, 16% of South Asians and 19% of Europeans started the day with no breakfast and overlooked this important meal of the day. There was also a significant difference in the source of their breakfast ( $p=0.0004$ ). Of those who reported eating breakfast, 81% of South Asians, followed by 77% of Europeans, and 75% of East Asians got their breakfast from home. The remainder of East Asians (13%), Europeans (4%), and South Asians (3%) got their breakfast from school canteen or a shop outside the school.

There was no significant difference in the frequency of morning tea consumption between the three ethnic groups ( $p=0.14$ ). The majority of the young people (90% of South Asians, 89% of Europeans, and 85% of East Asians) ate during the morning recess/interval on three to five days during the week, although 19% of East Asians and 17% of South Asians and Europeans indicated that they usually did not eat morning tea. The source of morning tea was significantly different between East Asians compared to South Asians and Europeans ( $<0.0001$ ). Only 37% of East Asians got their morning tea from home, compared to 62% of South Asians and 60% of Europeans. A higher proportion of East Asians (44%) got this food from school canteen, a shop

outside the school, or their friends, compared to 22% of South Asians and 23% of Europeans.

Similarly there was no significant difference between ethnic groups in the frequency of lunch consumption ( $p=0.27$ ). The majority of the European and South Asian adolescents (71%) and East Asians (70%) ate lunch on four to five days during the week. Once again, the source of lunch was significantly different between these groups ( $p=0.0002$ ), with 59% of Europeans, and 55% of South Asians, compared to 41% of East Asians, getting their lunch from home. In contrast, 53% of East Asians, 33% of South Asians, and 31% of Europeans got their lunch from school canteen, a shop outside the school, or their friends, while 12% of South Asians, 10% of Europeans, and 6% of East Asians did not eat lunch at all.

**TABLE 4.3.1. BREAKFAST AND SCHOOL MEALS – BY ETHNIC GROUP**

VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
In the last 5 school days, on how many days did you have something to eat for BREAKFAST?				0.003
0 days	6 (4)	5 (6)	6 (2)	
1-2 days	10 (6)	17 (20)	31 (9)	
3 days	16 (10)	12 (14)	47 (13)	
4 days	20 (13)	9 (11)	56 (16)	
5 days	108 (68)	41 (49)	216 (61)	
On school days, where do you usually get your breakfast from?				0.0004
Home	179 (81)	86 (75)	372 (77)	
School canteen or Shop	6 (3)	15 (13)	21 (4)	
I don't eat breakfast	36 (16)	14 (12)	92 (19)	

VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
In the last 5 school days, on how many days did you eat at morning recess/ interval?				0.14
0 days	6 (4)	5 (6)	5 (1)	
1-2 days	11 (7)	7 (9)	37 (10)	
3 days	28 (17)	18 (22)	59 (15)	
4 days	29 (18)	14 (17)	63 (16)	
5 days	89 (55)	37 (46)	223 (58)	
Where do you usually get your morning tea from?				<0.0001
Home	136 (62)	43 (37)	292 (60)	
School canteen/Shop/From friends	48 (22)	50 (44)	110 (23)	
I don't eat morning tea	37 (17)	22 (19)	83 (17)	
In the last 5 school days, on how many days did you eat lunch at lunchtime?				0.27
0 days	2 (1)	5 (5)	8 (2)	
1-2 days	12 (7)	6 (6)	41 (10)	
3 days	40 (22)	20 (19)	78 (18)	
4 days	35 (19)	25 (24)	80 (19)	
5 days	95 (52)	47 (46)	222 (52)	
Where do you usually get your lunch from?				0.0002
Home	122 (55)	47 (41)	287 (59)	
School canteen/Shop/From friends	72 (33)	61 (53)	152 (31)	
I don't eat lunch	27 (12)	7 (6)	46 (10)	

### 4.3.2 Food Patterns: After School Meals

A variety of food groups that are potentially consumed after school are presented in Table 4.3.2. These include fruits, bread and sandwiches, potato chips and noodles, pies or fried foods, and chocolates and sweets.

There was no significant difference between the three ethnic groups in relation to the frequency of snack foods purchased ( $p=0.36$ ) or the money they spent on

purchasing food or drinks from shops or dairies, not including school canteens ( $p=0.39$ ). However, a smaller percentage of Europeans (38%) did not buy snack food from a shop after school in the last five school days, compared to 43% of East Asians, and 49% of South Asians; while 36% of East Asians, 32% of South Asians, and 29% of Europeans spent five dollars (or more) on food or drinks after school on the last school day.

Overall, there was a significant difference in the consumption of other food groups among the three ethnic groups. East Asians had a higher percentage of adolescents who ate fruit most days after school (51%) than Europeans (49%), and South Asians (39%) ( $p=0.003$ ). For bread based foods such as toast, buns or sandwiches, 53% of European adolescents ate these foods on most days after school compared to 44% of South Asians, and 35% of East Asians ( $p=0.002$ ). For biscuits, potato chips or snacks such as instant noodles, a higher percentage of South Asians (39%) ate these foods on most days after school compared to East Asians and Europeans (32%) ( $p=0.004$ ).

However, in relation to pies, takeaways or fried foods such as French fries, there was no significant difference between the ethnic groups ( $p=0.02$ ) but the findings showed that 16% of East Asians, 11% of Europeans, and 10% of South Asians consumed these foods on most days. Neither was there a significant difference between ethnicity for the last group of foods consisting of chocolates, lollies, sweets or ice cream ( $p=0.13$ ). The findings show that 29% of South Asian, 23% of European, and 20% of East Asians ate these foods on most days after school.

**TABLE 4.3.2. AFTER SCHOOL MEALS – BY ETHNIC GROUP**

VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
In the last 5 school days, on how many days did you buy snack food from a shop or takeaway after school?				0.36
0 days	109 (49)	49 (43)	182 (38)	
1 day	43 (20)	27 (24)	112 (23)	
2 days	36 (16)	20 (17)	97 (20)	
3 days	20 (9)	10 (9)	44 (9)	
4 days	5 (2)	3 (3)	18 (4)	
5 days	8 (4)	6 (5)	32 (7)	
On the last school day, how much money did you spend on food or drinks for yourself at takeaway shops or dairies?				0.39
0	94 (43)	38 (33)	198 (41)	
\$1-4	57 (26)	36 (31)	147 (30)	
\$5-9	46 (21)	22 (19)	85 (18)	
\$10 or more	24 (11)	19 (17)	55 (11)	
How often do you usually eat fruit after school?				0.003
Most days	86 (39)	59 (51)	236 (49)	
Some days	87 (39)	48 (42)	162 (33)	
Hardly ever or never	48 (22)	8 (7)	87 (18)	
How often do you usually eat bread, toast, buns or sandwiches after school?				0.002
Most days	97 (44)	40 (35)	259 (53)	
Some days	86 (39)	57 (50)	153 (32)	
Hardly ever or never	38 (17)	18 (16)	73 (15)	
How often do you usually eat biscuits, potato chips or snacks such as instant noodles after school?				0.004
Most days	86 (39)	37 (32)	155 (32)	
Some days	99 (45)	66 (57)	217 (45)	
Hardly ever or never	36 (16)	12 (10)	113 (23)	

VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
How often do you usually eat pies, takeaways or fried foods such as french fries after school?				0.02
Most days	22 (10)	18 (16)	55 (11)	
Some days	99 (45)	58 (50)	187 (39)	
Hardly ever or never	100 (45)	39 (34)	243 (50)	
How often do you usually eat chocolates, lollies, sweets or ice cream after school?				0.13
Most days	63 (29)	23 (20)	109 (23)	
Some days	93 (42)	61 (53)	212 (44)	
Hardly ever or never	65 (29)	31 (27)	164 (34)	

### 4.3.3 Food Patterns: Fruit, Vegetables, Sugary Drinks and Takeaways

Table 4.3.3 presents further findings on food patterns of Asian and European adolescents during the week.

There was a significant difference between ethnicities in the consumption of fruits and vegetables ( $p < 0.0001$ ). A higher percentage of South Asians ate one or less serve per day of fruit (63%) and vegetable (48%) than Europeans (47% for fruit, 29% for vegetables) and East Asians (39% for fruit, 32% for vegetables). For the recommended two to three serves of fruits each day (a serve = one apple or two plums or one cup of diced fruit), East Asians had the highest percentage of fruit consumption (51%) followed by Europeans (44%) and South Asians (33%). For the recommended two to three serves of vegetables each day (a serve = ½ cup cooked vegetables or one cup of raw vegetables or salad), Europeans had the highest percentage of vegetable consumption (58%) followed by East Asians (50%) and South Asians (41%). Overall, East Asian adolescents ate more fruits and vegetables than European and South Asian adolescents.

There was no significant difference between ethnic groups in frequency of the consumption of non-diet soft drinks like Coke, Sprite, and Fanta or the amount it

was consumed (p=0.10). However, the results indicate that a high percentage of South Asians (87%), East Asians (86%), and Europeans (80%) drank soft drinks on at least one day or more (in the last five school days), with over 50% of them having two small glasses or one can (300 ml), or more on a daily basis.

The findings show a significant difference in frequency of fruit drinks or cordials consumption such as Ribena, Raro, Just Juice, or Freshup (p=0.0003), but no difference in the amount that was consumed (p=0.32). In this case, a high percentage of East Asians and Europeans (83%), followed by South Asians (76%), consumed fruit drinks or cordials on at least one day or more (in the last five school days). Although there was no significant difference in the amount they drank, over 60% of them had two small glasses or more on a daily basis.

There was a significant difference in the frequency each ethnic group eat food from a takeaway like McDonalds, KFC, Subway, fried chicken, fish and chips, hamburgers, or Chinese takeaway (p=0.002). Forty percent of South Asians ate food from a takeaway once a month or less while 12% ate two to three times a week or more. Respectively, 23% and 13% of East Asians, and 26% and 11% of Europeans ate food from a takeaway. Overall, East Asians were more likely to eat food from a takeaway than Europeans and South Asians.

**TABLE 4.3.3. FOOD HABITS – BY ETHNIC GROUP**

VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
How many serves of fruit do you usually eat each day?				<0.0001
1 serve or less	140 (63)	45 (39)	226 (47)	
2 to 3 serves	72 (33)	59 (51)	212 (44)	
4 serves or more	9 (4)	11 (10)	47 (10)	
How many serves of vegetables do you usually eat each day?				<0.0001
1 serve or less	105 (48)	37 (32)	142 (29)	
2 to 3 serves	91 (41)	58 (50)	283 (58)	
4 serves or more	25 (11)	20 (17)	60 (12)	



VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
In the last 5 school days, on how many days did you have regular (non-diet) soft drinks?				0.10
0 days	28 (13)	16 (14)	95 (20)	
1 day	31 (14)	27 (24)	95 (20)	
2 days	45 (20)	25 (22)	90 (19)	
3 days	55 (25)	23 (20)	96 (20)	
4 days	26 (12)	7 (6)	37 (8)	
5 days	36 (16)	17 (15)	72 (15)	
On the last school day, how many glasses or cans of soft drinks did you have?				0.13
None	38 (21)	23 (25)	101 (27)	
1 small glass / half a can (150ml)	39 (22)	18 (19)	68 (18)	
2 small glasses / 1 can (300ml)	53 (30)	28 (30)	89 (24)	
3 small glasses / 2 cans (600ml)	19 (11)	10 (11)	68 (18)	
4-5 glasses / 3 cans (1 litre) or more	30 (17)	15 (16)	46 (12)	
In the last 5 school days, on how many days did you have fruit drinks or cordial?				0.0003
0 days	52 (24)	20 (17)	80 (17)	
1 day	37 (17)	21 (18)	70 (14)	
2 days	45 (20)	33 (29)	75 (16)	
3 days	39 (18)	18 (16)	84 (17)	
4 days	23 (10)	8 (7)	60 (12)	
5 days	25 (11)	15 (13)	116 (24)	
On the last school day, how many glasses of fruit drinks or cordial did you have?				0.32
0	22 (15)	11 (13)	40 (11)	
1	33 (22)	18 (21)	86 (23)	
2	44 (29)	27 (31)	86 (23)	
3	19 (13)	15 (17)	68 (18)	
4 or more	33 (22)	15 (17)	99 (26)	

Variable	South Asian	East Asian	European	P-value
	No. (%)	No. (%)	No. (%)	
How often do you usually eat food from a takeaway?				0.002
Once a month or less	89 (40)	26 (23)	128 (26)	
2-3 times a month	54 (24)	45 (39)	165 (34)	
Once a week	51 (23)	29 (25)	138 (29)	
2-3 times a week or more	27 (12)	15 (13)	54 (11)	

Overall, the results suggest East and South Asian adolescents consume more takeaways, noodles, biscuits, chips, sweets, and ice creams than Europeans. Moreover, South Asians consume less fruits and vegetables; and East Asians consume more fruit drinks than others. Also the source of breakfast, morning tea, or lunch is less healthy in East Asian students.

The food patterns and dietary habits of young Asians and Europeans will be discussed in more details in the next chapter (Section 5.3).

#### 4.4. Activity Patterns

This section gives details on the level and patterns of activities carried out by young Asians and Europeans. This includes physical activity and exercise, as well as television and computer habits.

##### 4.4.1 Physical Activity

The exercise and physical activity patterns are reported in Table 4.4.1.

There was no significant difference in the frequency of walking or biking to or from school ( $p=0.08$ ) during the week, or the time it took to do so ( $p=0.14$ ). A higher percentage of South Asian adolescents did not walk or bike to or from school in the last five school days (31%) than East Asians (26%) or Europeans (23%); while 30% of European adolescents and 29% of East and South Asian adolescents walked or biked to school every day. For the majority of these adolescents (41% of Europeans, 58% of East Asians, and 68% of South

Asians) it took between 15 – 30 minutes to walk or bike to school; while the majority of the remainder of East Asians (25%) and South Asians (21%) took less than 15 minutes and the majority of the remainder of Europeans (38%) took more than 30 minutes to walk or bike to school. Although it took European adolescents longer to walk or bike to school, they were more likely to do so than Asian adolescents.

There were significant differences in physical activity patterns between the three ethnic groups at morning interval ( $p=0.0001$ ) and lunch time ( $p=0.003$ ). About half of all adolescents mostly stood or walked around the school during morning interval and lunch time. A lower percentage – 41% and 30% of East Asians, and 30% and 27% of Europeans – mostly just sat down during morning interval and lunch time respectively than South Asians (20% and 17%); while 25% and 30% of South Asians mostly played active games during morning interval and lunch time. These findings show that South Asian adolescents were the most physically active, and the East Asians were the least active group while at school.

However, there was no difference between ethnic groups in relation to how active they each are after school ( $p=0.05$ ). This included sports, dance, cultural performances or games in which they were active. The results show that 31% of South Asian adolescents were active on four to five days in the last five school days while 22% were not active on any day after school. This is followed closely by 28% of European adolescents who were active on four to five days and 26% who were not active on any day in the last five school days. In addition, 16% of East Asian adolescents were active on four to five days a week and 35% were not active on any day in the last five school days.

**TABLE 4.4.1. ACTIVITY PATTERNS – BY ETHNIC GROUP**

VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
In the last 5 school days, how many times did you walk or bike to or from school?				0.08
0	69 (31)	30 (26)	113 (23)	
1-2	27 (12)	21 (18)	53 (11)	
3-4	18 (8)	10 (9)	45 (9)	
5-6	37 (17)	19 (17)	94 (19)	
7-9	7 (3)	2 (2)	35 (7)	
10 or more	63 (29)	33 (29)	145 (30)	
How long does it take you to walk from home to your school?				0.14
Less than 15 minutes	6 (21)	3 (25)	7 (22)	
15 - 30 minutes	19 (68)	7 (58)	13 (41)	
More than 30 minutes	3 (11)	2 (17)	12 (38)	
Over the last 5 school days, what did you do most of the time at morning recess/ interval?				0.0001
Mostly just sat down	43 (20)	47 (41)	143 (30)	
Mostly stood or walked around	123 (56)	55 (48)	261 (54)	
Mostly played active games	55 (25)	13 (11)	81 (17)	
In the last 5 school days, what did you do most of the time at lunch time?				0.003
Mostly just sat down	37 (17)	35 (30)	130 (27)	
Mostly stood or walked around	118 (53)	61 (53)	256 (53)	
Mostly played active games	66 (30)	19 (17)	99 (20)	
In the last 5 school days, on how many days after school, did you do sports, dance or play games in which you were active?				0.05
0 days	49 (22)	40 (35)	125 (26)	
1 day	29 (13)	19 (17)	48 (10)	
2 days	37 (17)	24 (21)	97 (20)	
3 days	38 (17)	14 (12)	82 (17)	
4 days	26 (12)	9 (8)	52 (11)	
5 days	42 (19)	9 (8)	81 (17)	

#### 4.4.2 TV Patterns

Table 4.4.1 gives details on screen time activities like watching television (TV), videos, and digital video discs (DVD).

On the subject of TV presence in the homes of these young people, all East Asians (100%), and nearly all Europeans (98%), and South Asians (94%) had a TV in their home. Thus, South Asians were more likely to not have a TV at home (6%) than other ethnic groups. In addition, there was a significant difference in presence of a TV in their bedrooms ( $p < 0.0001$ ), with a higher percentage of Europeans (58%) and East Asians (52%) having a TV in their bedrooms, than South Asians (37%).

There was no significant difference in the frequency of watching TV, video, or DVD in their free time during the week ( $p = 0.12$ ). The results show that majority of young people in each group (48% of East Asians, 47% of South Asians, and 40% of Europeans) watched TV, videos, or DVDs on each day during the week. However, there was a significant difference in the hours they spent viewing TV, with 44% of Europeans watching less than one hour on the last school day, compared to 35% of South Asians, and 26% of East Asians ( $p = 0.007$ ). In addition, while only 10% of South Asians and 12% of Europeans spent more than four hours on the last school day watching TV, 17% of East Asians did the same. In general, East Asians were more likely to watch TV, videos or DVDs during the week, and for longer, followed by South Asians and Europeans.

There was a significant difference between the groups in relation to the hours they spent watching TV, videos or DVDs on the last Saturday ( $p = 0.0002$ ) and Sunday ( $p = 0.019$ ). East Asian and South Asian adolescents were more likely to spend four hours or more watching TV on the weekends (about 30%) than European adolescents (about 20%). Overall, young people from all groups spent more time watching TV on the weekends.

The findings show a significant difference in terms of rules and restrictions on the amount of TV, videos, and DVDs young people in each ethnic group were allowed to watch during the school week. While the majority of the European adolescents (63%) reported no limits on the amount of TV they watched, 52% of

East Asians and 30% of South Asians reported having no limits. Nearly half of the Asian adolescents – 46% of South Asians and 44% of East Asians – reported having some limits, while 24% of South Asians and 4% of East Asians reported having strict limits.

The results showed no significant difference between the ethnic groups in regard to the number of times they watched TV while eating their evening meal ( $p=0.65$ ). More than one third of young people ate their evening meal while watching TV on four to five days during the last five school days.

**TABLE 4.4.2. TV PATTERNS – BY ETHNIC GROUP**

VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
Do you have a TV in your home?				0.0007
Yes	208 (94)	115 (100)	477 (98)	
No	13 (6)	0 (0)	8 (2)	
Do you have a TV in your bedroom?				<0.0001
Yes	74 (37)	57 (52)	275 (58)	
No	126 (63)	52 (48)	198 (42)	
In the last 5 school days, how many days did you watch TV, videos or DVDs?				0.12
0 days	12 (5)	7 (6)	26 (5)	
1-2 days	47 (21)	18 (16)	143 (30)	
3 days	35 (16)	21 (18)	77 (16)	
4 days	23 (10)	14 (12)	44 (9)	
5 days	104 (47)	55 (48)	195 (40)	
On the last school day that you watched TV, videos or DVDs, how long did you watch for?				0.007
1 hour or less	77 (35)	30 (26)	215 (44)	
2 hours	62 (28)	33 (29)	118 (24)	
3 hours	46 (21)	25 (22)	66 (14)	
4 hours	14 (6)	7 (6)	27 (6)	
More than 4 hours	22 (10)	20 (17)	59 (12)	

VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
<p>Last Saturday, how many hours did you spend watching TV, videos or DVDs?</p> <p>0</p> <p>1</p> <p>2</p> <p>3</p> <p>4 or more</p>	<p>33 (15)</p> <p>36 (16)</p> <p>37 (17)</p> <p>42 (19)</p> <p>73 (33)</p>	<p>12 (10)</p> <p>22 (19)</p> <p>29 (25)</p> <p>14 (12)</p> <p>38 (33)</p>	<p>119 (25)</p> <p>102 (21)</p> <p>93 (19)</p> <p>58 (12)</p> <p>113 (23)</p>	0.0002
<p>Last SUNDAY, how many hours did you spend watching TV, videos or DVDs?</p> <p>0</p> <p>1</p> <p>2</p> <p>3</p> <p>4 or more</p>	<p>35 (16)</p> <p>45 (20)</p> <p>44 (20)</p> <p>40 (18)</p> <p>57 (26)</p>	<p>12 (10)</p> <p>21 (18)</p> <p>22 (19)</p> <p>24 (21)</p> <p>36 (31)</p>	<p>98 (20)</p> <p>123 (25)</p> <p>96 (20)</p> <p>59 (12)</p> <p>109 (23)</p>	0.019
<p>During the school week, do your parents limit the amount of TV you are allowed to watch?</p> <p>No limits - I can watch anything</p> <p>Yes - but not very strict limits</p> <p>Yes - strict limits</p>	<p>66 (30)</p> <p>102 (46)</p> <p>53 (24)</p>	<p>60 (52)</p> <p>50 (44)</p> <p>5 (4)</p>	<p>306 (63)</p> <p>132 (27)</p> <p>47 (10)</p>	<0.0001
<p>In the last 5 school days, how many times did you watch TV while eating your evening meal?</p> <p>0 days</p> <p>1 day</p> <p>2 days</p> <p>3 days</p> <p>4 days</p> <p>5 days</p>	<p>54 (24)</p> <p>20 (9)</p> <p>33 (15)</p> <p>30 (14)</p> <p>18 (8)</p> <p>66 (30)</p>	<p>24 (21)</p> <p>15 (13)</p> <p>21 (18)</p> <p>15 (13)</p> <p>11 (10)</p> <p>29 (25)</p>	<p>108 (22)</p> <p>62 (13)</p> <p>56 (12)</p> <p>68 (14)</p> <p>38 (8)</p> <p>153 (32)</p>	0.65

### 4.4.3 Games Patterns

The following results describe the screen-games habits of young Asians and Europeans as shown in Table 4.4.2. These include video games, electronic games or a use of computer (excluding for homework).

Regarding the presence of video/electronic games or a computer in their homes, the findings show a significant difference between the ethnic groups ( $p=0.001$ ). While majority of young people in all ethnic groups had games or a computer in home, European (98%) and East Asian (97%) adolescents were more likely to, than South Asians (91%).

There was no significant difference between the ethnic groups in the frequency of playing video/electronic games or using a computer between the ethnic groups during the last five school days ( $p=0.39$ ), with 34% of South Asians not playing any of these games compared to 28% of Europeans and 26% of East Asians.

There was not a significant difference in the total amount of time these young people spend playing video/electronic games or using a computer during the last school day ( $p=0.03$ ). However, East Asians showed the highest percentage of young people playing games for three hours or longer (21%), followed by Europeans (17%), and South Asians (12%). The findings also show that 37% of South Asians did not play on the last school day, compared to 31% of Europeans, and 27% of East Asians.

There was also a significant difference between the three ethnic groups in the frequency of playing video/electronic games or using a computer on the last Saturday ( $p<0.0001$ ) and Sunday ( $p=0.0003$ ). Again, East Asians were more likely to spend three hours or more playing games on the last Saturday (25%) and Sunday (23%), followed by Europeans (18% and 14% respectively) and South Asians (17% and 12%). Almost half of the European and South Asian adolescents did not spend any time at all playing these games on the last Sunday compared to 38% of East Asians. Thus, similar to TV patterns, East Asians were more likely to play video/electrical games or use a computer than



Europeans and South Asians. Overall, young people from all ethnic groups played more games on the last Saturday than Sunday or week day.

**TABLE 4.4.3. GAMES PATTERNS – BY ETHNIC GROUP**

VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
Do you have video games, electronic games or a computer in your home?				0.001
Yes	202 (91)	111 (97)	473 (98)	
No	19 (9)	4 (3)	12 (2)	
In the last 5 school days, how many days did you play video games, electronic games or use the computer?				0.39
0 days	74 (34)	30 (26)	134 (28)	
1 day	37 (17)	12 (10)	83 (17)	
2 days	35 (16)	17 (15)	77 (16)	
3 days	27 (12)	19 (17)	61 (13)	
4 days	15 (7)	8 (7)	35 (7)	
5 days	33 (15)	29 (25)	95 (20)	
On the last school day that you spent time playing video games or using the computer, how long did you play for?				0.03
Have not played for ages	81 (37)	31 (27)	151 (31)	
1 hour	86 (39)	34 (30)	191 (39)	
2 hours	29 (13)	26 (23)	62 (13)	
3 hours	8 (4)	9 (8)	34 (7)	
4 hours or more	17 (8)	15 (13)	47 (10)	
Last Saturday, how many hours did you spend playing video games or using the computer?				<0.0001
0 hours	98 (44)	44 (38)	227 (47)	
1 hour	64 (29)	19 (17)	136 (28)	
2 hours	23 (10)	23 (20)	36 (7)	
3 hours	17 (8)	9 (8)	18 (4)	
4 hours or more	19 (9)	20 (17)	68 (14)	

VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
Last SUNDAY, how many hours did you spend playing video games, or using the computer?				0.0003
0 hours	113 (51)	44 (38)	244 (50)	
1 hour	63 (29)	22 (19)	125 (26)	
2 hours	19 (9)	22 (19)	46 (10)	
3 hours	11 (5)	12 (10)	16 (3)	
4 hours or more	15 (7)	15 (13)	54 (11)	

Overall, the results suggest East Asian students are less physically active at or after school, spend more time watching TV or playing video and computer games, than South Asians and Europeans.

The activity patterns of Asian and European adolescents will be discussed in more details in the next chapter (Section 5.4).

## 4.5. Environment

This section presents findings reported by young Asians and Europeans regarding the settings created by family, school, and neighbourhood for them.

### 4.5.1 Family Environment

Information on the environment formed by the family and how it influences the nutritional and exercise habits of young Asians and Europeans, is given in Table 4.5.1.

The findings show a significant difference between the ethnic groups in relation to how much the mother or female caregiver ( $p=0.002$ ), and father or male caregiver ( $p<0.0001$ ), encourages them to be physically active or play sports. South Asian adolescents report receiving more encouragement from their parents to be physically active, followed by European and East Asian adolescents. In the case of South Asians, 40% reported their mothers and 47%

their fathers as encouraging them “a lot” to be physically active, with only 3% and 5% respectively not encouraging them at all. In the case of Europeans, 37% reported their mothers and 33% their fathers encouraged them “a lot” to be physically active, with 5% and 15% respectively not offering any encouragement at all. In contrast East Asians reported the highest percentage of mothers (37%) and fathers (28%) offering “some” encouragement to them to be physically active, as opposed to “a lot” of encouragement, compared to the other two groups. It also appears that mothers in all ethnic groups encourage their children to be physically active more than the fathers.

The results also showed a significant difference between the ethnic groups in regards to how much the mother and father encourage young people to eat healthy foods ( $p < 0.0001$ ). In general, South Asians reported being encouraged more by both mothers and fathers to eat healthy foods, followed by East Asians, and Europeans. In all ethnic groups, mothers encouraged young people to eat healthy foods more than fathers. South Asian adolescents reported 72% of mothers and 57% of fathers encouraged them “a lot” to eat healthy foods. East Asian adolescents reported 58% of mothers and 41% of fathers encouraged them “a lot” to eat healthy food. European adolescents reported 52% of mothers and 29% of fathers encouraged them “a lot” to eat healthy foods. In addition, only 2% of South Asian, 3% of East Asian, and 4% of European mothers did not encourage their children “at all” to eat healthy food, in comparison to 9% of South Asian, 10% of East Asian, and 15% of European fathers.

The findings do not show a significant difference in the frequency of times when all or most of the family had the evening meal together ( $p = 0.93$ ). Over half of the adolescents from each group reported having evening meal together on four to five days during the last five school days; this includes 63% of South Asian, 61% of East Asian, and 58% of European families.

There was a significant difference between the ethnic groups in relation to the frequency of having food from a takeaway shop for dinner ( $p < 0.0001$ ), with 7% of South Asian adolescents reporting having dinner from a takeaway shop more than once a week, compared to 6% of Europeans and 4% of East Asians. This was followed by 31% of Europeans, 29% of East Asians, and 21% of South

Asians having dinner from a takeaway shop at least once a week. In total, 37% of Europeans, 33% of East Asians, and 28% of South Asians reported having dinner from a takeaway shop once a week or more often.

The availability of different types of food at home did not differ between the ethnic groups in terms of fruit availability ( $p=0.58$ ) but there was a significant difference in terms of availability of some snack foods and sugary drinks.

Majority of young South Asians (95%), Europeans (93%), and East Asians (90%) reported fruit being available for them to eat almost everyday or on most days.

Potato chips or similar snacks were available almost everyday or on most days for 52% of South Asians, 50% of Europeans, and 48% of East Asians. This is followed by the same group of food being available on some days for 43% of South Asians, 42% of East Asians, and 37% of Europeans. In other words, potato chips or similar snacks are more available in South Asian households, followed by East Asians, and Europeans ( $p=0.03$ ).

Chocolates or sweets were available almost everyday or on most days for 37% of South Asians, 27% of Europeans, and 26% of East Asians. This was followed by the same group of foods being available on some days for 53% of East Asians, 47% of South Asians, and 46% of Europeans. Once more, chocolates or sweets are more available in South Asian households, followed by East Asians, and Europeans ( $p=0.005$ ).

As for the availability of non-diet soft drinks at home such as Coke, Sprite, or Fanta, there was a significant difference between the ethnic groups ( $p<0.0001$ ), with 53% of South Asians, 42% of East Asians, and 33% of Europeans having non-diet soft drinks available at home for them to drink almost everyday or on most days. This was followed by 44% of East Asians, 36% of Europeans, and 33% of South Asians having soft drinks available at home on some days. Overall, South Asian adolescents are more likely to have soft drinks available at home, followed by East Asian, and then European adolescents.

**TABLE 4.5.1. FAMILY ENVIRONMENT – ETHNIC GROUP COMPARISON**

VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
How much does your mother encourage you to be physically active or play sport?				0.002
A lot	88 (40)	28 (24)	180 (37)	
Some	82 (37)	43 (37)	144 (30)	
A little	24 (11)	26 (23)	82 (17)	
Not at all	21 (10)	18 (16)	56 (12)	
Don't live with my mother	6 (3)	0 (0)	23 (5)	
How much does your father encourage you to be physically active or play sport?				<0.0001
A lot	104 (47)	27 (24)	162 (33)	
Some	60 (27)	32 (28)	136 (28)	
A little	24 (11)	22 (19)	63 (13)	
Not at all	23 (10)	13 (11)	53 (11)	
Don't live with my father	10 (5)	21 (18)	71 (15)	
How much does your mother encourage you to eat healthy foods?				<0.0001
A lot	158 (72)	67 (58)	250 (52)	
Some	42 (19)	39 (34)	136 (28)	
A little	15 (7)	6 (5)	59 (12)	
Not at all	6 (2)	3 (3)	22 (5)	
Don't live with my mother	0 (0)	0 (0)	18 (4)	
How much does your father encourage you to eat healthy foods?				<0.0001
A lot	125 (57)	47 (41)	139 (29)	
Some	49 (22)	38 (33)	144 (30)	
A little	21 (10)	7 (6)	74 (15)	
Not at all	19 (9)	11 (10)	73 (15)	
Don't live with my father	7 (3)	12 (10)	55 (11)	

VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
In the last 5 school days, times when all/most of family had evening meal together?				0.93
0 days	21 (10)	12 (10)	59 (12)	
1-2 day	31 (14)	17 (15)	77 (16)	
3 days	30 (14)	16 (14)	66 (14)	
4-5 days	139 (63)	70 (61)	283 (58)	
How often do you have food from a takeaway shop for dinner?				<0.0001
More than once a week	16 (7)	4 (4)	29 (6)	
About once a week	47 (21)	33 (29)	151 (31)	
2-3 times a month	42 (19)	24 (21)	158 (33)	
Once a month or less	116 (53)	54 (47)	147 (30)	
How often is fruit available at home for you to eat?				0.58
Almost everyday or Most days	209 (95)	104 (90)	450 (93)	
Some days	11 (5)	10 (9)	29 (6)	
Hardly ever or never	1 (1)	1 (1)	6 (1)	
How often are potato chips or similar snacks available at home for you to eat?				0.03
Almost everyday or Most days	115 (52)	55 (48)	242 (50)	
Some days	94 (43)	48 (42)	178 (37)	
Hardly ever or never	12 (5)	12 (10)	65 (13)	
How often are chocolates or sweets available at home for you to eat?				0.005
Almost everyday or Most days	81 (37)	30 (26)	130 (27)	
Some days	104 (47)	61 (53)	222 (46)	
Hardly ever or never	36 (16)	24 (21)	133 (27)	
How often are non-diet soft drinks available at home for you to drink?				<0.0001
Almost everyday or Most days	117 (53)	48 (42)	161 (33)	
Some days	73 (33)	50 (44)	176 (36)	
Hardly ever or never	31 (14)	17 (15)	148 (31)	

## 4.5.2 School Environment

Factors in the school setting, which can potentially influence the nutritional and exercise habits of young Asians and Europeans are shown in Table 4.5.2. There were significant differences ( $p < 0.0001$ ) in the perception of each ethnic group in relation to how much schools and teachers influenced and supported young people's nutritional and exercise behaviours.

For South Asian adolescents, 60% reported that the school encouraged all students to play organised sports "a lot", while 35% of East Asian and 34% of European adolescents reported the same level of encouragement. This was followed by 29% of South Asians, 47% of East Asians, and 38% of Europeans reporting that the school offered "some" encouragement to them to play sports.

As for the school encouraging all students to be physically active at lunchtime the highest percentage within each ethnic group (55% of East Asians, 42% of South Asians, and 34% of Europeans) reported that the school offered "some" encouragement. This was followed by 30% of South Asians reporting "a lot" of encouragement, and 18% of East Asians and 29% of Asians reporting "a little" encouragement. Overall, more South Asian adolescents reported that school encouraged them to be physically active than East Asians, followed by Europeans.

There was again a significant difference in the three ethnic groups as to how much the school encouraged students to make healthy food choices ( $p = 0.001$ ), with 52% of East Asian, 45% of South Asian, and 44% of European adolescents reporting "some" encouragement from school for students to make healthy food choices. This was followed by 33% of South Asian and 20% of East Asians reporting "a lot" of encouragement, while 25% of Europeans reported a little encouragement.

However, there was no significant difference in the rating of food and drink choices available at school canteens among different ethnic groups, but over half of the students rated the available choices as half healthy and half unhealthy ( $p = 0.17$ ).

The majority of South Asians rated the teachers at their school as excellent role models for being physically active (64%) and for healthy eating (58%), while East Asians rated their teachers as “OK” role models (47% and 44% respectively), followed by Europeans (46% and 48%). European adolescents were most likely to rate teachers at their schools as “poor” role models for both being physically active (24%) and for healthy eating (23%).

In terms of friends, although there was no significant difference between the ethnic groups in regards to how much their friends encouraged them to be physically active or play sport ( $p=0.08$ ), the findings show that the highest percentage in each group (45% of East Asians, and 34% of South Asians and Europeans) received some encouragement from best friends to be physically active.

**TABLE 4.5.2. SCHOOL ENVIRONMENT – ETHNIC GROUP COMPARISON**

VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
How much does your school encourage ALL students to play organised sport?				<0.0001
A lot	133 (60)	40 (35)	165 (34)	
Some	65 (29)	54 (47)	186 (38)	
A little	14 (6)	15 (13)	97 (20)	
Not at all	9 (4)	6 (5)	37 (8)	
How much does your school encourage ALL students to be physically active at lunchtime?				<0.0001
A lot	66 (30)	11 (10)	67 (14)	
Some	92 (42)	63 (55)	164 (34)	
A little	34 (15)	21 (18)	141 (29)	
Not at all	29 (13)	20 (17)	113 (23)	



VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
How much does your school encourage students to make healthy food choices?				0.001
A lot	72 (33)	23 (20)	107 (22)	
Some	100 (45)	60 (52)	213 (44)	
A little	28 (13)	18 (16)	123 (25)	
Not at all	21 (10)	14 (12)	42 (9)	
How do you rate the food and drink choices available at your school canteen?				0.17
Mostly healthy	72 (33)	26 (23)	125 (26)	
Half healthy / half unhealthy	111 (50)	72 (63)	283 (58)	
Mostly unhealthy	38 (17)	17 (15)	77 (16)	
How do you rate the teachers at your school as role models for being physically active?				<0.0001
Excellent/Good	142 (64)	44 (38)	149 (31)	
OK	54 (24)	54 (47)	221 (46)	
Not very good/Poor	25 (11)	17 (15)	115 (24)	
How do you rate the teachers at your school as role models for HEALTHY EATING?				<0.0001
Excellent/Good	129 (58)	53 (46)	143 (30)	
OK	67 (30)	51 (44)	231 (48)	
Not very good/Poor	25 (11)	11 (10)	111 (23)	
How much do your best friends encourage you to be physically active or play sport?				0.08
A lot	63 (29)	21 (18)	107 (22)	
Some	74 (34)	52 (45)	167 (34)	
A little	38 (17)	25 (22)	106 (22)	
Not at all	46 (21)	17 (15)	105 (22)	

### 4.5.3 Neighbourhood Environment

The findings for the neighbourhood environments are given in Table 4.5.3. These include how safe young people, and their parents, feel about their neighbourhood.

There was no significant difference between the ethnic groups in relation to how safe young people feel about being out alone in their neighbourhood at night ( $p=0.04$ ). The majority in each group felt safe or very safe, with a higher proportion of South Asians (73%), compared to Europeans (66%), and East Asians (60%) indicating that they felt safe to be out alone at night.

There was no significant difference among the ethnic groups in the rest of the variables in this category.

Over half of young Asians and Europeans felt that their parents think it is unsafe or very unsafe for them to be out alone in their neighbourhood at night ( $p=0.61$ ).

Forty two percent of South Asians and 37% of East Asians and European adolescents reported that dogs did not bother them “at all” when they are walking in their neighbourhood ( $p=0.50$ ). This is followed by 37% of East Asians, 36% of Europeans, and 32% of South Asians reporting that dogs did bother them “a little”, and for the rest it bothers them “somewhat” or “a lot”.

As for traffic, 51% of Europeans, 43% of South Asians, and 38% of East Asians reported that traffic did not bother them “at all” when they are walking in their neighbourhood ( $p=0.08$ ). This is followed by 41% of East Asians, 37% of South Asians, and 34% of Europeans finding that traffic did bother them “a little”.

About half of the young people from each group reported that other people did not bother them “at all” when they are walking in their neighbourhood ( $p=0.37$ ). This is followed by 38% of East Asians, 33% of Europeans, and 28% of South Asians finding other people bothered them when walking in the neighbourhood.

**TABLE 4.5.3. NEIGHBOURHOOD ENVIRONMENT – ETHNIC GROUP COMPARISON**

VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
How safe do you feel being out alone in your neighbourhood at night?				0.04
Safe/Very safe	161 (73)	69 (60)	318 (66)	
Unsafe/Very unsafe	60 (27)	46 (40)	167 (34)	
How safe do parents think it is for you to be out alone in your neighbourhood at night?				0.61
Safe/ Very safe	84 (38)	36 (31)	168 (35)	
Unsafe/Very unsafe	117 (53)	66 (57)	258 (53)	
Don't know	20 (9)	13 (11)	59 (12)	
How much do dogs bother you when you are walking in your neighbourhood?				0.50
A lot	25 (11)	9 (8)	65 (13)	
Somewhat	33 (15)	21 (18)	67 (14)	
A little	70 (32)	42 (37)	173 (36)	
Not at all	93 (42)	43 (37)	180 (37)	
How much does traffic bother you when you are walking in your neighbourhood?				0.08
A lot	17 (8)	6 (5)	31 (6)	
Somewhat	28 (13)	18 (16)	43 (9)	
A little	81 (37)	47 (41)	164 (34)	
Not at all	95 (43)	44 (38)	247 (51)	
How much do other people bother you when you are walking in your neighbourhood?				0.37
A lot	13 (6)	4 (4)	26 (5)	
Somewhat	21 (10)	15 (13)	57 (12)	
A little	62 (28)	44 (38)	158 (33)	
Not at all	125 (57)	52 (45)	244 (50)	

Overall, the results suggest that Asian students have more access to junk foods such as chips, chocolates and sweets, and soft drinks at home than young

Europeans. Although there was no significant difference in the rating of food and drink choices available at school canteens among different ethnic groups, over half of the students rated the available choices as unhealthy. And in general, the majority in each group felt safe about their neighbourhood environment.

Other factors influencing eating and exercise habits of Asian and European adolescents will be further discussed in the next chapter (Chapter 5.5).

#### **4.6. Knowledge**

This section looks at the knowledge of Asian and European adolescents about nutrition and physical activity. Four statements associated with obesity risk factors were given to the students and they were asked to report whether they agree or disagree with the statement. Since all statements were incorrect, the better or correct response was to disagree with the statement. The results are presented in Table 4.6 and it demonstrates that there was a significant difference in the knowledge of Asian and European adolescents in regards to obesity risk factors.

In the first statement, they were asked whether or not 'skipping breakfast or lunch is a good way to lose weight' ( $p < 0.0001$ ). While 73% of Europeans disagreed with this statement, which was the correct answer, only 58% of South Asians, and 56% of East Asians also disagreed with it. At the same time 27% of East Asians, and 24% of South Asians agreed with the wrong statement compared to only 11% of Europeans.

Second statement asked whether or not 'fruit drinks and cordials have less sugar than non-diet soft drinks like Coke and Sprite' ( $p < 0.0001$ ). Overall, the highest percentage of students in all three groups agreed with the incorrect statement, although a much higher percentage of South Asians (62%) and East Asians (58%) did so compared to Europeans (37%). In addition, 29% of Europeans disagreed with the statement, which was the correct answer, compared to 17% of East Asians and 15% of South Asians.

The third statement expressed that 'watching a lot of TV does not lead to weight gain'. Consistent with the previous statements there was a significant difference between Asian and European adolescents ( $p=0.001$ ). While 51% of Europeans disagreed with this statement, which was the correct answer, 43% of East Asians, and 40% of South Asians disagreed with the same statement. At the same time 37% of South Asians and 34% of East Asians agreed with the wrong statement compared to only 22% of Europeans.

In the fourth statement the students were asked if 'eating a lot of fruit and vegetables is bad for their weight' ( $p=0.03$ ). In response, the majority, that is 89% of Europeans, disagreed with this statement, which was the correct answer, followed by 87% of South Asians, and 85% of East Asians. Furthermore, 3% of Europeans agreed with the wrong statement compared to 5% of East Asians and 7% of South Asians.

**TABLE 4.6. KNOWLEDGE – BY ETHNIC GROUP**

VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
Skipping breakfast or lunch is a good way to lose weight				<0.0001
Agree	53 (24)	31 (27)	51 (11)	
Neither agree nor disagree	41 (19)	20 (17)	81 (17)	
Disagree	127 (58)	64 (56)	353 (73)	
Fruit drinks and cordials have less sugar than non-diet soft drinks like Coke and Sprite				<0.0001
Agree	138 (62)	67 (58)	177 (37)	
Neither agree nor disagree	50 (23)	29 (25)	166 (34)	
Disagree	33 (15)	19 (17)	142 (29)	
Watching a lot of TV does not lead to weight gain				0.001
Agree	81 (37)	39 (34)	108 (22)	
Neither agree nor disagree	51 (23)	27 (24)	132 (27)	
Disagree	89 (40)	49 (43)	245 (51)	
Eating a lot of fruit and vegetables is bad for your weight				0.03
Agree	16 (7)	6 (5)	13 (3)	
Neither agree nor disagree	12 (5)	11 (10)	43 (9)	
Disagree	193 (87)	98 (85)	429 (89)	

Overall, these results suggest Asian students have less nutritional knowledge than Europeans. This will be explored in more details in the next chapter (Section 5.6).

#### 4.7. Opinions of Body Weight and Shape

This section explores descriptions and feelings of Asian and European adolescents about their current body weight and shape. It continues by investigating the actions they would like to take about their body image. These findings are presented in Table 4.7.

The only significant difference of opinion between the three ethnic groups was in regard to how young people described their weight ( $p=0.009$ ). Forty percent of South Asians, 47% of East Asians, and 52% of Europeans describe their weight to be “about the right weight”. This was followed by 33% of South Asians, 30% of Europeans, and 26% of East Asians describing their weight as “overweight”. Moreover, 27% of South and East Asian adolescents described their weight as “underweight” compared to 18% of European adolescents.

There was no significant difference among the ethnic groups in relation to how satisfied they were with their body weight ( $p=0.15$ ) or shape ( $p=0.40$ ), and less than 3% of them reported having never thought about their body weight or shape.

For body weight, the highest percentage of East Asians (45%) and South Asians (35%) were “OK” with their body weight compared to 39% of Europeans. A higher percentage of European adolescents (41%) reported being happy with their body weight compared to 38% of South Asians, and 35% of East Asians, while 25% of South Asians, 18% of East Asians, and 17% of Europeans were “unhappy” with their body weight.

The results were also similar for body shape between ethnic groups. The highest percentage of East Asians (45%) and South Asians (40%) were “OK” with their body shape compared to 37% of Europeans. The highest percentage of European adolescents (39%) reported being “happy” with their body shape, followed by 38% of South Asians, and 35% of East Asians, while 22% of South Asians, 21% of Europeans, and 18% of East Asians were “unhappy” with their body shape.

Again, there was no significant difference between the ethnic groups in terms of actions being taken about their current weight ( $p=0.25$ ) or muscle size ( $p=0.26$ ).

Over half of South Asian and European adolescents and 20% of East Asian adolescents were trying to lose weight. Moreover, 26% of Europeans were trying to stay at their current weight while 17% were not doing anything about their weight; 21% of South Asians were not doing anything about their weight while 15% were trying to stay at their current weight; and 47% of East Asian

adolescents were trying to stay at their current weight while 20% were not doing anything about their weight. East Asians have the highest percentage of adolescents reporting that they are trying to gain weight (13%) compared to 9% of South Asians and 6% of Europeans.

The highest percentage in each ethnic group (53% of South Asians, 51% of Europeans, and 42% of East Asians) reported trying to gain muscle size, followed by about one third in each group not doing anything about their muscles, and the remainders trying to stay at the same muscle size. Overall, South Asians seemed more concerned about their muscle size followed by European and East Asian adolescents.



**TABLE 4.7. OPINIONS OF BODY WEIGHT AND SHAPE – BY ETHNIC GROUP**

VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEAN	P-VALUE
	No. (%)	No. (%)	No. (%)	
How would you describe your weight?				0.009
Underweight	59 (27)	31 (27)	86 (18)	
About the right weight	89 (40)	54 (47)	254 (52)	
Overweight	73 (33)	30 (26)	145 (30)	
How happy or unhappy are you with your BODY WEIGHT?				0.15
Happy	84 (38)	40 (35)	201 (41)	
In between / OK	78 (35)	52 (45)	189 (39)	
Unhappy	56 (25)	21 (18)	83 (17)	
Never thought about my body weight	3 (1)	2 (2)	12 (3)	
How happy or unhappy are you with your BODY SHAPE?				0.40
Happy	80 (38)	40 (35)	190 (39)	
In between / OK	85 (40)	51 (45)	178 (37)	
Unhappy	47 (22)	21 (18)	101 (21)	
Never thought about my shape	1 (1)	2 (2)	13 (3)	
Which of these statements most closely applies to you? I am...				0.25
trying to lose weight	18 (55)	3 (20)	18 (51)	
trying to gain weight	3 (9)	2 (13)	2 (6)	
trying to stay at my current weight	5 (15)	7 (47)	9 (26)	
not doing anything about my weight	7 (21)	3 (20)	6 (17)	
Which of the following statements most closely applies to you? I am...				0.26
trying to gain muscle size	118 (53)	48 (42)	247 (51)	
trying to stay at the same muscle size	34 (15)	27 (24)	85 (18)	
not doing anything about my muscles	69 (31)	40 (35)	153 (32)	

## 4.8. Summary

This section summarises some of the significant findings of this chapter. Table 4.8 shows some of the variables that have already been discussed in detail and determines whether they are protective factors (+) contributing to young people not putting on too much weight and maintaining a healthy weight, or risk factors (-) contributing to Asian and European adolescents becoming overweight or obese.

Overall, the results show no significant difference in mean waist circumference, mean waist to height ratio, mean BMI, or fat mass between South Asian and European adolescents. The same applies to East Asian adolescents with the exception of waist circumference and fat mass that is lower in East Asians. In addition, 35% of European, 29% of South Asian, and 24% of East Asian adolescents are considered overweight or obese. Therefore, the findings suggest that Asian adolescents are faced with similar obesity related issues as European adolescents.

In general, some of the risk factors include, unhealthy source of breakfast, morning tea, or lunch (e.g. from school canteen), high consumption of biscuits, chips, noodles, sweet, creams, takeaway, and soft drinks during or after school, lack of physical activity, long hours of watching TV or playing video and computer games, availability of junk foods and soft drinks at home, lack of parents' encouragement for young people to be physically active and to eat healthy, lack of school's support for young people to be active and to eat healthy, and lack of knowledge of obesity risk factors.

Some of the protective factors include living with parents, healthy source of breakfast or morning tea (e.g. from home), consumption of fruits and vegetables, being physically active at and after school, limiting TV viewing hours, parents encouraging young people to be physically active and to eat healthy, schools and teachers supporting young people to be active and to eat healthy, and accurate knowledge of obesity risk factors.

These protective and risk factors will be further explored in the next chapter (Section 5.8) and discussed in Chapter six.

**TABLE 4.8. OVERWEIGHT/OBESITY PROTECTIVE AND/OR RISK FACTORS – ETHNIC GROUP COMPARISON**

TABLE	VARIABLE	SOUTH ASIAN	EAST ASIAN	EUROPEANS
4.1	Living with parents	+ <sup>14</sup>	+	+
4.2	Weight status	29% overweight/ obese	24% overweight/ obese	35% overweight/ obese
4.3.1	Unhealthy source of breakfast/morning tea	+	-	+
	Unhealthy source of lunch	-	--	-
4.3.2	Consumption of biscuits, chips and noodles	-	-	
	Consumption of sweet and ice cream	-	-	-
	Consumption of takeaways	-	-	
4.3.3	Consumption of fruits	--	-	-
	Consumption of vegetables	--	-	+
	Consumption of soft drinks	-	-	-
4.4.1	Physically active at school	+	--	-
	Physically active after school	+	--	+
4.4.2	TV viewing frequency and hours	-	--	+
4.4.3	Video/computer games frequency and hours	+	--	-
4.5.1	Parents encouraging to be physically active	+	-	+
	Parents encouraging to eat healthy food	+	-	-
	Availability of potato chips at home	-	-	
	Availability of chocolates and sweets at home	-	-	-
	Availability of soft drinks at home	-	-	
4.5.2	Schools encouraging to be physically active	+	-	-
	Schools encouraging to eat healthy food	+	-	-
	Teachers as role models to be physically active and eat healthy foods	+	-	-
4.5.3	Parents' perception of safe neighbourhoods	-	-	-
4.6	Knowledge of obesity risk factors	--	--	+
4.7	Trying to gain weight	9%	13%	6%

Chapter Five presents the results from the qualitative interviews with South Asian, East Asian, and European adolescents.

<sup>14</sup> The “+” sign indicates that the variable is a protective factor against obesity and the “-” sign indicates that the variable is a risk factor for obesity. The double signs in some cases are to show the strength of the variable/factor.

# Chapter 5. Qualitative Results

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This chapter summarises the results obtained from the semi-structured interviews with 46 students who participated in the 12 focus groups held at one of the participating schools. As described in the methodology chapter, a general inductive approach to qualitative data analysis was utilised to find main themes inherent in the transcripts.

The chapter is divided into eight sections: the demographic variables of the population of study (Section 5.1); the structure of the Interview Guideline (Section 5.2); food patterns (Section 5.3) and activity patterns (Section 5.4) of young Asians and Europeans; factors influencing their food and activity patterns (Section 5.5); their knowledge of obesity risk factors and heart health (Section 5.6); and their opinion on ways to get young people to eat healthy and become physically more active (Section 5.7). At the conclusion (Section 5.8), a summary of the main themes is presented as well as the common themes that examines the themes derived so far, and extracts a set of more general themes from the main themes.

Sections 5.3 to 5.7 present the main results in terms of the five major sections of the Interview Guideline. This is done using the following general format for each section:

- Section number, topic and a brief description
- The actual questions asked
- Subsection number and a summary of the responses
- A listing of the main themes found across all ethnic groups and relevant illustrative quotes
- Differences among ethnic groups in that subsection and relevant quotes

## **5.1. Demographic Variables**

The sample was 12 focus groups, which included a total of 46 participants as shown in Table 5.1. The numbers shown in the cells represent the number of participants in each focus group.

**TABLE 5.1. DEMOGRAPHICS OF FOCUS GROUPS**

SENIOR STUDENTS (16-18 YEARS OLD)	ETHNICITY →	EUROPEAN	EAST ASIAN	SOUTH ASIAN
	Male	4	3	4
	Female	6	2	4
JUNIOR STUDENTS (13-15 YEARS OLD)	ETHNICITY →	EUROPEAN	EAST ASIAN	SOUTH ASIAN
	Male	3	5	4
	Female	4	3	4

The participants included 17 Europeans, 16 South Asians, and 13 East Asians, with an equal gender representation (23 males and 23 females) and equal age representation in two groups of 13 – 15 year olds or 15 – 18 year olds (23 participants in each group).

All the European adolescents, five South Asian and two East Asian adolescents were born in New Zealand. Those South or East Asians who were not born in New Zealand had lived here between 1 – 12 years, with an average of four years. The Asian students came from India, China, Cambodia, Philippines, Thailand, and Vietnam.

It was observed that 10 of the participants (22%) were overweight or obese.

## **5.2. Interview Guideline**

The results in this section are presented in order of the questions in the original Interview Guideline (See Appendix Eleven). A summary of the interview guideline is presented in Table 5.2.

**TABLE 5.2. STRUCTURE OF THE INTERVIEW GUIDELINE**

<b>Part One: Food Patterns</b>
<b>5.3.1. Favourite Foods and Drinks</b>
Q1: What are your favourite foods and drinks?
<b>5.3.2. School Food</b>
Q2: What do you usually eat during school and where do you get it from?
<b>5.3.3. After School Food</b>
Q3: What do you usually eat after school and where do you get it from?
<b>5.3.4. Traditional Diet</b>
Q4: What are the differences between the traditional diet of East/South Asians back in the country of origin and in New Zealand? <sup>15</sup>
<b>Part Two: Activity Patterns</b>
<b>5.4.1. Leisure Activities</b>
Q5: What are your hobbies? What do you do in your spare time or for fun?
<b>5.4.2. Physical Activities</b>
Q6: Do you get any exercise? What sort? How much?
<b>5.4.3. Cultural Barriers to Physical/Recreational Activities</b>
Q7: Are there any cultural considerations that might influence your physical activities/recreation?
<b>Part Three: Influencing Factors</b>
<b>5.5.1. Environmental Influences</b>
Q8: How do you decide which food you eat every day?
<b>5.5.2. Family Influences</b>
Q9: Does your family have an influence on your food choice?
<b>5.5.3. Food and Mood</b>
Q10: Do you tend to like particular food if you are happy or sad? Or for special occasions?

<sup>15</sup> This question was intended for South and East Asian Focus Groups only.

<b>PART FOUR: KNOWLEDGE AND EXPERIENCE</b>
<b>5.6.1. Knowledge of Healthy Food</b>
Q11: How would you rate young people’s (East Asians/South Asians/Europeans’) knowledge of healthy food and what to eat?
<b>5.6.2. Source of Knowledge of Healthy Food</b>
Q12: Where do you think they get their knowledge from?
<b>5.6.3. Knowledge of Heart Health</b>
Q13: What do you know about heart health and its contributing factors?
<b>5.6.4. Source of Knowledge of Heart Health</b>
Q14: Where do you get this information from?
<b>Part Five: Recommendations for Prevention Programmes</b>
<b>5.7.1. Prevention Programmes</b>
Q15: What would be a good way to get young people to eat healthy and become physically more active?
<b>5.7.2. Participation in Prevention Programmes</b>
Q16: How can we engage the individuals and the community in these intervention programs?
<b>Part Six: Others</b>
Q17: Is there anything else you would like to discuss in relation to a healthy lifestyle and maintaining a healthy weight?

The next section covers a presentation of the themes derived from the interview transcripts, which are ordered in terms of the structure of the Interview Guideline, as shown above.

### **5.3. Food Patterns**

This section explores food patterns and dietary habits of South Asian, East Asian, and European adolescents in New Zealand. It looks at the differences between the traditional diet of South and East Asians back in their home country and their diet in New Zealand. This was done to explore any differences between these ethnic groups by looking at their favourite foods and drinks, what they consume while they are at the school, and what they consume when they go home.



This section refers to the following questions from Table 5.1:

Q1. What are your favourite foods and drinks?

Q2: What do you usually eat during school and where do you get it from?

Q3: What do you usually eat after school and where do you get it from?

Q4: What is the traditional diet of East/South Asians back in the country of origin? And in New Zealand? (For Asian focus groups only)

### **5.3.1 Favourite Foods and Drinks**

In response to Q1 (*What are your favourite foods and drinks?*), most participants talked about fast foods such as burgers, sandwiches, pizza, fish and chips, fried chicken, and Chinese takeaways, as their favourite food. The second favourite foods were meats (such as chicken, lamb, beef, and pork) and starches (such as bread, rice, potato, pasta, and noodles). This was followed by traditional or international foods (such as Chinese, Japanese, Indian, and Italian), fruits and vegetables, and chocolate and sweets (such as ice cream).

For drinks, soft drinks were everyone's favourite drink. Although the majority talked about normal carbonated/fizzy drinks such as Coke and Fanta, a few also mentioned diet and energy drinks. This was followed by water and fruit juice. A few also mentioned milk and tea.

*Main Themes for 'Favourite Foods and Drinks':*

- Fast food is the most favourite food in all ethnic groups
- The other favourite foods are meats and starches, followed by traditional/international foods, fruits and vegetables, and chocolate and sweets
- Soft drink is the most favourite drink in all ethnic groups
- The other favourite drinks are water and fruit juice

These themes are illustrated by the following quotes<sup>16</sup>:

*“I like Fast food, McDonald’s, Subway, KFC, Denny’s, Burger King is the best. Anything that’s not too healthy because healthy is Yuk”* (European Focus Group, senior<sup>17</sup> male)

*“I often get it, we will have pizza or fish and chips or something, just when mum and dad are tired and no one wants to do the cooking”* (European Focus Group, junior<sup>18</sup> male)

*“Mostly Asian food, as long as it looks good and it tastes good, well not really looks good but just tastes good”* (East Asian Focus Group, senior male)

*“I love Pizza, KFC, McDonald’s, Takeaways, Indian Food and any type of chocolate”* (South Asian Focus Group, junior female)

*“I love coke, but then my dad got angry so I started drinking coke zero and I just drink coke zero now, it tastes the same”* (European Focus Group, senior male)

#### *Differences among Ethnic Groups:*

Fruits and vegetables were more talked about by European adolescents, whereas South Asians talked more about meat, and East Asians talked more about starches. The findings also show that both East and South Asian focus groups mentioned drinking more fruit juice than Europeans.

#### *Ethnic Differences Themes for ‘Favourite Foods and Drinks’:*

- European focus groups mentioned fruits and vegetables as their favourite foods more than Asian groups
- South Asian focus groups mentioned meats as their favourite foods more than East Asian and European groups
- East Asian focus groups mentioned starchy foods as their favourite foods more than South Asian groups
- East and South Asian adolescents in the focus groups mentioned they consume more fruit juice than Europeans

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<sup>16</sup> Example Quotes are presented in the exact wording of the participants and have not been edited

<sup>17</sup> 16 – 18 years old

<sup>18</sup> 13 – 15 years old

These themes are illustrated by the following quotes:

*“My favourite food is fried rice or soup [noodle soup] and other stuff like pies and stuff”* (East Asian Focus Group, junior male)

*“I like vegetables, that’s pretty weird”* (European Focus Group, junior female)

*“I like juice and coke”* (East Asian Focus Group, senior female)

### **5.3.2 School Food**

In response to Q2 (What do you usually eat during school and where do you get it from?), most of the focus groups mentioned chips, followed by sandwiches (such as peanut butter, nutella, and chicken), and fruits (such as apple, banana, and dried fruits). This was then followed by foods such as biscuits, muesli bars, pies and pizza breads, chocolates, sweets, and ice cream, with the same number reporting that they eat nothing while they are at the school. As for drinks, most focus groups mentioned having soft drinks while they are at the school with half of that number reporting drinking water.

Over half of the focus groups reported purchasing these foods and drinks from the school canteen, followed by a slightly less number reporting bringing these foods and drinks from home. However, they made a clear point that they bring what they perceive as healthy food (such as sandwiches or fruits) from home, and purchase what they perceive as unhealthy food (such as chips, chocolates, or pies) from the school canteen. Some also mentioned purchasing food from a dairy or a supermarket outside the school or sharing foods and drinks with their friends at school.

Most of the participants also indicated eating nothing before coming to school, but if the food was prepared for them or if they had the time to eat, it would mainly be cereals, toasts or noodles.

*Main Themes for ‘School Food’:*

- The food that was mentioned most to be consumed at the school was chips, followed by sandwiches and fruits, then biscuits, pies, chocolates, and sweets

- Some reported eating nothing while they are at school (or before coming to school)
- Most adolescents from the focus groups mentioned having soft drinks during school hours
- Over half of the focus groups mentioned purchasing food from school canteen
- Almost half of the focus groups mentioned bringing food from home
- It was clearly mentioned that healthy food is brought from home, while unhealthy food is purchased from school canteen

These themes are illustrated by the following quotes:

*“I get chips from the canteen; I don’t bring anything from home”* (South Asian Focus Group, senior female)

*“I go to the canteen just to buy chips and a drink like Pepsi”* (East Asian Focus Group, junior female)

*“I bring peanut butter sandwiches or nutella sandwiches everyday”* (European Focus Group, senior male)

*“If I don’t have money I’ll bring sandwiches like cheese sandwiches, or chicken sandwiches or ham sandwiches, whatever I can make, or I bring money to school and buy pies or Health Plus chips, that’s about it”* (East Asian Focus Group, senior male)

*“I go to school and I have a lunch I buy from the shop at the school. I buy pizza bread, hot dog and pies”* (East Asian Focus Group, senior female)

*“I bring my morning tea and get my lunch at the canteen, pizza bread, pie and drink. Sometimes I bring food from shop outside on my way to school and the other times from the school shop”* (East Asian Focus Group, senior female)

#### *Differences among Ethnic Groups:*

The findings showed that East Asian adolescents in the focus groups talked more about not eating at school compared to other ethnic groups. It also shows that South Asian adolescents talked more about having biscuits, and European

adolescents talked more about having fruits and muesli bars while at school. Both East and South Asian adolescents in the focus groups mentioned having soft drinks at the school more than the European groups. At the same time, South Asian focus groups mentioned drinking water at the school more than the other ethnic groups.

European adolescents in the focus groups mentioned bringing food from home or sharing food with their friends more than both Asian groups. East Asian focus groups mentioned more that they would eat nothing for breakfast or have noodles for breakfast.

*Ethnic Differences Themes for 'School Food':*

- East Asian adolescents in the focus groups mentioned not eating while they are at school or before coming to school more than others
- European adolescents in the focus groups mentioned eating fruits during school hours more than others
- East and South Asian adolescents in the focus groups mentioned having soft drinks during school hours more than European groups
- European adolescents in the focus groups mentioned bringing food from home more than others

These themes are illustrated by the following quotes:

*"I don't eat at school because the line is too long and I can't be bothered bringing anything from home"* (East Asian Focus Group, senior male)

*"I bring sandwiches, muesli, and heaps of dried fruit if we have them"*  
(European Focus Group, senior male)

*"I get chips from canteen and drinks like Pepsi or Mountain Dew"* (South Asian Focus Group, senior male)

*"Sometime I get it from home and if I get it from home I'll have healthy like fruit and chips, like I would have a balance, and if I go to the canteen it's all bad, it's not good for you. It's like cookies and chips and ice creams, I bring food from*

*home about 3 or 4 days a week so I don't buy from the canteen that often"*

(European Focus Group, junior female)

### **5.3.3 After School Food**

The responses to Q3 (What do you usually eat after school and where do you get it from?), were divided into three parts. Foods consumed after school until dinner, dinner itself, and any food or drinks consumed after dinner.

In response to foods consumed after school, the most mentioned foods were sandwiches or toast, followed by leftovers (like rice or roti<sup>19</sup> with meat or curry), chips, biscuits or muffins, fruits, and pies. A similar number of focus groups reported not eating anything at all until dinner. With a couple of exceptions everyone reported getting after-school foods from home.

In regards to dinner, over half of the focus groups' participants talked about having meat for dinner, which included red meat, chicken, and fish. The second single food that was most talked about was rice, followed by fast foods (such as french-fried potatoes, fried chicken, fish and chips, burgers, pizza, and fried rice), vegetables (such as broccoli, cauliflower, and green salad), and curries<sup>20</sup>. Some also mentioned having potato or soup (including noodle soups) for dinner. A couple of participants mentioned drinking water with their dinner.

As for foods eaten after dinner, ice cream was the one mainly mentioned by the participants of all focus groups, followed by milk (including Milo), fruits, chips, biscuits, and chocolates. Some mentioned not eating anything more after dinner.

#### *Main Themes for 'After School Food':*

- After school food includes sandwiches or toasts, heavy meals or leftovers, chips, biscuits or muffins, fruits, and pies
- Dinner includes meat, rice, fast foods, vegetables, and curries

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<sup>19</sup> A traditional flat Indian bread

<sup>20</sup> A gravy dish of vegetables or meats flavoured with spices and usually eaten with rice or bread

- After dinner food includes ice cream, milk, fruits, chips, biscuits, and chocolates

These themes are illustrated by the following quotes:

*“I mostly get a sandwich or a packet of chips or something from home”*

(European Focus Group, senior male)

*“Since I don’t eat at school I eat my heavy meal after school, it depends, and it’s like rice with pork, chicken, egg, soy sauce”* (East Asian Focus Group, senior male)

*“I eat whatever my mum makes and then chips and other junk food”* (South Asian Focus Group, senior female)

*“I don’t usually eat fruits but if there is nothing left, as a last thing I’ll have the fruits”* (South Asian Focus Group, senior male)

*“Fruits? Not really”* (South Asian Focus Group, senior male)

*“Normally for dinner we have like potatoes and veges and meat”* (European Focus Group, senior female)

*“I eat dinner, and again its rice with something else like fish or fried chicken. Even if I’ve had a heavy meal after school I will eat another one, it’s nice”* (East Asian Focus Group, senior male)

*“Usually around about anytime is dinner after 6 o’clock, mostly Indian food, lots of curry depends what they have, mostly with meat”* (South Asian Focus Group, senior male)

*“Well, sometimes as a takeaway it’s not an Asian takeaway so its not fried rice, it’s just McDonald’s or Burger King so if it is considering them then kind of a lot, probably like twice a week”* (East Asian Focus Group, junior female)

*“Every night I have ice cream and then chocolate and then chips and then maybe a sandwich and then I go to sleep”* (European Focus Group, senior male)

*“I eat anything that’s in the cupboard after dinner”* (East Asian Focus Group, senior male)

#### *Differences among Ethnic Groups:*

The findings show that European adolescents in the focus groups mentioned eating sandwiches or fruits after school more than both Asian groups. More

adolescents from the East Asian groups talked about having fast foods or rice, more adolescents from the South Asian groups talked about having chips, chocolates, traditional food, or not eating anything after school and until dinner.

The findings showed a significant difference between the consumption of foods for dinner among the three ethnic groups. European adolescents in the focus groups mentioned having meat, potato, and vegetables for dinner, more than South and East Asian groups. East Asian adolescents in the focus groups mentioned having rice or noodle soup for dinner as well as fried foods more than other groups. South Asian adolescents in the focus groups mentioned having curry for dinner more than other groups. In general, East and South Asian focus groups talked about having fast foods for dinner more than the adolescents in the European groups.

With regard to foods consumed after dinner, European adolescents in the focus groups mentioned having fruits more than others. Adolescents from European and South Asian groups mentioned having chocolate after dinner than East Asian groups. Adolescents from the East Asian focus groups mentioned having chips after dinner more than others. Both East and South Asian focus groups mentioned having milk and biscuits after dinner more than the European groups. Some of the adolescents in the European focus groups mentioned not eating anything after dinner.

*Ethnic Differences Themes for 'After School Food':*

- After school, European focus groups mentioned consuming more sandwiches or fruits; East Asians mentioned consuming more fast foods or rice; and South Asians mentioned consuming more chips, chocolates, and traditional food
- For dinner, European focus groups mentioned having more meat, potato, and vegetables; East Asians mentioned having more rice, noodle soup, fried foods, and fast foods; and South Asians mentioned having more curries, and fast foods



- After dinner, European focus groups mentioned having more fruits and chocolate; South Asians mentioned having more chocolate, milk, and biscuits; and East Asians mentioned having more chips, milk, and biscuits

These themes are illustrated by the following quotes:

*“Sometimes I eat rice that mum cook. I eat the rice with fish that we cook”* (East Asian Focus Group, senior female)

*“Junk or sometimes rice and stuff, junk is pies, chips and biscuits all available at home”* (East Asian Focus Group, junior male)

*“I eat Indian food like roti, curry, dahl, anything”* (South Asian Focus Group, junior female)

*“I have the fried rice and the noodles and the fish”* (East Asian Focus Group, senior female)

*“Well most of the time we have takeaways but most, well casually we have Indian food everyday. We have takeaways like twice a week; normally everyone likes pizza and sometimes McDonald’s”* (South Asian Focus Group, junior female)

#### **5.3.4 Traditional Diet**

In response to Q4 (What are the differences between the traditional diet of East/South Asians back in the country of origin and in New Zealand), a few of the focus group participants indicated that their diet is still traditional and has been only a little bit influenced by the Western diet. A few were not aware of what the traditional diet of their home country consisted of. However, the overwhelming majority talked about fast foods and junk foods, mentioning that they had less access to these kinds of foods in their home countries, but consume plenty of them in New Zealand. They also mentioned that they would eat more rice and noodles in their home countries. The participants of the focus groups talked about not having as much meat (with the exception of fish) or meat products in the traditional diet, as many would be vegetarians in their home countries and would therefore consume more vegetables in the traditional diet. Both East and South Asian adolescents in the focus groups talked about

consuming smaller portions of food in their traditional diet, but having more money and easier access to variety of food in New Zealand means having bigger quantity of food.

#### *Main Themes for 'Traditional Diet':*

- Participants of the Asian focus groups mentioned that both South and East Asians' traditional diet is influenced by New Zealand diet
- Participants of the Asian focus groups mentioned that South and East Asians consume more fast food and junk food in New Zealand

These themes can be illustrated by the following quotes:

*"They [Asians] probably change over time and have more takeaway food"* (East Asian Focus Group, junior male)

*"We stick to it [traditional diet] but like when we feel lazy we just order something like white people. Or make like bread sandwiches. When we feel lazy or like when we want some"* (East Asian Focus Group, senior male)

*"Like in India we don't have much takeaways around so we eat roti and dahl, but here we have how many takeaways around so people change, and junk food, we don't have junk food in India"* (South Asian Focus Group, junior female)

#### *Differences among Ethnic Groups:*

East Asian adolescents in the focus groups mentioned more often that they would eat more rice and noodles but less bread in their home countries compared to New Zealand. South Asian adolescents in the focus groups talked more often about having more vegetables in their traditional diet compared to their diet in New Zealand.

#### *Ethnic Differences Themes for 'After School Food':*

- East Asian focus groups mentioned having more rice and noodles and less bread in their traditional diet
- South Asian focus groups mentioned having more vegetables and less meat in their traditional diet

These themes can be illustrated by the following quotes:

*“Like Thai people married with Kiwi man change and they eat bread, they don’t eat rice. If they are not it’s the same they still eat McDonald’s, Burger King, pizza”* (East Asian Focus Group, senior female)

*“Just mostly curry and roties and rice for traditional diet, that changes when they come to New Zealand by eating takeaways and other stuff like ham and that, they eat more meat and that. Back home they eat less as well”* (South Asian Focus Group, junior male)

## **5.4. Activity Patterns**

This section explores the range of physical activities and other recreational activities young people may be involved in, as well as looking at the cultural barriers they might experience to performing these activities. This was important to explore because obesity is directly related to both nutrition and physical activity. In addition, the benefits of physical activity are not limited to helping with weight control but also include providing more energy, reducing the risk of developing some chronic diseases, and helping one to feel more confident, happy, and relaxed. Therefore presence or absence of such activities is important.

This section refers to the following questions:

Q5. What are your hobbies? What do you do in your spare time or for fun?

Q6. Do you get any exercise? What sort? How much?

Q7. Are there any cultural considerations that might influence your physical activities/recreation?

### **5.4.1 Leisure Activities**

In response to Q5 (What are your hobbies?), almost everyone in the focus groups mentioned watching television (TV), including Digital Video Disks (DVDs). This was followed by the participants talking about computer and video

games, including PlayStation<sup>21</sup>, Xbox<sup>22</sup>, and online games<sup>23</sup>. The girls in the focus groups mentioned using computer for chat or emails. About half of the participants in the focus groups talked about one kind of sport, including competitive and team sports, as their hobby. Others talked about doing nothing, working, playing a musical instrument or listening to music, socialising with friends and/or family, doing arts such as painting or carpentry, reading, and doing homework.

#### *Main Themes for 'Leisure Activities':*

- The single leisure activity mentioned most by the participants of the focus groups was watching television
- Other leisure activities mentioned by the focus groups included playing computer and video games, sports, working, music, socialising, arts, reading, and doing homework

These themes can be illustrated by the following quotes:

*"I watch a lot of TV, and I record it so I can watch it later as well"* (European Focus Group, senior male)

*"How about TV? Yes, everyday, who wouldn't?"* (South Asian Focus Group, senior male)

*"Computer games and TV, not everyday, Monday to Friday about 3-4 hours, and the weekend probably half the day"* (East Asian Focus Group, junior male)

*"I play PlayStation 2, everyday, long hours, finishes at 12 [midnight]"* (East Asian Focus Group, junior male)

*"Just play PC games and PS2, sometimes I play everyday for about 4-5 hours"* (East Asian Focus Group, junior male)

#### *Differences among Ethnic Groups:*

There were some differences between the ethnic groups in regards to leisure activities. More adolescents from the South Asian and European focus groups

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<sup>21</sup> A fifth generation video game console produced by Sony Computer Entertainment

<sup>22</sup> A sixth generation video game console produced by Microsoft

<sup>23</sup> A game played over some forms of computer network, often the Internet

talked about being involved in sporting activities in their spare time compared to East Asian adolescents in the focus groups. East Asian adolescents in the focus groups talked about reading and doing homework in their spare time more than others. European adolescents in the focused group mentioned doing nothing in their spare time or working after school and/or on the weekends more than other groups.

Of those East Asian adolescents in the focus groups who mentioned playing video or computer games, male participants mentioned spending longer hours playing it.

#### *Ethnic Differences Themes for 'Leisure Activities':*

- South Asians and Europeans adolescents in the focus groups more often mentioned being involved in sports activities in their spare time than East Asian groups
- East Asian adolescents in the focus groups more often mentioned reading and doing homework in their spare time than other groups

These themes can be illustrated by the following quotes:

*“Depends, what’s around like school soccer, or club soccer, or softball and stuff like that, and then bike at home and stuff”* (European Focus Group, senior female)

*“I play sports, soccer. I play 4 days a week, after school and it’s probably two hours a day”* (South Asian Focus Group, junior male)

*“I’m just reading book, writing stories and getting on computers, three hours on the computers typing”* (East Asian Focus Group, junior female)

#### **5.4.2 Physical Activities**

In response to Q6 (Do you get any exercise?), about half of the focus groups talked about walking to and/or from school as the only exercise they get. This could be a 10 to 45 minutes walk each way but those who talked about walking mentioned doing so every day during the week.

Most of the participants of the focus groups talked about being involved in or occasionally trying one sporting activity. Many mentioned playing soccer, and some mentioned playing rugby. Some mentioned not being involved in any kinds of sports. A few participants of the focus groups also talked about being involved in the following sports: softball, tennis, biking, golf, ice skating, karate, archery, going to the gym, playing active games and dancing. A couple of the participants mentioned mowing the lawn or drumming as their form of exercise. Of those who talked about being physically active, some mentioned being active on three to four days a week, and some mentioned one to two days a week, with a few participants in the focus groups mentioning being physically active on the weekends only.

When asked about sports options at the school, the majority indicated very little or no support from the school in regards to encouraging or providing opportunities for young people to be physically active while at the school. Moreover, some of the participants talked about their keenness to be physically active but not having the opportunity in general.

There were two major differences between males and females in relation to being physically active and the type of sports young people mentioned being involved in. First, male focus groups were more likely to report playing rugby than female focus groups. Second, most of the males focus groups mentioned being active on three to four days a week, while most of the female focus groups mentioned being active on one to two days a week.

*Main Themes for 'Physical Activities':*

- The major form of exercise mentioned by most of the participants of the focus groups is walking to/from school
- The main sports activities mentioned are soccer and rugby
- For those who mentioned being physically active, most of the male focus groups mentioned being active on three to four days a week, while female focus groups mentioned being active on one to two days a week

- The participants of the focus groups talked about lack of opportunities for young people to be physically active at the school

These themes can be illustrated by the following quotes:

*“I normally walk to school and from school to home and that’s like half and hour each way, and then I go to work for like three or four hours and I’m always on my feet”* (European Focus Group, senior female)

*“I play sports, soccer. I play 4 days a week, after school and it’s probably two hours a day”* (South Asian Focus Group, junior male)

*“I play badminton and soccer, playing around in the backyard with my dad and my brothers”* (South Asian Focus Group, junior female)

*“I run around for half an hour few days a week after school for league training on Tuesday and Thursday and the game is on Saturdays”* (South Asian Focus Group, senior male)

*“I like playing rugby, kicking the ball around outside, playing with the dog and stuff like that. I do rugby for about four times a week”* (European Focus Group, junior male)

*“No, there is not much to do at the school, they close the field during lunch time because too much people smoke and sometimes it gets too damp, so we have to sit around”* (South Asian Focus Group, senior male)

*“Well there is a lots kids in our family and there is plenty to do so were always playing something or something is going around, you just run around after the kids and play tag with them”* (European Focus Group, junior female)

#### *Differences among Ethnic Groups:*

Adolescents from East Asian and European focus groups mentioned walking to/from school more than the South Asian focus groups.

There was also a significant difference between the ethnic groups with regard to other sporting activities. In general, East Asian adolescents in the focus groups were less likely to report being involved in sports than South Asian or European adolescents. European adolescents in the focus groups mentioned playing softball, golf, and ice skating, and South Asian adolescents in the focus groups mentioned doing karate or dancing. Most of the East and South Asian

adolescents in the female focus groups mentioned playing active games (such as tag or touch<sup>24</sup>) with their siblings at home.

*Ethnic Differences Themes for 'Physical Activities':*

- East Asian and European focus groups talked more about walking to/from school
- East Asian adolescents in the focus groups did not report being involved in any sports
- East and South Asian adolescents in the focus groups motioned playing active games at home

These themes can be illustrated by the following quotes:

*“I walk from school to home, I get dropped off in the morning, it takes like 40 minutes to walk home”* (East Asian Focus Group, senior male)

*“Not really I don't play anything, I get no exercise”* (East Asian Focus Group, senior female)

*“I like playing sport, I really like it, like netball and touch and that, but after school I text all my friends to hang out at the library”* (East Asian Focus Group, junior female)

*“Dancing, playing with my nephew and nieces, jumping around on the trampoline. The dancing is every single day at home where you turn the stereo on high and jumping around like a monkey”* (South Asian Focus Group, junior female)

### **5.4.3 Cultural Barriers to Physical/Recreational Activities**

In response to Q7 (Are there any cultural considerations that might influence your physical activities/recreation?), there were major gender and ethnic differences between the participating groups.

*Main Themes for 'Cultural Barriers to Physical/Recreational Activities':*

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<sup>24</sup> An informal playground game that involves one player chasing other players



- Most of the East and South Asian participants from the focus groups talked about cultural barriers in relation to physically activity

*Differences among Ethnic Groups:*

While none of the European or male participants indicated anything such as cultural considerations affecting their involvement in physical activity or recreation, most of the East and South Asian female participants mentioned having some limitations. These include the clothing or outfit they are forced to wear for team or organised sports, having strict family rules and parents not allowing them to play, and culturally not being allowed to touch other people (for example touching someone's head).

*Ethnic Differences Themes for 'Cultural Barriers to Physical/Recreational Activities':*

- East and South Asian participants in the female focus groups experience cultural barriers to be physically active
- Cultural consideration mentioned by the focus groups that would influence young people's recreation include sports clothing and strict family rules

These themes can be illustrated by the following quotes:

*"You know how you wear mini shorts and stuff like that, in my culture we're not allowed, especially girls are not allowed to show their bodies that much so when your jumping around in the field, they feel shames, our parents so that's why were not allowed to play much sports"* (South Asian Focus Group, junior female)

*"My parents are kind of strict so it's like no mini skirts, no short tops. Like if it's for school occasions it's alright. They won't stop me, but they are restrictive, it's just the cultural way"* (East Asian Focus Group, junior female)

*"If you're a girl you're not allowed to touch the boy's head, anyone's head, yeah they get angry and give you a hiding [beating]"* (East Asian Focus Group, senior female)

## **5.5. Influencing Factors**

This section explores possible experiences one might have that could consequently have an effect on their nutritional behaviour. This was important because young Asians now living in New Zealand are experiencing two different cultures, their parents' and a new developing culture that will have its own definition of a meal. This section looks at psychological and social dimensions, and the cultural and/or religious factors affecting their food choice and eating habits.

This section refers to the following questions:

Q8. How do you decide which food you eat every day?

Q9. Does your family have an influence on your food choice?

Q10. Do you tend to like particular food if you are happy or sad? Or for special occasions?

### **5.5.1 Environmental Influences**

In response to Q8 (How do you decide which food you eat every day?), the participants talked about the taste and look of the food, as well as its availability and convenience of use at home. In regards to money, about half of the participants in the focus groups indicated that money has no influence on their food choice, while the other half indicated that it does. Of those who indicated money affecting their food choice, with a couple of exceptions, everyone stated that if they had more money they would buy more food and more junk food.

In terms of friends influencing each other's food choices, half of the participants in the focus groups indicated not being influenced, while the other half indicated being quite influenced and wanting what their friends are eating or not wanting a food that their friends would make fun of them for. As for teachers and the school, most of the participants in the focus groups talked about their teachers not having any influence or in some cases having a negative impact on their food choices (e.g. questioning the students about their cultural food and

embarrassing them). They talked about the school canteen and its lack of support for providing an affordable healthy environment for the young people to purchase food while at the school. The only positive aspects of school that were talked about were health and hospitality teachers who encourage students to have a healthy lifestyle and the topics they teach were found to be useful information.

With regard to culture, the European adolescents in the focus groups and about half of the Asian participants in the focus groups indicated that culture does not influence their food choice.

*Main Themes for 'Environmental Influences':*

- Factors influencing young people's food choice mentioned by adolescents in the focus groups include taste and look, availability and convenience, money, friends, teachers, and the school

These themes are illustrated by the following quotes:

*"I don't eat salad or vegetables; I just eat meat and sometimes fruit. Like apple and that's it. I just eat it and if I think its Yuk then I don't eat it again"*

(European Focus Group, senior male)

*"I eat what's ever in my cupboard really, I pick what ever is easier to grab out"*

(European Focus Group, senior female)

*"Just see what's in the fridge"* (East Asian Focus Group, senior male)

*"Yeah it's like whatever is in the cupboard and if I want something I'll just have it"* (European Focus Group, junior female)

*"I reckon if you have money then you're tempted to go to the canteen and buy something so it's much better to bring in your own food so you're not tempted to buy"* (European Focus Group, senior male)

*"Like if your friends have junk food and you have spare money to get it you want to go and get junk food too"* (European Focus Group, senior female)

*"Probably, if I had more money I'd probably eat more takeaways"* (South Asian Focus Group, junior male)

*“Yes, like if you see your friend eating something and inside you you’re just like I feel like it, I want that right now so it doesn’t matter if it’s healthy or unhealthy you feel like it”* (South Asian Focus Group, junior female)

*“Teachers? Absolutely not”* (European Focus Group, senior male)

*“Teachers? Like when we bring [traditional] food from home and they ask you ‘what’s that’ [in a funny voice]?”* (South Asian Focus Group, senior female)

*“Sometimes I have hospitality from school and then go home and eat from the design of the meal and snack, how much I eat today and how much I enjoyed the food. The course teaches me about the food”* (East Asian Focus Group, senior female)

*“It’s mainly just the health teacher when you learn about nutrition and you know if you eat a packet of chips in class she takes it off you and reads the nutrition and tell you. We had health last year for a term where we did health and well being and this year in year 10 we have it for two terms and then you get to choose it from next year”* (European Focus Group, junior female)

#### *Differences among Ethnic Groups:*

In general, European adolescents in the focus groups talked about the taste and look of the food more than the Asian focus groups. However, East Asian adolescents in the focus groups mentioned their food choice being influenced by money more than others.

Of those South and Asian adolescents in the focus groups who talked about being influenced by cultural factors, most of the South Asian focus groups talked about not being allowed to eat beef, pork, ham, or a food that is not halal<sup>25</sup>. East Asian focus groups however, talked about not liking the traditional food their parents made for them. Both East and South Asian participants in the focus groups also talked about being made fun of or teased for having their traditional foods at the school, in most cases influencing them to not bring that food to school and instead bringing money to purchase something from the school canteen.

#### *Ethnic Differences Themes for ‘Environmental Influences’:*

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<sup>25</sup> Any food that is permissible to eat under Islamic laws, Muslim dietary laws

- Cultural factors influencing young people's food choice mentioned by adolescents in South and East Asian focus groups included consumption of meat, and having traditional foods at school

These themes are illustrated by the following quotes:

*“Probably spend more money on good food, like tastier food. Good food is food which is nice in terms of taste, don't really care about healthiness”* (East Asian Focus Group, junior male)

*“But if I only have a dollar or two I can only buy a coke or chips”* (East Asian Focus Group, senior female)

*“Oh yeah, our friends don't eat red meat so we don't eat ham or anything, so can't eat pizza and stuff”* (South Asian Focus Group, senior male)

*“In my culture were not allowed to eat anything that's un-halal, so we have to do everything the halal way”* (South Asian Focus Group, junior female)

*“Like my cultural food roti I used to bring but then my class in intermediate would smell it and tease me about it and it just puts you off really”* (South Asian Focus Group, junior female)

*“It depends on the person, if they take it [others teasing the traditional food] personally they don't have to bring it if they want, but if they want to eat it then they can eat it. It affects some people”* (East Asian Focus Group, junior female)

### **5.5.2 Family Influences**

In response to Q9 (Does your family have an influence on your food choice?), the majority of the participants in the focus groups mentioned that their parents not only influence their eating patterns, but also control and decide what they eat every day. Some also mentioned their parents would encourage them to eat healthy food.

*Main Themes for 'Family Influences':*

- Young people in the focus groups mentioned that their parents have a major role in influencing and deciding what young people eat

- Some of the adolescents in the focus groups mentioned that their parents encourage them to eat healthy

These themes are illustrated by the following quotes:

*“Depends on what mom makes”* (South Asian Focus Group, senior male)

*“I go shopping with my dad to see what I want”* (European Focus Group, senior female)

*“Mum will just ask me what I feel like or just say something that we like and then agree or disagree. She will prepare the food but will talk to us”* (European Focus Group, junior male)

*“Yeah mum asks what I want and gives me a variety of things and I decide which one, whichever I feel like”* (European Focus Group, junior male)

*“She will ask what we want for dinner, and you can say no don’t put that in it and she won’t because she brings your needs into it and it’s the same in the supermarket as well you get what you need and what you want”* (European Focus Group, junior male)

*“My mum she encourages me to eat healthy and my dad makes me eat some vegetables”* (European Focus Group, senior male)

#### *Differences among Ethnic Groups:*

South Asian adolescents in the focus groups indicated having very little influence on their food choice and their parents having more control over what they eat, followed by East Asian adolescents in the focus groups. European students in the focus groups mentioned that although their parents are mainly in charge of shopping and preparing the food but they usually consult with them and listen to what they like or want to eat.

#### *Ethnic Differences Themes for ‘Family Influences’:*

- South Asians focus groups mentioned having little influence on their food choice and their parents having more control over what they eat, followed by East Asians compared to Europeans

These themes are illustrated by the following quotes:

*“They make our breakfast for us, so whatever they put on the table we eat. It’s the same for dinner”* (South Asian Focus Group, senior female)

*“My mum is mainly in charge of cooking and shopping, we just eat it. My mum has a stronger say at home”* (East Asian Focus Group, junior female)

### **5.5.3 Food and Mood**

In response to Q10 (Do you tend to like particular food if you are happy or sad?), about half of the focus groups indicated that feeling happy or sad has no influence on what they eat, while the other half mentioned that they do tend to eat particular foods when they are feeling happy or sad. Of those who reported their eating patterns is influenced by their mood (all being female focus groups), half mentioned that they would lose their appetite, while the other half mentioned they would eat more chocolate and other junk foods when they are sad or agitated.

In regard to special occasions (such as holidays, celebrations, or temple meetings), most of the participants in the focus groups talked about eating more food and eating more of the food with higher sugar and fat content during such events. Many mentioned going to restaurants on special occasions, having more fast foods, or eating more sweets and cakes.

*Main Themes for ‘Food and Mood’:*

- Half of the young people in the focus groups mentioned eating particular foods when they are happy or sad, while this had no impact on the other half
- Only female focus groups mentioned their eating habits are affected by their mood
- For special occasions, most people eat more food and more of the unhealthy food

These themes are illustrated by the following quotes:

*“Like at weddings when you’re enjoying yourself you eat more, like more of the sweets, but when you’re sad you don’t feel like anything, like I don’t”* (South Asian Focus Group, junior female)

*“Yeah when I’m sad I’ll go towards the junk food like chocolate and ice cream. When I’m happy I’m more inclined to make more healthy decisions”* (European Focus Group, senior female)

*“Chocolate if I’m sad, chocolate is anti-depressant”* (South Asian Focus Group, senior female)

*“Celebrate and get better food? Yes. Better food would be going to a restaurant and just getting whatever looks good from the menu. More fatty foods, fried chicken and chips”* (East Asian Focus Group, senior male)

*“Yeah, Christmas as well as holidays, I eat bad and I eat more. It depends on the occasion, on a good happy party celebration yep more junk food”* (European Focus Group, senior female)

*“It’s not the occasion that affects me it’s the food itself”* (European Focus Group, senior female)

#### *Differences among Ethnic Groups:*

Of those female focus groups who mentioned their eating patterns being influenced by their mood, most of the adolescents in the East and South Asian focus groups mentioned that they would lose their appetite when they are sad or agitated, while European adolescents in the focus groups mentioned that they would eat more chocolate and other junk foods.

East Asian adolescents talked more about going to restaurants on special occasions, having more fast foods, or eating more sweets and cakes.

#### *Ethnic Differences Themes for ‘Food and Mood’:*

- East and South Asian adolescents in the focus groups mentioned losing their appetite when they are sad or agitated
- European adolescents in the focus groups mentioned eating more chocolate and other junk foods when they are sad or agitated



- East Asian adolescents in the focus groups mentioned going to restaurants and eating more unhealthy foods for special occasions more than the other groups

These themes are illustrated by the following quotes:

*“When I’m sad I eat less and when I’m happy I eat. When I’m angry with someone I won’t eat”* (East Asian Focus Group, senior female)

*“When I’m sad I tend to just eat junk food that’s not good for you like chips and chocolate and lollies, but when I’m happy I eat happy food like bananas and cool stuff”* (European Focus Group, junior female)

*“Say it’s someone’s birthday it would just be like have a cake and then have some traditional kebabs, stuff like that, desserts. I would eat more because the food is more special and because they got more food, you eat more”* (East Asian Focus Group, junior female)

## **5.6. Knowledge and Experience**

This section explores how knowledge of healthy food and what to eat influences the food choice and eating behaviours of young people in the different ethnic groups. This was done to look at how knowledge shapes our food habits, because as was discussed in the previous chapter, there is a big gap in the knowledge of different ethnic populations studied here.

This section refers to the following questions:

Q11. How would you rate young people’s (East Asians/South Asians/Europeans’) knowledge of healthy food and what to eat?

Q12. Where do you think they get their knowledge from?

Q13. What do you know about heart health and its contributing factors?

Q14. Where do you get this information from?

### 5.6.1 Knowledge of Healthy Food

In response to Q11 (How would you rate young people's knowledge of healthy food and what to eat?), most of the participants in the focus groups indicated that their knowledge is poor to average, followed by some mentioning that they know the basics but they don't care about it (mostly male focus groups). Some others mentioned that the nutritional knowledge of a person depends on the family's background and education. They also mentioned that the available information is confusing and this doesn't help with their current knowledge level of healthy food and what to eat. Younger adolescents in the focus groups (i.e. 13-15 year olds) showed better knowledge of healthy foods and what to eat compared to the older students in the focus groups. This was observed through details and examples the adolescents in younger focus groups were able to share.

*Main Themes for 'Knowledge of Healthy Food':*

- Participants in the focus groups mentioned that young people's knowledge of healthy food and what to eat is poor to average
- The adolescents in the focus groups indicated that the available information is confusing and misleading
- Younger students showed a better knowledge of what to eat than older students

These themes are illustrated by the following quotes:

*"They don't know what's healthy and what isn't. If you look at it overall for the male population, and our age group there is a lot of fat people"* (European Focus Group, senior male)

*"I don't know what's really healthy at all because scientists don't know much. Few years ago they said don't eat too much red meat and now they encourage it. So sometimes they don't know what they're doing and we don't know what we're doing"* (European Focus Group, senior male)

*“They just get their knowledge from education, I have no idea how good the knowledge is” (East Asian Focus Group, senior male)*

*“They sort of know if it’s [food] unhealthy but don’t really know the consequences of having it everyday” (European Focus Group, senior male)*

*“Depends on what family you come from, backgrounds like certain foods you don’t eat, family tradition that are passed on to you, depends, because different people know different things” (South Asian Focus Group, senior male)*

#### *Differences among Ethnic Groups:*

South Asian adolescents in the focus groups rated their knowledge of nutrition and what to eat lower than East Asian or European adolescents.

#### *Ethnic Differences Themes for ‘Knowledge of Healthy Food’:*

- South Asian adolescents in the focus groups feel they know less about nutrition compared to other groups

These themes are illustrated by the following quotes:

*“They probably don’t have the knowledge, they just eat, I think they really don’t know probably” (South Asian Focus Group, senior female)*

### **5.6.2 Source of Knowledge of Healthy Food**

In response to Q12 (Where do you think they get their knowledge from?), most of the participants in the focus groups mentioned getting this information from their parents or TV (including advertisements, reality shows, cooking shows, and the news). Some mentioned getting their nutritional knowledge from school and their teachers in health and hospitality classes; however these classes are not compulsory and students can decide whether to attend it or not. Other sources of knowledge mentioned by a few participants in focus groups included friends, internet, pamphlets and magazines.

#### *Main Themes for ‘Source of Knowledge of Healthy Food’:*

- Sources of nutritional knowledge mentioned by adolescents in the focus groups include parents, television, school, friends, internet, pamphlets, and magazines

These themes are illustrated by the following quotes:

*“My parents gave me that first knowledge”* (East Asian Focus Group, junior female)

*“They get this information from their ancestors and stuff like back at their home place, its passed on to them through family”* (South Asian Focus Group, senior female)

*“Parents and people around you”* (European Focus Group, senior female)

*“TV, the shows about diets and what’s good for you and what’s not and all that”* (South Asian Focus Group, senior female)

*“They get the knowledge mostly get the education from school and TV, TV like programs and advertisements like keeping fit. And school like Health class which is compulsory when you start year 10”* (East Asian Focus Group, senior male)

*“Mostly TV, commercials and the news. One commercial promoting healthy foods is like Woolworths, the fruits are your friends”* (East Asian Focus Group, senior male)

*“TV affects takeaways you eat, it makes it seem healthy in a way, like the McDonalds salads which are worse than the Big Macs”* (European Focus Group, junior female)

*“Books, magazines and sometimes newspapers”* (South Asian Focus Group, junior male)

*“Hospitality which is all about food knowledge teaches you stuff. They cook about once a week which is pretty healthy and the rest we talk about nutrition. It’s an elective course just for students who are interested in it”* (European Focus Group, senior male)

*“for me because I do hospitality and if I learn something new I tell my mum and she kind of thinks about it and she knows it. Like the other day I was telling her about chips and fat”* (South Asian Focus Group, junior female)

*“School, mum and dad. At school in health we learn about nutrition and what’s good for you and saturated fat and unsaturated fat. Parents just say eat healthy food and eat your vegetables and stuff”* (South Asian Focus Group, junior female)

*“Probably from school, like there are some classes like health which if you take it tell you what are good foods for your body”* (East Asian Focus Group, junior male)

#### *Differences among Ethnic Groups:*

The only difference that was talked about was by East Asian adolescents in the focus groups, who mentioned not getting any knowledge of healthy food, and what to eat, from their friends.

#### *Ethnic Differences Themes for ‘Source of Knowledge of Healthy Food’:*

- East Asian adolescents in the focus groups mentioned not getting any nutritional information from their friends

### **5.6.3 Knowledge of Heart Health**

In response to Q13 (What do you know about heart health and its contributing factors?), some of the participants in the focus groups mentioned having a very basic knowledge of what contributes to having a healthy heart, and some mentioned having very poor or even wrong knowledge of this area. The very basic knowledge that was talked about included knowing that there are foods such as fatty foods that are bad for the heart, foods like fruits and vegetables are good, and that exercise contributes to having a healthy heart. Having said that, the students could not identify foods with bad fat or how much of these foods they could eat in their daily diet. Of more concern were those who had wrong information about heart health, as shown below in the quotes. Once again, younger students had better knowledge of heart health, and its contributing factors, than older students.

#### *Main Themes for ‘Knowledge of Heart Health’:*

- The focus groups mentioned that young people's knowledge of heart health and its contributing factors is very basic or incorrect
- Younger students had better knowledge of heart health than older students

These themes are illustrated by the following quotes:

*“Not much I reckon because young people don't know all that stuff until later on, when they start realizing like twenties or something, like what's good and not good”* (South Asian Focus Group, senior female)

*“Um like if you eat like bad food like you can get bad heart disease like heart attack and stuff and so it's like better to eat like good food and stuff like that rather than junk food and yeah”* (European Focus Group, senior female)

*“Eating good food helps, red meat, red wine. But too much fatty food will cause like angina and stuff”* (European Focus Group, senior male)

*“I know that much, just that fatty foods can be bad for you”* (European Focus Group, senior female)

*“5+ a day”* (South Asian Focus Group, senior male)

*“Good food to make it flow coz if you eat fatty food and don't exercise your just going to die of heart disease”* (European Focus Group, junior female)

*“A lot of salt will kill you, and a lot of spice will kill you. Like it clogs up, all the bad stuff, one of your veins, I don't know what vein but ye the blood can't get to it and you have a heart attack”* (European Focus Group, senior male)

*“Eat some vegetables and meat and pork”* (East Asian Focus Group, senior female)

*“To eat rice and noodles is good for heart”* (East Asian Focus Group, senior female)

*“Fatty foods gathers up in your and stops something”* (European Focus Group, junior female)

#### *Differences among Ethnic Groups:*

The findings show that South Asian adolescents in the focus groups talked more about being faced with confusing messages in regards to what contributes to having a healthy heart compared to the other groups.

#### *Ethnic Differences Themes for 'Knowledge of Heart Health':*

- South Asians in the focus groups mentioned being faced with confusing messages more than the other groups

These themes are illustrated by the following quotes:

*“Red meat, I don't know if that would make you healthier”* (South Asian Focus Group, junior male)

*“Heaps of water and oxygen is good”* (South Asian Focus Group, junior female)

#### **5.6.4 Source of Knowledge of Heart Health**

In response to Q14 (Where do you get this information from?), most of the participants in the focus groups talked about getting the information about factors contributing to a healthy heart from their families (e.g. heart disease experienced by a family member) or their school (i.e. health or science teachers). A few also talked about TV, radio, books, internet and doctors as their source of information.

#### *Main Themes for 'Source of Knowledge of Heart Health':*

- Sources of information in regards to heart health mentioned by young people in the focus groups include family, school, television, radio, books, internet, and health professionals

These themes are illustrated by the following quotes:

*“Pretty much because heart disease runs through my dad's side and my dad has heart disease, that's how I know more about it”* (East Asian Focus Group, senior male)

*“From school, if you do PE classes (but it's not compulsory, it's extra option), and health studies”* (South Asian Focus Group, senior female)

*“School, in science studies you study about the heart and what contributes to having a healthy heart, it is a compulsory course”* (South Asian Focus Group, junior female)

*“Yeah you get it from radio adverts or TV adverts”* (European Focus Group, junior female)

*“Programmes like downsize me, or like the Healthy Living website”* (South Asian Focus Group, junior male)

*“From pamphlets or from doctors or specialists. They're usually given out or found at pretty much anywhere”* (European Focus Group, junior male)

#### *Differences among Ethnic Groups:*

East Asian and European adolescents in the focus groups mentioned their families as the source of information in regards to heart health more than South Asian focus groups. East Asian adolescents in the focus groups mentioned books as their source of information more than the other groups.

#### *Ethnic Differences Themes for ‘Source of Knowledge of Heart Health’:*

- East Asian and European focus groups mentioned getting information about heart health from their parents more than South Asian groups
- East Asian focus groups mentioned books as their source of information more than others

These themes are illustrated by the following quotes:

*“I know a lot about heart stuff, just because my sister; she influences a lot of what I know like different kinds of fats like saturated fats and the healthy fats. I have an older sister at uni”* (European Focus Group, senior female)

*“School, books, and my parents tell me sometimes”* (East Asian Focus Group, junior female)

*“From books, from both inside and outside of school”* (East Asian Focus Group, junior male)

## **5.7. Recommendations for Prevention Programmes**

This section explores the participants' recommendations for steps to be taken in future to combat the problem of overweight/obesity in young people. This was



done to provide a good basis for planning health promotion interventions that affects the population of study here.

This section refers to the following questions from Table 5.2:

Q15. What would be a good way to get young people to eat healthy and become physically more active?

Q16. How can we engage the individuals and the community in these intervention programs?

### **5.7.1 Prevention Programmes**

In response to Q15 (What would be a good way to get young people to eat healthy and become physically more active?), the participants talked about possible programmes or interventions that could make a difference in promoting their health in regards to keeping a healthy weight. The following responses are presented in the order of the number of times repeated by the participants in the focus groups.

The majority of the participants in the focus groups talked about the school as the first portal contributing to their physical wellbeing. They suggested that the school should have policies and monitor the school canteen by removing all the unhealthy options from the canteen or by monitoring the price of healthy food and making it cheaper than, or at least the same price as, unhealthy foods such as junk foods. They recommended that the school should have more sports activities and an opportunity for everyone to get active during school hours. They also mentioned that although physical education, health, and hospitality courses are compulsory for junior students, these are optional for the rest and that senior students do not have access to these educational forums. They recommended that school should either make these courses compulsory for everyone or organise seminars and workshops for senior students to have access to reliable information in regard to nutrition and physical activity. However, they mentioned that all these programmes need to be fun, enjoyable, positive and encouraging.

The second component that was mostly talked about was the role of the government. They mentioned that the best programme to promote their health and wellbeing is a programme that is available, accessible and organised. They wanted a healthy environment that is conducive to making healthy food choices and being physically active. For example they mentioned that the government could monitor the price of healthy foods at dairies and at the schools, as well as providing affordable opportunities for young people to be physically active after school hours and on the weekends.

The third component that was talked about was the media, and specially the role of the television. They suggested that current food advertisements should be replaced by advertisements for healthy foods, showing them what they are, how to use them and what their health benefits are. On the other hand, if they are advertising unhealthy foods, they should also talk about consequences of consuming those kinds of foods on a regular basis. Another way that they suggested television could help is to have educational programmes and documentaries about these issues with clear and practical messages, targeting young people and their families.

The fourth component that was discussed was the community. They suggested that the community could organise fun and enjoyable educational and sports activities to promote everyone's health and wellbeing, however the information they provide needs to be reliable and not confusing.

Finally, the participants talked about the messages that these programmes are trying to deliver to get young people to eat healthy food and become more physically active. They strongly suggested that these messages should be about health and not losing weight, otherwise they will either not listen to it, or it may lead young people to experience eating disorders. They talked about everything being done in balance.

*Main Themes for 'Intervention/Preventive Programmes':*

- The first way to get young people to eat healthy and become physically more active suggested by the adolescents in the focus groups is through school by monitoring the availability and the price of healthy food at

canteen, offering nutritional workshops and seminars, and more sports opportunities

- The second way suggested is through government by creating a healthy environment that making healthy choices is available, accessible, and affordable
- The third suggested way is through media by eliminating harmful messages and promoting educational and motivational programmes
- The fourth way suggested is through community by organising fun and enjoyable educational and sports activities to promote everyone's health and wellbeing
- Young people in the focus groups mentioned that any message delivered by these programmes need to be reliable, clear, informative, positive, and encouraging

These themes are illustrated by the following quotes:

*“Like the healthy things in the canteen, not for their price to go up and for them to come down so they're cheaper or the same as the junk food. The price on the sandwiches have gone up and stuff and people hardly buy sandwiches now, they just get like pizza pies and stuff, like sandwiches are double the price of pizza pies”* (European Focus Group, junior female)

*“We shouldn't have canteens at schools we should have a healthy canteen and they shouldn't serve hot dogs and pies full of fat and chips and drinks”* (South Asian Focus Group, junior female)

*“Don't give them the temptation of bad food and just give them school sports involving them in fun sports. Involving them at school activities. Talk to them about how bad foods can affect you and let them know that they should eat healthy and involve them in fun activities. Take them to like a nutritionist with the family or something like that”* (European Focus Group, senior female)

*“Try to cooperate into studies or school what teenagers are into and then try to show healthy eating as a positive thing not a negative thing”* (South Asian Focus Group, senior male)

*“They should organize more like teachings of health and body and stuff yeah. At school, at TV” (South Asian Focus Group, senior male)*

*“Like have fun sports, like the things young teenagers enjoy like rugby and stuff, you have to do everything like organize and stuff” (South Asian Focus Group, junior female)*

*“Have government control what goes in and what people eat and if some certain foods can attract the highest chance of obesity shouldn’t be allowed to go on the market. It’s for people’s health so sometimes you got to save them from themselves” (European Focus Group, senior male)*

*“The documentary ‘Super Size Me<sup>26</sup>’ should be compulsory at school because it was extreme what he went through. Like because a lot of people live on fast food and they should see what’s going on to them, it was just gross. Making the documentary available for all students to see, so more knowledge on these issues” (European Focus Group, senior female)*

*“The community should organize more sports or something that people can get into things, like the community organizing sport teams after school so young people can get involved” (South Asian Focus Group, senior male)*

*“To start with the products, the people selling them should promote the consequences of buying them. Those who are selling them, even though they’re making money from it should give information because it’s pretty sad what it does. Like with smoking and how they put the pictures of what it can do to you on it, if they did that with fatty food, it would really scare some people off” (European Focus Group, senior male)*

*“But also you have to be careful that they don’t take it too far and develop an eating disorder, that’s quite a big problem. We don’t want people to be bulimic or anorexic we just want them to be healthier. We’re not on a weight loss plan, we’re more on a healthy food eating plan, to become more healthy. We should focus on becoming more healthy and not losing weight” (European Focus Group, senior male)*

*“More practical stuff, there is too much theory and people don’t see that” (South Asian Focus Group, senior male)*

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<sup>26</sup> A documentary film directed by Morgan Spurlock, which over a 30 day time period he only eats McDonald’s food

### *Differences among Ethnic Groups:*

Although young people from all ethnic groups recommended the programmes mentioned above, European adolescents in the focus groups talked about the use of television more than East and South Asian focus groups. East Asian adolescents in the focus groups talked about the need for more opportunities for sports activities more than South Asian and European focus groups. South Asian adolescents talked about the need for intervention programmes to be fun and enjoyable more than East Asian and European focus groups. South Asian focus groups also talked more about the role of the government compared to other groups.

### *Ethnic Differences Themes for 'Intervention/Preventive Programmes':*

- European adolescents in the focus groups talked about the use of television in intervention programmes more than other groups
- East Asian adolescents in the focus groups talked about the need for sports activities more than other groups
- South Asian adolescents in the focus groups talked about fun and enjoyable intervention programmes, as well as the role of the government in these programmes more than other groups

These themes are illustrated by the following quotes:

*“Less advertising on TV and more advertising for healthy stuff and push play stuff. And like that movie we watched in Health ‘Super Size Me’”* (European Focus Group, junior female)

*“I would set up more like physical activities like sports and add some more of it. Like competitions where you could win two thousand dollars like so everyone would want to go for it, or if that didn't work I know its sad but I would have to take all the fatty foods off the canteen, that's what they're doing right now”* (East Asian Focus Group, senior male)

*“In schools they should encourage us to play sports”* (East Asian Focus Group, junior female)

*“Ministry of Health should promote the young people to eating healthy food. Probably on TV because that what children mostly see, and have those talks going into schools and talking about healthy diets and stuff like that giving them an idea of what’s good for them and what’s not, like you know sorting out the differences between bad and good and telling them that its not a good option to just eat whatever you want. Like you can eat, there is a level of yeah you can, but not all of the time because there should be a limit towards it. Like you know now they have those bans in school canteens with fatty foods so that’s probably helping” (South Asian Focus Group, senior female)*

### **5.7.2 Participation in Prevention Programmes**

In response to Q16 (How can we engage the individuals and the community in these intervention programs?), the participants were asked to respond to the question in regard to the programmes they mentioned in the previous question.

Once again the first and most repeated response was to do with school and how the school and teachers could influence young people to be engaged in such programmes. They also talked about their families and that for them to make any behavioural changes in regards to eating and exercise habits, they would need their families involved in these programmes.

The participants in the focus groups then talked about making these programmes interesting and enjoyable to capture young people’s attention, they mentioned that they want these programme to positively encourage them to make changes rather than a set of “dos and don’ts”. They mentioned that they understand that they need these programmes but would appreciate if this could be reminded and communicated to them in a positive manner rather than a forceful approach.

They talked about the use of media (television in specific) to engage young people in healthy eating by encouraging them and giving them reliable information. They talked about using role models to encourage them to get involved in such programmes and that young people would also like to become role models themselves.

The participants once again talked about accessibility and affordability of educational and sports activities, stating that they would participate if the option was available to them.

Some talked about the importance of the way these programmes are marketed to young people, an element of competition in the given programme, a token to accompany the programme (such as a small prize for participation), and being involved in the programmes with their friends, as different ways that would encourage young people to engage in the intervention programmes. In addition, they mentioned that involving young people in the design and implementation of the programmes would give them a feel of ownership and hence encourage them to get involved.

A few of the participants in the focus groups said that they do not really care about these programmes or they do not know if young people want to be engaged in such programmes.

#### *Main Themes for 'Engagement':*

- The focus groups suggested that individuals and the community can be engaged in intervention programs through schools, teachers, family and friends' involvement
- Other ways of engaging young people mentioned by the focus groups include making the programme interesting and enjoyable, positive and encouraging, based on their needs, accessible and affordable
- Participants in the focus groups mentioned that media, a clear and a simple message, having role models, and taking ownership of the programmes could influence and encourage young people to get engaged in intervention programmes

These themes are illustrated by the following quotes:

*“Go to schools and just get people to do it [the programme] and once they see its fun the rest of the people join. I would bring specialists to schools to talk to people”* (European Focus Group, senior female)

*“Offer it during school time” (East Asian Focus Group, junior male)*

*“I think that going through schools, if you get the student involved then you get the family interested in it. At our age group we have great influence on our families” (European Focus Group, senior female)*

*“Tell them to tell your friends to come join us weekends, hang out, play sport have fun, something organized” (East Asian Focus Group, junior male)*

*“Hanging out with friends and making it friendly. It should be free, because people like to take part in something that’s free” (East Asian Focus Group, junior female)*

*“People don’t do things that they don’t want to do, so you’ve got to give to them in a way that’s interesting and going to capture their attention” (European Focus Group, senior male)*

*“Instead of demoting the unhealthy food, promoting the healthy food. So get some role models like that guy from Subway who lost all that weight and all those people can show to be like that if they eat healthy and exercise. Like positive reinforcement” (European Focus Group, senior male)*

*“Try to show healthy eating as a positive thing not a negative thing” (South Asian Focus Group, senior male)*

*“In schools they should encourage us to play sports” (East Asian Focus Group, junior female)*

*“Being healthy is not a bad thing. I watched ‘Downsize Me’<sup>27</sup>, and the end result is like good, they were quite happy so it’s for your own benefit basically” (European Focus Group, senior male)*

*“Advertising, advertise it like in a fun way so they would want to do it” (South Asian Focus Group, junior female)*

*“Like that movie we watched in Health ‘Super Size Me’. Go around to schools and advertise health and stuff, and get more healthy stuff in the canteen” (European Focus Group, junior female)*

*“This is New Zealand, most people watch rugby. So if we had rugby stars talking about it people would think that’s cool and then that’s what people do, they would model” (European Focus Group, senior male)*

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<sup>27</sup> A New Zealand weight and diet reality series



*“Just let them know what you're eating because if they see you get fit they will follow what you're eating, they get an idea of what you're eating and how you're eating. They are people around you. Each individual becoming a role model for the community, that way encouraging them to eat more healthy or be more active. Just try to impress those people, try to be a role model”* (East Asian Focus Group, senior male)

*“I would like put out like a competition for like coming up with the healthiest food and get like all of the ideas and do something with it”* (European Focus Group, senior female)

*“Playing sports, play sports for money”* (South Asian Focus Group, junior male)

*“Free food would encourage me to participate in programmes”* (South Asian Focus Group, junior female)

*“Putting more emphasis on the sport would be important, because within school you're either hard out academic or hard out sporty and there is not people in between who would want to go towards sports, and academics just don't think they can do it as well so its like making it fair sport as well as encouragement. Having a balance between the two”* (European Focus Group, senior female)

#### *Differences among Ethnic Groups:*

In general, European adolescents in the focus groups talked more about the use of media and positive encouragement to get young people engaged in the intervention programmes compared to other groups. East Asian adolescents in the focus groups mentioned that they would also need their families to be involved in such programmes if they are to change their habits and lifestyle. East Asian adolescents also talked about not knowing what needs to be done to engage young people in intervention programmes more than European and South Asian adolescents in the focus groups.

Another major point that was talked about by most of the East and South Asian adolescents in the focus groups was about their cultural background and the impact of immigration on their eating and exercise habits. Although, the majority mentioned that they were happier to be in New Zealand and some were born in New Zealand, they still pointed out that they do not always fit in with everyone

and do not have the feeling of belonging to either one of the cultural groups (the European culture or their parent's culture). For them to be engaged in intervention programmes, they also require a feeling of belonging to or fitting in that group, hence the programmes targeted at Asian adolescents need to take this point into consideration. This point was a stronger case for East Asian adolescents than South Asians in the focus groups.

*Ethnic Differences Themes for 'Engagement':*

- East Asian adolescents in the focus groups mentioned needing their families to be involved in intervention programmes if they are to change their habits and lifestyle
- East and South Asian adolescents in the focus groups mentioned that the cultural background and the feeling of belonging play a role in young people's engagement in intervention programmes

These themes are illustrated by the following quotes:

*“Well if they want to encourage students the same age as us to eat healthy, it should start in the family and keep going in the schools because that's where the children spend most of their time, in schools. The children can choose what they eat, but they got to think you know, you don't want to grow up and be older and have diabetes or something”* (East Asian Focus Group, junior female)

*“I think it starts in the family, like you go shopping and you want some food and they should tell you which one is healthy and which is good for you. It's good that they tell you that. Yeah your family should know this and tell you and the school carries it on”* (East Asian Focus Group, junior female)

*“Asians that live here or have moved here are way different than the ones back in Asia. There is another thing I've noticed and that's us Asians here, if there is a bigger Asian community and a smaller Asian community then one of those people pretty much won't belong in the bigger Asian community. So like all the Asian students at this school are like a small community and they don't fit in to other groups. I went to church for like a meeting for all Philippines afterwards there was this game and seeing I talk different and am a bit taller than them, I was playing but they weren't giving me the ball, that's a bit of a sad thing. I fit*

*in better here at my school with other ethnicities. Personality, friends, the way you talk, and the way you think. You think more positive, but you think more negative about what happens there, and like what would happen to you if you grew up in Asia” (East Asian Focus Group, junior male)*

*“Like in the Philippine you would hang out with your friends and here it’s like boring, in some ways you would be happier back in your country and in some ways you like what NZ is offering you” (East Asian Focus Group, junior male)*

*“I was born here, I consider myself an Asian-Kiwi” (East Asian Focus Group, junior male)*

*“The ones that stayed in India I reckon are happier, because they are in their motherland, like over here we don’t have much relatives and gatherings like we used to in India and so I miss my family here, they have heaps of families there and we don’t have any, we’re all alone here, I would love to go back” (South Asian Focus Group, junior female)*

*“Indians are happier in New Zealand than Indians in India” (South Asian Focus Group, junior male)*

*“I think there are some differences; there is difference in food, the living place and the community. They are all together there, but in New Zealand they are scattered, when they have a holiday they come together” (East Asian Focus Group, junior female)*

*“Well, like back in the home country its kind of different because you’re all different but it’s all considered as Asian, where here its all just Asian” (East Asian Focus Group, junior female)*

## **5.8. Summary of Main Themes and Common Themes**

Table 5.3 – 5.7 presents a summary of the qualitative results so far. These tables are listing of each section and subsection with their respective themes (showing those across all ethnic groups and the differences among ethnic groups).

**TABLE 5.3. THEMES ACROSS ALL ETHNIC GROUPS AND ETHNIC DIFFERENCES: FOOD PATTERNS**

<b>Part One: Food Patterns</b>	
<i>Main Themes</i>	<i>Ethnic Differences</i>
<b>5.3.1. Favourite Foods and Drinks</b>	
<ul style="list-style-type: none"> <li>▪ Fast food is the most favourite food in all ethnic groups</li> <li>▪ The other favourite foods are meats and starches, followed by traditional/international foods, fruits and vegetables, and chocolate and sweets</li> <li>▪ Soft drink is the most favourite drink in all ethnic groups</li> <li>▪ The other favourite drinks are water and fruit juice</li> </ul>	<ul style="list-style-type: none"> <li>▪ European focus groups mentioned fruits and vegetables as their favourite foods more than Asian groups</li> <li>▪ South Asian focus groups mentioned meats as their favourite foods more than East Asian and European groups</li> <li>▪ East Asian focus groups mentioned starchy foods as their favourite foods more than South Asian groups</li> <li>▪ East and South Asian adolescents in the focus groups mentioned they consume more fruit juice than Europeans</li> </ul>
<b>5.3.2. School Food</b>	
<ul style="list-style-type: none"> <li>▪ The food that was mentioned most to be consumed at the school was chips, followed by sandwiches and fruits, then biscuits, pies, chocolates, and sweets</li> <li>▪ Some reported eating nothing while they are at school (or before coming to school)</li> <li>▪ Most adolescents from the focus groups mentioned having soft drinks during school hours</li> <li>▪ Over half of the focus groups mentioned purchasing food from school canteen</li> <li>▪ Almost half of the focus groups mentioned bringing food from home</li> <li>▪ It was clearly mentioned that healthy food is brought from home, while unhealthy food is purchased from school canteen</li> </ul>	<ul style="list-style-type: none"> <li>▪ East Asian adolescents in the focus groups mentioned not eating while they are at school or before coming to school more than others</li> <li>▪ European adolescents in the focus groups mentioned eating fruits during school hours more than others</li> <li>▪ East and South Asian adolescents in the focus groups mentioned having soft drinks during school hours more than European groups</li> <li>▪ European adolescents in the focus groups mentioned bringing food from home more than others</li> </ul>

<i>Main Themes</i>	<i>Ethnic Differences</i>
<b>5.3.3. After School Food</b>	
<ul style="list-style-type: none"> <li>▪ After school food includes sandwiches or toasts, heavy meals or leftovers, chips, biscuits or muffins, fruits, and pies</li> <li>▪ Dinner includes meat, rice, fast foods, vegetables, and curries</li> <li>▪ After dinner food includes ice cream, milk, fruits, chips, biscuits, and chocolates</li> </ul>	<ul style="list-style-type: none"> <li>▪ After school, European focus groups mentioned consuming more sandwiches or fruits; East Asians mentioned consuming more fast foods or rice; and South Asians mentioned consuming more chips, chocolates, and traditional food</li> <li>▪ For dinner, European focus groups mentioned having more meat, potato, and vegetables; East Asians mentioned having more rice, noodle soup, fried foods, and fast foods; and South Asians mentioned having more curries, and fast foods</li> <li>▪ After dinner, European focus groups mentioned having more fruits and chocolate; South Asians mentioned having more chocolate, milk, and biscuits; and East Asians mentioned having more chips, milk, and biscuits</li> </ul>
<b>5.3.4 Traditional Diet</b>	
<ul style="list-style-type: none"> <li>▪ Participants of the Asian focus groups mentioned that both South and East Asians' traditional diet is influenced by New Zealand diet</li> <li>▪ Participants of the Asian focus groups mentioned that South and East Asians consume more fast food and junk food in New Zealand</li> </ul>	<ul style="list-style-type: none"> <li>▪ East Asian focus groups mentioned having more rice and noodles and less bread in their traditional diet</li> <li>▪ South Asian focus groups mentioned having more vegetables and less meat in their traditional diet</li> </ul>

**TABLE 5.4. THEMES ACROSS ALL ETHNIC GROUPS AND ETHNIC DIFFERENCES: ACTIVITY PATTERNS**

<b>Part Two: Activity Patterns</b>	
<i>Main Themes</i>	<i>Ethnic Differences</i>
<b>5.4.1. Leisure Activities</b>	
<ul style="list-style-type: none"> <li>▪ The single leisure activity mentioned most by the participants of the focus groups was watching television</li> <li>▪ Other leisure activities mentioned by the focus groups included playing computer and video games, sports, working, music, socialising, arts, reading, and doing homework</li> </ul>	<ul style="list-style-type: none"> <li>▪ South Asians and Europeans adolescents in the focus groups more often mentioned being involved in sports activities in their spare time than East Asian groups</li> <li>▪ East Asian adolescents in the focus groups more often mentioned reading and doing homework in their spare time than other groups</li> </ul>
<b>5.4.2. Physical Activities</b>	
<ul style="list-style-type: none"> <li>▪ The major form of exercise mentioned by most of the participants of the focus groups is walking to/from school</li> <li>▪ The main sports activities mentioned are soccer and rugby</li> <li>▪ For those who mentioned being physically active, most of the male focus groups mentioned being active on three to four days a week, while female focus groups mentioned being active on one to two days a week</li> <li>▪ The participants of the focus groups talked about lack of opportunities for young people to be physically active at the school</li> </ul>	<ul style="list-style-type: none"> <li>▪ East Asian and European focus groups talked more about walking to/from school</li> <li>▪ East Asian adolescents in the focus groups did not report being involved in any sports</li> <li>▪ East and South Asian adolescents in the focus groups motioned playing active games at home</li> </ul>
<b>5.4.3. Cultural Barriers to Physical/Recreational Activities</b>	
<ul style="list-style-type: none"> <li>▪ Most of the East and South Asian participants from the focus groups talked about cultural barriers in relation to physically activity</li> </ul>	<ul style="list-style-type: none"> <li>▪ East and South Asian participants in the female focus groups experience cultural barriers to be physically active</li> <li>▪ Cultural consideration mentioned by the focus groups that would influence young people’s recreation include sports clothing and strict family rules</li> </ul>

**TABLE 5.5. THEMES ACROSS ALL ETHNIC GROUPS AND ETHNIC DIFFERENCES: INFLUENCING FACTORS**

<b>PART THREE: INFLUENCING FACTORS</b>	
<i>Main Themes</i>	<i>Ethnic Differences</i>
<b>5.5.1. Environmental Influences</b>	
<ul style="list-style-type: none"> <li>▪ Factors influencing young people’s food choice mentioned by adolescents in the focus groups include taste and look, availability and convenience, money, friends, teachers, and the school</li> </ul>	<ul style="list-style-type: none"> <li>▪ Cultural factors influencing young people’s food choice mentioned by adolescents in South and East Asian focus groups included consumption of meat, and having traditional foods at school</li> </ul>
<b>5.5.2. Family Influences</b>	
<ul style="list-style-type: none"> <li>▪ Young people in the focus groups mentioned that their parents have a major role in influencing and deciding what young people eat</li> <li>▪ Some of the adolescents in the focus groups mentioned that their parents encourage them to eat healthy</li> </ul>	<ul style="list-style-type: none"> <li>▪ South Asians focus groups mentioned having little influence on their food choice and their parents having more control over what they eat, followed by East Asians compared to Europeans</li> </ul>
<b>5.5.3. Food and Mood</b>	
<ul style="list-style-type: none"> <li>▪ Half of the young people in the focus groups mentioned eating particular foods when they are happy or sad, while this had no impact on the other half</li> <li>▪ Only female focus groups mentioned their eating habits are affected by their mood</li> <li>▪ For special occasions, most people eat more food and more of the unhealthy food</li> </ul>	<ul style="list-style-type: none"> <li>▪ East and South Asian adolescents in the focus groups mentioned losing their appetite when they are sad or agitated</li> <li>▪ European adolescents in the focus groups mentioned eating more chocolate and other junk foods when they are sad or agitated</li> <li>▪ East Asian adolescents in the focus groups mentioned going to restaurants and eating more unhealthy foods for special occasions more than the other groups</li> </ul>

**TABLE 5.6. THEMES ACROSS ALL ETHNIC GROUPS AND ETHNIC DIFFERENCES: KNOWLEDGE AND EXPERIENCE**

<b>PART FOUR: KNOWLEDGE AND EXPERIENCE</b>	
<i>Main Themes</i>	<i>Ethnic Differences</i>
<b>5.6.1. Knowledge of Healthy Food</b>	
<ul style="list-style-type: none"> <li>▪ Participants in the focus groups mentioned that young people’s knowledge of healthy food and what to eat is poor to average</li> <li>▪ The adolescents in the focus groups indicated that the available information is confusing and misleading</li> <li>▪ Younger students showed a better knowledge of what to eat than older students</li> </ul>	<ul style="list-style-type: none"> <li>▪ South Asian adolescents in the focus groups feel they know less about nutrition compared to other groups</li> </ul>
<b>5.6.2. Source of Knowledge of Healthy Food</b>	
<ul style="list-style-type: none"> <li>▪ Sources of nutritional knowledge mentioned by adolescents in the focus groups include parents, television, school, friends, internet, pamphlets, and magazines</li> </ul>	<ul style="list-style-type: none"> <li>▪ East Asian adolescents in the focus groups mentioned not getting any nutritional information from their friends</li> </ul>
<b>5.6.3. Knowledge of Heart Health</b>	
<ul style="list-style-type: none"> <li>▪ The focus groups mentioned that young people’s knowledge of heart health and its contributing factors is very basic or incorrect</li> <li>▪ Younger students had better knowledge of heart health than older students</li> </ul>	<ul style="list-style-type: none"> <li>▪ South Asians in the focus groups mentioned being faced with confusing messages more than the other groups</li> </ul>
<b>5.6.4. Source of Knowledge of Heart Health</b>	
<ul style="list-style-type: none"> <li>▪ Sources of information in regards to heart health mentioned by young people in the focus groups include family, school, television, radio, books, internet, and health professionals</li> </ul>	<ul style="list-style-type: none"> <li>▪ East Asian and European focus groups mentioned getting information about heart health from their parents more than South Asian groups</li> <li>▪ East Asian focus groups mentioned books as their source of information more than others</li> </ul>



**TABLE 5.7. THEMES ACROSS ALL ETHNIC GROUPS AND ETHNIC DIFFERENCES: RECOMMENDATIONS FOR PREVENTION PROGRAMMES**

<b>PART FIVE: RECOMMENDATIONS FOR PREVENTION PROGRAMMES</b>	
<i>Main Themes</i>	<i>Ethnic Differences</i>
<b>5.7.1. Prevention Programmes</b>	
<ul style="list-style-type: none"> <li>▪ The first way to get young people to eat healthy and become physically more active suggested by the adolescents in the focus groups is through school by monitoring the availability and the price of healthy food at canteen, offering nutritional workshops and seminars, and more sports opportunities</li> <li>▪ The second way suggested is through government by creating a healthy environment that making healthy choices is available, accessible, and affordable</li> <li>▪ The third suggested way is through media by eliminating harmful messages and promoting educational and motivational programmes</li> <li>▪ The fourth way suggested is through community by organising fun and enjoyable educational and sports activities to promote everyone’s health and wellbeing</li> <li>▪ Young people in the focus groups mentioned that any message delivered by these programmes need to be reliable, clear, informative, positive, and encouraging</li> </ul>	<ul style="list-style-type: none"> <li>▪ European adolescents in the focus groups talked about the use of television in intervention programmes more than other groups</li> <li>▪ East Asian adolescents in the focus groups talked about the need for sports activities more than other groups</li> <li>▪ South Asian adolescents in the focus groups talked about fun and enjoyable intervention programmes, as well as the role of the government in these programmes more than other groups</li> </ul>
<b>5.7.2. Participation in Prevention Programmes</b>	
<ul style="list-style-type: none"> <li>▪ The focus groups suggested that individuals and the community can be engaged in intervention programs through schools, teachers, family and friends’ involvement</li> <li>▪ Other ways of engaging young people mentioned by the focus groups include making the programme interesting and enjoyable, positive and encouraging, based on their needs, accessible and affordable</li> <li>▪ Participants in the focus groups mentioned that media, a clear and a simple message, having role models, and taking ownership of the programmes could influence and encourage young people to get engaged in intervention programmes</li> </ul>	<ul style="list-style-type: none"> <li>▪ East Asian adolescents in the focus groups mentioned needing their families to be involved in intervention programmes if they are to change their habits and lifestyle</li> <li>▪ East and South Asian adolescents in the focus groups mentioned that the cultural background and the feeling of belonging play a role in young people’s engagement in intervention programmes</li> </ul>

It was considered useful to identify themes that recurred in two or more of the subsections. Hence each subsection in Table 5.3 was examined and major common themes were identified as described below.

### **5.8.1 Common Theme 1: Risk Factors**

The first common theme was concerned with those factors contributing to the problematic nutritional and exercise behaviours in young Asians and Europeans, which could lead to overweight/obesity.

These include the high consumption of fast foods including fried foods and pies, and junk foods such as chips, chocolates, ice creams, and biscuits, and sugary drinks such as soft drinks. Eating habits such as not having a breakfast, or not having anything to eat while at the school, hence having a heavy meal right after school, are also considered risk factors. Purchasing food from the school canteen, and the influence of New Zealand diet (accessibility and variety of food) on the traditional diet is another risk factor.

In addition, long hours of watching television or playing video or computer games, lack of sports and exercise opportunities at school or elsewhere (especially for East Asians), and cultural barriers to being physically active are considered risk factors.

Other factors include little or too much money, peer pressure, lack of school's support (e.g. unhealthy foods at school canteen or no access to sports equipment), lack of parents' involvement, and lack of or misleading knowledge of healthy food and what to eat.

### **5.8.2 Common Theme 2: Protective Factors**

The second common theme is to do with those factors that contribute to young people's not putting on too much weight and keeping a healthy lifestyle.

These include having a breakfast, bringing healthy food to school from home such as sandwiches or fruits (mainly seen in European adolescents), having a

balanced dinner including protein/meat, carbohydrates, and vegetables, and the use of traditional diet as opposed to fast foods.

Walking to or from school and involvement in organised or team sports such as soccer or rugby, are other protective factors contributing to the health and wellbeing of young people.

Factors such as friends, schools, teachers, correct knowledge and money can also be a protective factor, in addition to families encouraging and involving their adolescents in healthy eating and being active.

### **5.8.3 Common Theme 3: Recommendations for Prevention Programmes**

The Third common theme is to do with practical ideas suggested by the young people themselves that can help them to eat healthy, be active, and maintain a healthy lifestyle.

These include providing a healthy environment for young people, where making healthy decisions is not a major task (e.g. monitoring school canteen), offering nutritional education, and creating more sports opportunities for young people of all ages, genders and cultures to get involved in. School, government, media, and community's support are all necessary.

To engage young people in any health promotion activity, they recommended that the programme requires having the following characteristics: is fun and enjoyable, positive and encouraging, about being healthy not losing weight, provides reliable information, have clear and simple message, be accessible and affordable, is based on needs, creates a sense of ownership and belonging, involves the whole family and considers the cultural backgrounds of the population that is aimed at.

Overall, these common themes provide a good basis for planning health promotion interventions, which will be discussed further in the discussion chapter that follows.

## Chapter 6. Discussion

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This chapter is a discussion of the findings of the research with five main sections. First is a discussion of the findings as presented in the results chapters (Section 6.1), and second in terms of the common themes (Section 6.2). Third is a discussion on the development of a health promotion approach for young Asians in New Zealand to maintain a healthy weight and a healthy lifestyle (Section 6.3). Fourth is concerned with the limitations of this study (Section 6.4). And fifth relates the research findings to the original objectives of this study (Section 6.5).

## **6.1. Results Discussion**

This section provides a general discussion of the results presented in Chapter Four and Five, under the section headings used there.

### **6.1.1 Anthropometric Measurements**

In the past, obesity was seen as a non-Asian phenomenon but the findings of this study along with others in recent years, is suggesting a different picture.

Findings from the anthropometric measurements in this study showed that there was a difference in mean body weight and height between both Asian groups and the European adolescents. Mean weight and height was highest in European adolescents (64 kg and 167 cm), followed by South Asian (57 kg and 164 cm), and East Asian adolescents (55 kg and 161 cm). Consequently the mean Body Mass Index (BMI) did not differ between South Asian, East Asian or European adolescents (Table 4.2.1).

Mean waist circumference, showed no difference between South Asians and Europeans but there was a difference between East Asians and Europeans. However, once height was added to the equation, there was no difference in mean waist to height ratio between South Asians and Europeans or between East Asians and Europeans (Table 4.2.1).

Internationally accepted criteria were used to define weight status in adolescents based on their age and gender. The results showed that statistically there was no significant difference in mean BMI between East

Asian, South Asian, or European adolescents and high proportions from each ethnic group – 35% of European, 29% of South Asian, and 24% of East Asian adolescents – were classified as being overweight or obese (Table 4.2.2).

Prevalence of obesity among Asians living in Western countries is also shown in studies done in the United States by Popkin and Udry (1998) where 20.6% of all Asian-Americans were overweight or obese; Lauderdale and Rathouz (2000) where the total Asian male population was 57% overweight and the total Asian female population was 38% overweight; by Ahn et al. (2008) where 15% of Asian adolescents were either overweight or at risk of being overweight; and in the United Kingdom by Jebb et al. (2004) where 25.9% of young Asians were overweight and four times as likely to be obese as young Europeans; and by Taylor et al. (2005) where it was found that Indian males were at higher risk of being overweight than European males.

However, the criteria used to define obesity here (as well as the studies mentioned above) have not been varied for ethnicity. As it has been discussed in Chapter Two (Section 2.3.2) there are numerous studies that suggest lower cut-off points need to be used to define obesity in Asian populations. This is because Asian children experience obesity related health problems at a lower BMI, and have smaller figures and higher percent fat mass (Deurenberg-Yap et al., 2009; Jafar et al., 2006; Naser, Gruber, & Thomson, 2006). As there are no agreed cut-off points to define weight status in Asian populations at the moment, the World Health Organization definition of obesity has remained the same for adolescents from European and Asian backgrounds and the same has been employed in this study as well. Nevertheless, this study also supports the international call for lower cut-off points for appropriate classifications of overweight and obesity in Asian adolescents. Cho and Juon (2006) suggest that a BMI of 23 to 27.4 kg/m<sup>2</sup> should indicate being overweight and a BMI of 27.5 kg/m<sup>2</sup> or higher should indicate obesity in Asian populations. Adjusting these criteria will in the end classify a higher percentage of East and South Asian adolescents as overweight or obese, which may put them in a worse position than European adolescents. However, regardless of these figures and which ethnic group is doing better or worse, knowing that obesity does occur in Asian

populations as well – both in their home countries and in the migrated countries – it calls for Action.

Another area that was investigated in this study was bioimpedance measurements. The results showed that means for fat free mass (FFM) were estimated to be lower in East and South Asian groups than Europeans, hence putting the European adolescents in a healthier position. Means for fat mass however, showed that there was no difference between South Asian (17.9 kg) and European (20.6 kg;  $p=0.06$ ) adolescents but there was a difference between East Asian (16.5 kg) and European (20.6 kg;  $p=0.004$ ) adolescents (Table 4.2.1). Once again, the mean fat mass is not adjusted for ethnicity but taking into account the weight of the participants, the fat percentage was 30% for East Asians, 31% for South Asians, and 32% for Europeans, which does not show a difference between the three ethnic groups. Considering that Asian adolescents (especially East Asians) had lower BMI values (i.e. lower weight and height), the lower mean fat mass shown here does not put East Asian adolescents in a healthier position, and it does not show the real picture (Duncan et al., 2004; Ko et al., 2001; Rush et al., 2004). More studies and internationally accepted criteria are needed to show the real scope of the issue of overweight and obesity in Asian adolescents. This has proven to be a challenging task as Asian adolescents represent many different ethnic backgrounds and it may not be appropriate to put everyone under the same criteria of 'Asian' again.

There is agreement by experts that overweight and obesity is a complex and growing problem that affects all ethnicities (World Health Organization, 2000a), however when discussing overweight and obesity of Asian adolescents, the first years of their lives and the role of in utero life as a major cause of being overweight or obese also needs to be considered (Rey & Bresson, 1997; The World Bank Group, 2002). It is possible that some of the Asian mothers were pregnant in impoverished situations. According to the Barker hypothesis, subsequently described by the term 'Foetal Origins of Adult Disease (FOAD)' and more recently by 'Developmental Origins of Health and Disease (DOHaD)', is thought to occur if the pregnant mother is undernourished and the foetus

takes information from its mother to set its biology for an undernourished world (Tenhola et al., 2000). When born, the baby is not programmed for the kind of nutritional environment that is found in New Zealand, for example the child is not set to cope with the kind of diets such as fast foods. This area is beyond the scope of this study, but when studying the overweight and obesity status of young children, it is important also to consider their maternal and childhood nutrition.

Obesity is a multifactorial issue; genetics, culture, change of environment, and many other factors have an impact on the weight status of young people. This study has just started looking at some of the possible determinants of obesity in Asian adolescents, and hopes to stimulate further studies on influences on childhood overweight/obesity within this population.

### **6.1.2 Food Patterns**

This section explored nutritional habits of young Asians and Europeans.

In regards to breakfast and school foods, the findings (Table 4.3.1) showed that majority of the Asian and European adolescents ate breakfast, but there was a significant difference between the ethnic groups in that South Asians (81%) were more likely to have breakfast on most days during the week compared to Europeans (77%) and East Asians (60%). Moreover, there was a significant difference in the source of their breakfast. Of those who reported eating breakfast, 13% of East Asians got their breakfast from school canteen or a shop outside the school, compared to only 4% of European and 3% of South Asian adolescents. This was consistent with the source of morning tea and lunch where 44% and 53% of East Asians got their morning tea and lunch respectively from school canteen, a shop outside the school, or their friends, compared to 22% and 33% of South Asian, and 23% and 31% of European adolescents. This puts East Asian adolescents at more risk of getting their food from unhealthy sources while at the school.

In the focus groups (Section 5.3.2), the food that was mentioned to be consumed most at the school was chips, followed by sandwiches, biscuits, pies,



and chocolates. Most participants talked about having soft drinks during school hours, with a higher number in East and South Asian focus groups. In addition, over half of the participants in the focus groups mentioned purchasing food from school canteen and made a clear point that they have healthy food when they bring foods from home but purchase unhealthy foods from the school canteen.

The only other study in relation to breakfast among Asian youth is by Rasanathan, Ameratunga et al. (2006) who indicated that many Asian students did not eat breakfast, with New Zealand born Asians or those who had lived in New Zealand for more than five years being more likely to miss breakfast.

In terms of after school meals (Table 4.3.2), a higher percentage of East Asians (43%) and South Asians (49%) reported purchasing snack foods or drinks from shops or dairies on their way home, compared to European adolescents (38%).

In regards to other snack foods, a higher percentage of South Asians (39%) ate biscuits, potato chips or snacks such as instant noodles on most days after school, compared to East Asians and Europeans (32%). There was no significant difference in relation to other foods but nevertheless 16% of East Asians, 11% of Europeans, and 10% of South Asians consumed pies, takeaways or fried foods such as French fries on most days after school. Also 29% of South Asian, 23% of European, and 20% of East Asians ate chocolates, lollies, sweets or ice cream on most days after school.

Previous studies support the findings of this thesis in relation to the consumption of fast foods. Unger et al. (2004) found a significant effect from acculturation and a higher frequency of fast food consumption in the second year after immigration in Asian-Americans. Wahlqvist (2002) stated that Asians in Australia have adapted the western lifestyle with an increase in the consumption of energy dense foods such as increased fat and sugary drinks. Rasanathan, Ameratunga et al. (2006) indicated that New Zealand Asian students reported having more takeaways in the weekends with 32.5% reporting having had takeaways twice or more during the previous school week.

There was a significant difference among the three ethnicities in the consumption of fruits and vegetables (Table 4.3.3). For the recommended two

to three serves of fruits each day, East Asians had the highest percentage of fruit consumption (51%) followed by Europeans (44%) and South Asians (33%). For the recommended two to three serves of vegetables each day, Europeans had the highest percentage of vegetable consumption (58%) followed by East Asians (50%) and South Asians (41%). In general, most of the South Asian adolescents did not meet the recommended daily intake of fruits and vegetables.

A study by Reynolds et al. (1999) also showed that Asian-Americans mainly of Southeast Asian heritage consumed less vegetable than other ethnic groups. The 2006/07 New Zealand Health Survey showed that Asian women were less likely to meet the daily requirement of two or more servings of fruits a day compared to women in the total population; and Asian men and women were less likely to meet the daily requirement of three or more servings of vegetables a day compared to European and Maori men and women (Ministry of Health, 2008).

Although there was no significant difference between ethnic groups in frequency of the consumption of non-diet soft drinks (Table 4.3.3), the results showed that a very high percentage of South Asians (87%), East Asians (86%), and Europeans (80%) drank soft drinks on at least one day or more in the last five school days. However, there was a significant difference in frequency of consumption of fruit drinks and cordials where a high percentage of East Asians and Europeans (83%), followed by South Asians (76%), consumed fruit drinks or cordials on at least one day or more. Altogether, the results show that the consumption of sugary drinks is high in young people. There did not appear to be any other studies comparing the consumption of soft drinks in young Asians and Europeans.

In the focus groups (Section 5.3.3) more East Asian adolescents mentioned consuming fast foods or rice after school; and more South Asian adolescents mentioned consuming chips, chocolates, or heavy traditional foods; while European adolescents mentioned consuming more sandwiches or fruits. For dinner, more East Asians mentioned having rice, noodle soup, fried foods and fast foods; more South Asians mentioned having curries and fast foods; while

Europeans mentioned having more meat, potato, and vegetables. After dinner, more East Asians mentioned having chips; more South Asians mentioned having chocolate; and more European adolescents mentioned having fruits.

When asked about their favourite foods (Section 5.3.1), European adolescents mentioned fruits and vegetables more than the Asian groups. South Asian focus groups mentioned different meats as their favourite foods<sup>28</sup> more than East Asian and European groups; and East Asian focus groups mentioned starchy foods as their favourite foods more than South Asian groups. Both East and South Asian adolescents in the focus groups mentioned consuming sugary drinks more than Europeans.

In relation to traditional diet (Section 5.3.4), both Asian focus groups believed that their traditional diet has been influenced by the New Zealand diet. With access to more food and more variety of food, they believe that they consume more fast food and junk food in New Zealand in addition to bigger portions of any food they consume. East Asian focus groups mentioned consuming less bread in their traditional diet, and South Asian focus groups mentioned having more vegetables in their traditional diet.

It is evident that the daily diet of most Asian families in New Zealand differs from their home countries. Even though they may still consume their traditional foods, young people seem to enjoy the variety of foods available here and parents find it convenient and provide it for them.

Overall, the results show that East and South Asian adolescents consume more takeaways, chips, biscuits, sweets, and sugary drinks compared to European adolescents. South Asians consume less fruits and vegetables. And the source of breakfast, morning tea and lunch is less healthy in East Asian adolescents. All these factors are indicators of problematic nutritional behaviour in young East and South Asians living in New Zealand, which can lead to further weight problems in their adult years.

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<sup>28</sup> This is an interesting point, considering that South Asian adolescents also mentioned that they come from a vegetarian background.

### 6.1.3 Activity Patterns

This section explored the level and patterns of activities carried out by young Asians and Europeans.

The findings (Table 4.4.1) showed that a higher percentage of South Asian adolescents (31%) did not walk or bike to or from school in the last five school days, compared to East Asian (26%) and European (23%) adolescents. In addition, although it took European adolescents longer to walk or bike to school, they were more likely to do so than Asian adolescents. In contrast, South Asian adolescents showed to be most physically active at school. While 25% and 30% of South Asian adolescents mostly played active games during morning interval and lunch time respectively; 41% and 30% of East Asians, and 30% and 27% of Europeans mostly just sat down during morning interval and lunch time. Similarly, 31% of South Asian adolescents were active on four to five days, while 28% of European adolescents, and 16% of East Asian adolescents were active on four to five days a week.

Previous studies support the finding of this thesis. In the United states, Unger et al. (2004) found that there was a significant effect from acculturation, with a lower frequency of physical activity in the second year after immigration; Kandula and Lauderdale (2005) showed that Asian-Americans were much less likely to meet the recommended levels of physical activity but the level of physical activity in Asian-Americans increased with an increase in the years they had lived in the US. In the United Kingdom, Khunti et al. (2007) stated that European children were more likely to have walked to and from school compared to South Asians and showed low level of active behaviours during school breaks, especially in Asian girls. In New Zealand, Rasanathan, Ameratunga et al. (2006) indicated that only 35.5% of female and 56.9% of male Asian participants in the youth health survey reported being physically active on at least three occasions per week. The problem with most of these studies is that all Asian groups are combined into a single population, whereas this thesis has divided them into East and South Asian groups, as they come from very different backgrounds.

In terms of television (TV) (Table 4.4.2), South Asian adolescents were more likely to not have a TV at home (6%), or to have a TV in their bedrooms (37%), compared to European (58%) and East Asian (52%) adolescents. The findings showed a significant difference in terms of rules and restrictions on the amount of TV young people in each ethnic group were allowed to watch during the school week. While the majority of the European adolescents (63%) reported no limits on the amount of TV they watched, 52% of East Asians and 30% of South Asians reported having no limits.

There was no significant difference in the frequency of watching TV, video, or DVD during the week and the majority of young people in each group (48% of East Asians, 47% of South Asians, and 40% of Europeans) watched TV on each day during the week. However, there was a significant difference in the hours they spent viewing TV, with 44% of Europeans watching less than one hour on the last school day, compared to 35% of South Asians, and 26% of East Asians. East Asian and South Asian adolescents were also more likely to spend four hours or more watching TV on the weekends (~30%) than European adolescents (~20%). In general, East Asians were more likely to watch TV, videos or DVDs during the week, and for longer, followed by South Asians and then Europeans.

Other studies such as Khunti et al. (2007), showed that in the United Kingdom almost half of all children spent four or more hours watching television or playing computer games every day but South Asian students spent more time. Rasanathan, Ameratunga et al. (2006) indicated that New Zealand born Asians or those who had lived in New Zealand for more than five years, were more likely to watch television more than five hours a day than students who had been in New Zealand for less than five years.

In terms of the presence of video/electronic games or a computer in homes (Table 4.4.3), European (98%) and East Asian (97%) adolescents were more likely to have games or a computer than South Asian adolescents (91%), with 34% of South Asians not playing any of these games compared to 28% of Europeans and 26% of East Asians. East Asians (21%) also had the highest percentage of young people playing games on more days and for longer (three

hours or more), followed by European (17%), and South Asian (12%) adolescents. In general, East Asian adolescents were more likely to play video/electrical games or use a computer than European adolescents and South Asians adolescents are less likely to do so.

In the focus groups (Section 5.4.1), the single leisure activity mentioned most by young people was watching TV. Other leisure activities mentioned included playing computer and video games, sports, listening to music, socialising, arts and reading.

The major form of exercise mentioned by most of the participants in the focus groups (Section 5.4.2) was walking to/from school, and the main sports activities mentioned were soccer and rugby. Male focus groups reported being active on more days (3-4 days) during the week compared to female focus groups (1-2 days). In general, South Asian and European adolescents in the focus groups mentioned being physically active or involved in sports activities a lot more than East Asian adolescents. East Asian adolescents however, mentioned reading and being busy doing homework more than South Asian and European focus groups.

The participants in the focus groups (Section 5.4.3) also talked about lack of opportunities for young people to be physically active at the school, as well as cultural barriers for young female Asians to be active or to participate in sports. Cultural considerations that would influence young people's involvement in sports and recreation include strict family rules and sports outfits.

Overall, the results suggest that East Asian adolescents are less physically active during the day and spend more time watching TV and playing video or computer games, compared to South Asian and European adolescents, making East Asians a group at risk of obesity and it's related problems such as cardiovascular diseases.

#### **6.1.4 Influencing Factors**

This section explored the settings created for young Asians and Europeans by family, school, and neighbourhood that influence their food choice or physical activity.

In regards to family environment (Table 4.5.1), the findings showed a significant difference between the ethnic groups with South Asian adolescents reporting receiving more encouragement from their parents to be physically active and to eat healthy foods, followed by European and East Asian adolescents. It also appeared that mothers in all ethnic groups encouraged their children to be physically active and eat healthy foods more than the fathers.

The availability of different types of food at home did not differ between the ethnic groups in terms of fruit availability, with majority of young people reporting fruits being available for them to eat almost everyday or on most days. However, there was a significant difference in terms of availability of some snack foods and sugary drinks. Potato chips or similar snacks, chocolates, sweets, and soft drinks were more available in South Asian households, followed by East Asians, and then Europeans.

In terms of school environment (Table 4.5.2), 60% of South Asian adolescents reported that the school encouraged all students to play organised sports a lot, compared to 35% of East Asian and 34% of European adolescents. Overall, more South Asian adolescents reported that school encouraged them to be physically active than East Asian and European adolescents. Moreover, a high percentage of South Asians rated the teachers at their school as excellent role models for being physically active (64%) and for healthy eating (58%), compared to East Asians (47% and 44% respectively) and Europeans (46% and 48%) who rated their teachers as “OK” role models.

In relation to neighbourhood environment (Table 4.5.3), there was no significant difference between the ethnic groups in relation to how safe young people feel about being out in their neighbourhood. The majority in each group indicated feeling safe to be out alone at night, that dogs, traffic, or people did not bother them when they are walking in their neighbourhood. However, over half of

young Asians and Europeans felt that their parents think it is unsafe or very unsafe for them to be out alone in their neighbourhood at night.

Young people in the focus groups (Section 5.5.2) mentioned that their parents have a major role in influencing and deciding what they eat, with South Asians mentioning having very little influence on their food choice and their parents having more control over what they eat, followed by East Asians compared to Europeans whose parents would consult with them about their daily diet, what to shop and what to cook. European adolescents were also more involved in preparing meals at home or help cooking, compared to East and South Asian adolescents.

Other factors influencing young people's food choice as mentioned by adolescents in the focus groups (Section 5.5.1) included taste and look of the food, availability and convenience, money, friends, teachers, and the school. Cultural factors influencing young people's food choice included consumption of meat (especially for South Asians who are or used to be vegetarians), and having traditional foods at school and being made fun of.

Half of the young people in the female focus groups (Section 5.5.3) mentioned their eating habits were affected by their mood and that they would eat particular foods when they were happy or sad. Most of East and South Asian adolescents mentioned losing their appetite when they were sad or agitated, while European adolescents mentioned eating more chocolate and junk foods.

For special occasions, most of the participants mentioned eating more food and more of the unhealthy food. East Asian adolescents in the focus groups mentioned going to restaurants and eating more unhealthy foods for special occasions more than the other groups.

Overall, the results suggest that Asian adolescents have more access to junk foods such as chips, chocolates and sweets, and soft drinks at home compared to young Europeans. Family has a strong say in what they eat, and East and South Asian adolescents are also affected by cultural considerations. No other literature was found to investigate the topics raised above. However, there are a few studies that have looked at the length of residency in the Western countries



and its affects on acculturation and weight gain (Ahn et al., 2008; Cho & Juon, 2006; Kandula & Lauderdale, 2005; Lauderdale & and Rathouz, 2000; Popkin & Udry, 1998; Schaefer et al., 2009; Unger et al., 2004).

### **6.1.5 Knowledge**

This section explored the knowledge of Asian and European adolescents about nutrition and physical activity.

A number of statements associated with obesity risk factors were given to the students and they were asked to report whether they agree or disagree with the statement. All statements were incorrect and the correct response was to disagree with it. The statements included 'skipping breakfast or lunch is a good way to lose weight', 'fruit drinks and cordials have less sugar than non-diet soft drinks', 'watching a lot of TV does not lead to weight gain', and 'eating a lot of fruit and vegetables is bad for their weight'. There was a significant difference in the knowledge of Asian and European adolescents in regards to obesity risk factors. The results showed that a much higher percentage of East and South Asian adolescents agreed with the wrong statement suggesting that Asian adolescents have a significantly less knowledge of obesity risk factors than European adolescents (Table 4.6). It needs to be noted that most of the Asian students had good knowledge of the English language and if they needed help, they were either accompanied by an English language support teacher or assisted by one of the interviewing staff members.

Likewise in the focus groups (Sections 5.6.1 & 5.6.2), young people were asked to rate their knowledge of healthy food and what to eat. Participants mentioned that young people's knowledge in this regard is poor to average, with more of the South Asian focus groups talking about their lack of nutritional knowledge. Younger adolescents (13-15 years) in all groups indicated knowing more about healthy eating, which was evident by the examples they provided. The participants also talked about the available information to do with nutrition, confusing and misleading at times. When asked about the source of their knowledge, the participants mentioned their families, television, school, friends,

internet, pamphlets, magazines and books. More students of East Asian focus groups mentioned books as their source of knowledge.

The focus groups (Sections 5.6.3 & 5.6.4) were also asked about their knowledge of heart health and its contributing factors, which was rated very basic or in many cases incorrect. The participants were asked to give examples of any information they had, which confirmed their own statement of young people having incorrect knowledge of what contributes to having a healthy heart, with more number of South Asian focus groups being confused about health messages in this regard.

Overall, these results suggest that South and East Asian adolescents' knowledge of healthy food, what to eat, and obesity risk factors is poor in general and in comparison to European adolescents, which generates a big concern. There is no other previous research looking at the knowledge of obesity risk factors in Asian adolescents. In an analysis of the OPIC study Faeamani (2007) reported that Asian groups scored the highest in school functions among all ethnic groups in New Zealand, however this has not translated into their health literacy.

### **6.1.6 Opinions about Body Weight & Shape**

This section explored feelings of Asian and European adolescents about their current body weight and shape (i.e. body image).

There was a significant difference of opinion between the three ethnic groups in regard to how they described their weight. 27% of South and East Asian adolescents described their weight as “underweight” compared to 18% of European adolescents, which is not consistent with the actual values – 18% of South Asian, 11% of East Asian, and 4% of European adolescents – shown in this research (Table 4.7). This is an area of concern because if young people feel that they are underweight when they are not actually underweight, it can lead to unnecessary weight gain.

There was no significant difference between the ethnic groups in terms of actions being taken about their current weight. Having said that, 13% of East

Asian adolescents reported trying to gain weight compared to 9% of South Asian and 6% of European adolescents. Also, the highest percentage in each ethnic group (53% of South Asians, 51% of Europeans, and 42% of East Asians) reported trying to gain muscle size, followed by about one third in each group not doing anything about their muscles, and the remainders trying to stay at the same muscle size. Overall, South Asian adolescents seem more concerned about their muscle size followed by European and East Asian adolescents.

Simeon et al. (2003) have examined the perception of body size among Trinidadian adolescent and suggested that South Asian males were more likely to overestimate their body size than the other adolescents; also thin South Asians were more likely to be satisfied with their size than other thin adolescents. Although the majority of the sample associated the normal body size with good health, but the majority also associated being overweight and obese with wealth. In addition, 40% associated overweight and obesity in males with happiness, which were all causes of concern.

### **6.1.7 Recommendations for Prevention Programmes**

This section (5.7) explored the opinion of young people about good ways to get young people to eat healthy and become physically more active (e.g. intervention programmes), and how to engage the individuals and the community in these programmes.

The first way to get young people to eat healthy and become physically more active suggested by the young people in the focus groups was through school by monitoring the availability and the price of healthy food at school canteen, offering nutritional workshops and seminars, and providing more sports opportunities. The second way suggested was through government by creating a healthy environment that making healthy choices is available, accessible, and affordable. The third suggested way was through media by eliminating harmful messages and instead promoting educational and motivational programmes. The fourth way suggested was through community by organising fun and

enjoyable educational and sports activities to promote everyone's health and wellbeing.

The focus groups suggested that individuals can be engaged in intervention programs when schools, teachers, family and friends are all involved. To engage young people in health promoting interventions, the programme needs to be interesting and enjoyable, positive and encouraging, accessible and affordable, and based on the needs of young people. The message delivered by these programmes needs to be reliable, clear and simple, informative, positive, and encouraging. They also mentioned that media and role models could encourage young people to get engaged in health promoting activities, as well as a sense of ownership of the programmes by young people.

East Asian adolescents in the focus groups talked about the need for opportunities to be physically active (e.g. sports activities) more than other groups. They also talked more about the need for their families to be involved in intervention programmes if they are to change their habits and lifestyle.

Both East and South Asian adolescents in the focus groups mentioned that the cultural background and the feeling of belonging play a major role in young people's engagement in intervention programmes.

What is evident from the findings of this research, is that most young people are aware of their problems and areas that they need to improve (for example their knowledge of what to eat, or to be physically more active). What they are recommending that needs to be done to make a difference in their health and wellbeing is consistent with the findings of this study, but they need support, resources and opportunities to put them into action.

## **6.2. Summary in terms of Common Themes**

The three common themes outlined at the end of the results chapters sum up the main findings of this thesis.

### **6.2.1 Overweight/Obesity in Asian adolescents**

The first common theme was to do with the anthropometric measurements, showing that Asian adolescents experience the same rate of overweight and obesity as European adolescents when using same criteria to define weight status. Adjusting the criteria for ethnicity could potentially put young Asians in a worse position in terms of obesity related issues.

### **6.2.2 Risk Factors**

The second common theme was about unhealthy nutritional and exercise behaviours in young Asians including not eating breakfast, unhealthy sources of breakfast, morning tea or lunch (e.g. from school canteen), high consumption of takeaways and junk foods such as fried foods, pies, noodles, chips, biscuits, chocolates, sweets, ice creams, and soft drinks during or after school, availability of junk foods and soft drinks at home, and the influence of the New Zealand dietary environment (e.g. accessibility and variety of food). In addition, there was a lack of physical activity or opportunities to be active (e.g. at school or in the community), cultural barriers to being physically active, long hours of watching TV or playing video and computer games, lack of school support for young people to be active and to eat healthy, lack of parental involvement, peer pressure, lack of knowledge of obesity risk factors, and lack of or misleading knowledge of healthy food and what to eat.

### **6.2.3 Protective Factors**

The third common theme was concerned with protective factors regarding young Asians' nutritional and exercise patterns that help them maintain a healthy weight including having a breakfast, healthy source of breakfast or morning tea (e.g. from home), consumption of fruits and vegetables, and having a balanced dinner including traditional diets. In addition, they included being physically active at and after school, walking to or from school, involvement in organised or team sports (e.g. soccer), limiting TV viewing hours, parents and friends encouraging young people to be physically active and to eat healthy,

schools and teachers supporting young people to be active and to eat healthy, and accurate knowledge of obesity risk factors.

#### **6.2.4 Recommendations for Prevention Programmes**

The fourth common theme was to do with the recommendation made by young people themselves as to what can help them to maintain a healthy lifestyle. The role of the school, government, media, family and community was talked about by providing a health promoting, encouraging and educational environment for young people to have the opportunity to maintain a healthy weight by eating healthy and being active.

### **6.3. A Health Promotion Approach**

Health promotion is both a philosophy and a set of approaches for improving people's health including the prevention of obesity (Tse, Laverack, Foroughian, & Jackson, 2006). As a philosophy, it signifies an empowering approach to health where people have control over the influences on their lives and health. In practice, health promotion is usually implemented as activities set within the context of an intervention (e.g. a project or a programme) (Tse et al., 2006).

In this section of the chapter, an attempt is made to look more closely at the fourth objective of this research, which was to suggest a community development or health promotion approach based on the concept of empowerment targeted at young New Zealand Asians to improve their health in relation to weight related issues (i.e. obesity risk factors).

An attempt is made to suggest a framework and approach to provide health promotion action, with the aim of maintaining healthy weight and healthy lifestyle in young Asians in New Zealand. First, the overall framework is discussed, and then a brief attempt is made to outline a model and approach for young New Zealand Asians. It needs to be noted that this approach is not an ethnic analysis of community engagement but rather a general guideline based on available literature and the findings of this study.

### **6.3.1 General Framework**

In the Ottawa charter (1986), health promotion is defined as “the process of enabling people to increase control over, and to improve, their health”. Therefore, a fundamental aspect of health promotion is that it aims to empower people to have more control over aspects of their lives which affect their health.

Green and Raeburn (1988) state that empowerment is defined in practical terms as involving control over life affairs, at the community, group and personal level. This control is established by a process of strength-building and is accomplished through people having access to the knowledge, skills, material and political resources. Professionals will always be required to assist with health promotion initiatives; however the community – the Asian community in this case – can deal effectively with their own health promotion needs and activities if they have information and skills, financial, professional and organisational support and resources.

According to Raeburn and Rootman (1998), in health promotion, one is not dealing with people in a clinic or laboratory, but in real life, in the community, thus the community, rather than the individual, should be the centre of health promotion activities. Any health promotion programme dealing with Asian adolescents should consider having the community as its core focus (e.g. young Asians and their families) in order to be successful.

An empowering community approach to health promotion requires full participation by community members in all aspects of intervention design, implementation, evaluation, and maintenance. Previous health promotion interventions in this regard have not been as effective, as they often did not include the participants in all aspects of intervention and hence the programmes have not been customized to the concerns and cultures of the participants (Chavez et al., 2004).

In addition to ‘strengthening community action’, which is the main focus of the health promotion approach in this study, according to the Ottawa Charter (1986), there are four other streams that a health promotion approach needs to take into account. These are building healthy public policy, creating supportive

environments, developing personal skills, and reorienting health services. So while the focus is on the community, the influence and role of these other areas need to also be considered.

In general, there are two types of health promotion approaches: the bottom-up approach (set by people themselves to identify issues they perceive as relevant), and the top-down approach (set by health promoters who have the power and resources to make decisions). In the case of promoting healthier lifestyle among young Asians, a combination of both approaches appears to be required.

Based on the findings of this study, literature review, previous experience and consultation with the Asian community and cultural advisors, the Asian community is aware of the issue of obesity in young people and is ready to be involved in intervention programmes. The PEOPLE System suggested by Raeburn and Rootman (1998) seems to be an appropriate model to empower young Asians to live a healthier lifestyle in New Zealand. The PEOPLE System (Raeburn & Rootman, 1998), that is, the “Planning and Evaluation of People-Led Endeavours” system, is a simple systems-oriented organizational framework designed to help community people plan, run and evaluate their own community projects. The philosophy behind the PEOPLE system is People-centeredness, Empowerment, Organisational and community development, Participation, Life quality and Evaluation. What makes the PEOPLE System work is the role of the “needs/wishes assessment” to find out what people really want for themselves, and what triggers motivation – this is the single most important element to understand when changing something as difficult as lifestyle. In this way the approach is also certain to be culturally appropriate and effective for the Asian community, in addition to acknowledging Asian health beliefs.

**TABLE 6.1. THE PEOPLE SYSTEM**

1	2	3	4	5	6	7
OBJECTIVES & VALUES STATEMENT	NEEDS/ WISHES ASSESSMENT	GOAL SETTING	ORGANISATIONAL & RESOURCE ARRANGEMENTS	ACTION	REVIEWS	PERIODIC OUTCOME ASSESSMENT



When working with the Asian community, the diversity of the 'Asian' adolescents should be recognised and take into account the differences in ethnicity, religion, language proficiency, settlement history, socio-economic status, and acculturation (Rasanathan, Ameratunga et al., 2006). Also when recommending health promotion approaches, one need to recognise the identity of 'young Asians' as 'New Zealanders', as well as considering the role of traditional family cultures and practices, and find ways to support these practices to preserve the protective effects of their culture (Foroughian, 2005; Rasanathan, Ameratunga et al., 2006).

### **6.3.2 Developing a Health Promotion Approach for Young Asians in New Zealand**

Obesity is a serious multifactorial condition with short-term and long-term physical and psychological consequences in childhood and adulthood. However the majority of the risk factors that may result in a person being overweight or obese are modifiable and with a multidisciplinary approach can be prevented or managed.

What follows will describe a health promotion model that involves the family and the community of young Asians based on the concept of empowerment and community development. It will offer two types of interventions suggested by young Asians including educational and physical activity interventions. At the end it will present other avenues (e.g. role of the government) that also need to be considered in empowering and improving the health of young New Zealand Asians to maintain a healthy lifestyle.

The recommendations made by young people in the focus groups on what they saw was needed to initiate an effective behaviour and environment change programme, will be taken as a hypothetical "needs/wishes assessment" as a basis for suggesting a health promoting project.

The findings of this study suggest that the Asian community (especially young people) recognize the emerging pandemic of overweight and obesity in young

people, and can be considered ready to take part in health promotion initiatives that are promoting a healthier lifestyle.

The approach suggested by this study to promote a healthier lifestyle in young New Zealand Asians in order to address the problem of obesity is a family and community centred programme. In this approach the families and communities are involved in identifying their needs, recognising risk factors, planning, implementation, evaluation, and the maintenance of the programme.

The programme needs to be culturally specific and appropriate to address the needs of the Asian community in New Zealand. It needs to consider the needs of the parents such as language, traditions and values. It also needs to consider the needs of the young people, whom regardless of the years they have lived in New Zealand, are trying to fit in with the wider community of young people.

Another issue when working with Asian communities is the diversity of the communities and how scattered they are across the country. This community consists of individuals from many different backgrounds, cultures, traditions, and educations who live in different geographical areas and have been living in New Zealand with various durations. Regardless of these differences, most of the Asian community in New Zealand belong to one or more Asian organisations and can therefore be approached through these organisations in their public or networking meetings (Tse et al., 2006). Another strategy to approach the Asian community is through young people in neighbourhood schools. Other ways of approaching the community include ethnic newspapers, TV channels and radio stations (e.g. Indian or Chinese channels), temples (mainly for East Asians), mosques (mainly for South Asians), or churches.

It needs to be emphasized that for these programmes to be successful in promoting healthier lifestyles and changing bad habits, the whole family needs to be involved and targeting either one of the parents or the young people is not enough. This does not mean that both groups (parents and children) have to be targeted through the exact same approach, but rather simultaneously.

To begin the process a model like the PEOPLE System could work very well with the Asian community. Once the community is approached an initial meeting

can be set up to consult the objectives, values, needs and wishes of the community in regards to the topic of a healthy lifestyle to prevent obesity. Identified and well respected community members or community leaders could be trained to facilitate this session to tend to the language and cultural needs of the community, as well as giving the community the ownership of the programme. It is believed that the best results would be achieved with parents and young people initially meeting in separate groups.

After the initial meetings, the interested members of the community can get together and set their goals (e.g. physical activity intervention such as a community space for young people to participate in sports after school), followed by planning the details and organising resources that they may need (e.g. material and financial resources such as sports equipments and a trained coach). They will then put their plan into action and evaluate its effectiveness along the way.

A programme like this will need many resources including the help of an expert to guide them through the process and to help the community to arrange the necessary resources for the implementation of the programme. This programme will take a considerable amount of time to be organised and to show its results but it is not appropriate for an expert to walk into a community and advise them on what they should be doing. In a situation like that, fewer members of the community will be engaged in the programme as the objectives of the programme may or may not address the needs and concerns of the community. In addition once the expert is out of the picture the community is not able to sustain the programme. Therefore, it is crucial for the community to be involved in all aspects of the programme, regardless of the time and effort it will require.

In this study, young people were asked to describe the kind of programmes that would make a difference in their lives in promoting healthier lifestyles to maintain a healthy weight. Among the many programmes suggested was a great emphasis on educational and physical activity interventions.

The quantitative findings of this study suggested that Asian adolescents have little knowledge of obesity risk factors. This was also supported by the

qualitative findings where young people recognised that their knowledge of healthy foods and what to eat is poor and that they are faced with confusing messages. Although education is not the only way to promote health, it is an important component of it and the community of interest (young Asians) believe that this is what they need. There are numerous ways that this can be done but it is important to provide these educational opportunities for both young people and their families to promote dietary changes and healthy food choices by providing information as well as practical advice. This can be achieved through schools and communities. Younger students attend compulsory health classes and they find it useful but as they get older they can choose the subjects they do each year and most of the Asian students do not select hospitality or physical education where they can receive nutritional information so they welcome seminars or workshops organised by the school that would give them practical nutritional information. However, Asian students emphasised that without their families involved in this process there would be very little change in their diet at home. Most schools offer weekly evening classes for adults in the community on various topics and nutrition could be one of them where families could be assisted in making healthier food choices. These classes could teach parents and young people how to cook any kind of food (traditional or western) with healthy substitutes and techniques. It could take people to a supermarket and teach them how to shop healthy on a low budget, how to read nutrition information on food labels and determine for example the fat and sugar content of food. It can encourage families to have vegetable gardens in their homes. The classes could also teach people about appropriate portion sizes, good and bad fats and any other simple yet valuable information that would help them make better choices.

The point that is really important to be mentioned here, and it was emphasised by young people as well, is that they need nutritional education but they are looking for reliable, clear, simple and practical information. They also want information that is positive, encouraging and motivational. In other words, young people do not like programmes with an emphasis on weight loss but rather on having a healthy lifestyle and adding to the quality of life. What is needed here is development of a curriculum that addresses all these needs to be used

across the county in different communities. Members of the Asian communities should be involved in the production of this curriculum to make sure the content is what they need, practical and culturally appropriate.

Although the emphasis here is on the food, obesity is influenced by many other factors so it would be useful to include non-nutrition information that indirectly affects weight status in these classes and workshops. Topics such as stress management (relationship between food and mood), time management (how to avoid the use of fast foods and enjoy home meals), parenting skills (how to involve children in all aspects of life including shopping and cooking), and budgeting.

In relation to physical activity interventions, young people mentioned that there are not many opportunities for them to be physically active during school hours or in the community after school and on the weekends. In addition to this some girls are faced with cultural constraints that prevent them from being involved in team and organised sports. It is evident from the findings of this study that those who were involved in organised sports were the ones getting enough exercise during the week but the opportunity is not present for everyone. Since young people recognise that they need more exercise and they want to be active, the solution is as simple as providing accessible and affordable sports opportunities for young people at school and in the community. This could even include dance classes or active games that involve the whole family. People who are active, are not only physically healthier, but are also happier, so involving the whole family has benefits beyond decreasing the prevalence of obesity and its associated health problems.

In this regard, the community can play a big role by directing its resources towards providing opportunities for young people and their families to be physically active. Role models could also be utilised to get people involved in these activities. Another way of engaging the Asian community in sport activities, as mentioned by young people, is through competitions with small rewards.

As mentioned before, these programmes (educational and physical activity interventions) need to be developmentally appropriate. The aim is not to limit young people's food intake, but rather to encourage healthy eating and exercise habits. In addition, young people need to be motivated to change, and sustain the positive behaviour changes, and they are motivated when the programme is fun, interesting, enjoyable, and it involves friends and good role models. There would need to be behavioural strategies modelled, discussed and rehearsed. There would be a need for regular follow ups, but the sustainability of the results and long term behaviour change will mostly depend on the family and the community. Ongoing community groups can provide the necessary support and keep the members of the community motivated. This could, for example, include community action days or health days, where the community gets together to follow-up and evaluate the existing programmes, or to organize physical and recreational activities for the whole community, but with the main focus on young people.

The community is the main driver and can take care of its own affairs in this model, but no doubt they will need appropriate knowledge, skills, and money to undertake such projects. The community alone cannot resource such a programme, and other organisations and service providers need to assist them by increasing the availability of resources. These may include supporting and encouraging the existing activities, financial support, culturally appropriate support (e.g. providing sports facilities for girls and more access to any type of physical activity for everyone), new policies and legislations, etc. Schools also play a big role in making these experiences easier by teaching healthy lifestyles, teachers becoming role models, and by providing a more supportive environment for young people (e.g. monitoring the school canteen). The community working together with other professionals or organisations need strong communication and collaboration in setting priorities, making decisions, planning strategies and implementing them.

In addition to 'strengthening community action' and 'developing personal skills' with a strong focus on empowerment, which has been discussed as the main focus of the health promotion approach in this study, the Ottawa Charter (1986)

offers three other streams that a health promotion approach needs to take into account:

### *Building Healthy Public Policy*

This includes putting the health of the ever growing Asian community of New Zealand on the agenda of policy makers in all sectors for example Ministry of Health, Ministry of Sports and Recreation, and Ministry of Education; and to include and target Asian community in obesity related policies, guidelines and interventions.

### *Creating Supportive Environments*

The links between people's health and their environment comprise the basis for a socio-ecological approach to health. Health promotion creates living conditions that are conducive to making healthy food choices and being active easy and stimulating. This could include monitoring the price and availability of healthy foods at school canteens and dairies close to schools, monitoring media by eliminating harmful advertisements and increasing reliable educational documentaries, making sports opportunities available and affordable.

### *Reorienting Health Services*

The responsibility for health promotion is shared by individuals, community groups, health professionals, health service institutions and the government and needs to move in a health promotion direction, beyond providing clinical and curative services.

In summary, to empower and improve the health of young people to maintain a healthy lifestyle a 'family and community centred' model with the concept of empowerment at its core is suggested. This model would include educational and physical activity interventions for young people and their families. The programme needs to be enjoyable, encouraging and culturally appropriate. For the programme to be successful, communication and collaboration between community, health professionals and services and government sectors are vital.

## **6.4. Limitations of the Study**

This study like any other study was not free of limitations.

### **6.4.1 Study Design**

#### **6.4.1.1. A cross-sectional survey**

In this study, the OPIC baseline survey has been treated as a cross-sectional study in which the prevalence of a condition (e.g. obesity) was measured at a single point in time; therefore it is not possible to distinguish between causes and effects because of the lack of time involved. Obesity is a process that happens over a period of time and hence the findings of this study must be interpreted as observations. However, the data provide valuable information to develop appropriate interventions to tackle the problem of obesity in young Asians.

#### **6.4.1.2. Sample size**

The first part of this study has utilised the OPIC baseline data to compare East Asian, South Asian and European adolescents. The number of East Asian participants, followed by South Asians in this research was less than European adolescents. However, this was corrected for in the focus groups and the qualitative results supported the quantitative findings of the study.

#### **6.4.1.3. Clustered sampling**

In the OPIC survey, a clustered sampling approach (by school class) has been used. The cluster unit is a group of participants who are selected together because they belong to a common sampling unit (e.g. class). Participants from the same cluster unit however are more likely to have similar behaviours, meaning that random variation between participants is reduced, and less variation reduces the effectiveness of sample size and the power of the study. This is called the design effect and usually statistical software (e.g. SAS) can be used to correct this effect by correcting standard errors. In this study correcting



the design effect proved to be problematic because of the sample size (e.g. low, or zero, number of Asian students in each class within schools). An attempt was made to use a different software (SUDAAN) to control for design effect but at the end it was decided to set the p-value at less than 0.01 (rather than the usual  $p < 0.05$ ) to make sure that the outcomes are statistically significant.

## **6.4.2 Validity of the study**

### **6.4.2.1. External validity**

External validity is the ability to generalise the findings of the study to a wider population, for example to all Asian youth in New Zealand. Because the sample in this study does not represent all members of the Asian community in New Zealand (e.g. those with higher socioeconomic status or those living in different geographical locations in New Zealand) the external validity of the study is under question. However, some literature suggest that the issue of obesity is worse for those with higher socioeconomic status (Ji & Cheng, 2008; Kaur et al., 2008; Taylor et al., 2005; Wang et al., 2009). Moreover, Asian – East or South – is not a homogenous group and includes people of many different cultures and backgrounds. But at least the results from this study give some indication of the bigger picture in New Zealand.

### **6.4.2.2. Internal validity**

Internal validity is the accuracy of a study's findings in relation to the study subject (e.g. absence of bias).

#### **Selection bias**

Selection bias is possible in this study due to errors in choosing the individuals to take part in the surveys or focus groups. The overall response rate of the baseline survey (over 65%) minimises the selection bias, however there is a lower proportion of Asian participants in the first part of the study compared to Europeans. For the second part of the study, young people volunteered to participate in the focus groups as long as they fit the criteria.

### **Random measurement error**

Random measurement error is when the error is equal between comparison groups, as a result reducing the differences between comparison groups. Random measurement error is practically unavoidable but an attempt has been made to minimise this error for example by using a digital scale to measure the weight (i.e. instruments with good precision). For the qualitative component another random measurement error could be due to imperfect memory to recall and respond to the survey questions.

### **Systematic measurement error**

Systematic measurement error is when the error is different between comparison groups. In this study different research staffs were involved in the anthropometric measurements of height and waist circumference. However, this was tried to be minimised by training all staff to standardise their measurements. Also the staff measured all ethnicities in any given class so generally any error for measurements is likely to have been randomly distributed.

The students were not aware that the responses provided by them would be used to explore differences between ethnic so they are unlikely to have given incorrect answers based on their ethnicity, hence minimising the recall bias. Moreover, because self-completion questionnaires were used for the first part of the study, interviewer bias was also minimised. However, recall bias by students and interviewer bias are likely in the focus groups.

### **6.4.3 Analysis**

To be able to compare the ethnic groups, the participants have been divided into three groups representing East Asian, South Asian and European adolescents. Although this general definition has been adopted in this study due to time and resources, it is generally not a good practice to put people of Asian backgrounds in one group as they represent diverse cultures and lifestyles.

While comparing the BMI, weight status, waist circumference, and percent body fat of adolescents, the same criteria have been used to define obesity in all ethnic groups. The literature suggests that Asian populations need lower cut-off points but to date no agreed values have been suggested by the WHO. Thus the findings of this study may potentially underestimate the scale of the problem.

## **6.5. Relating Findings to Original Objectives of this Research**

To end this chapter, we look at how this research meets the original objectives set at the beginning of the study.

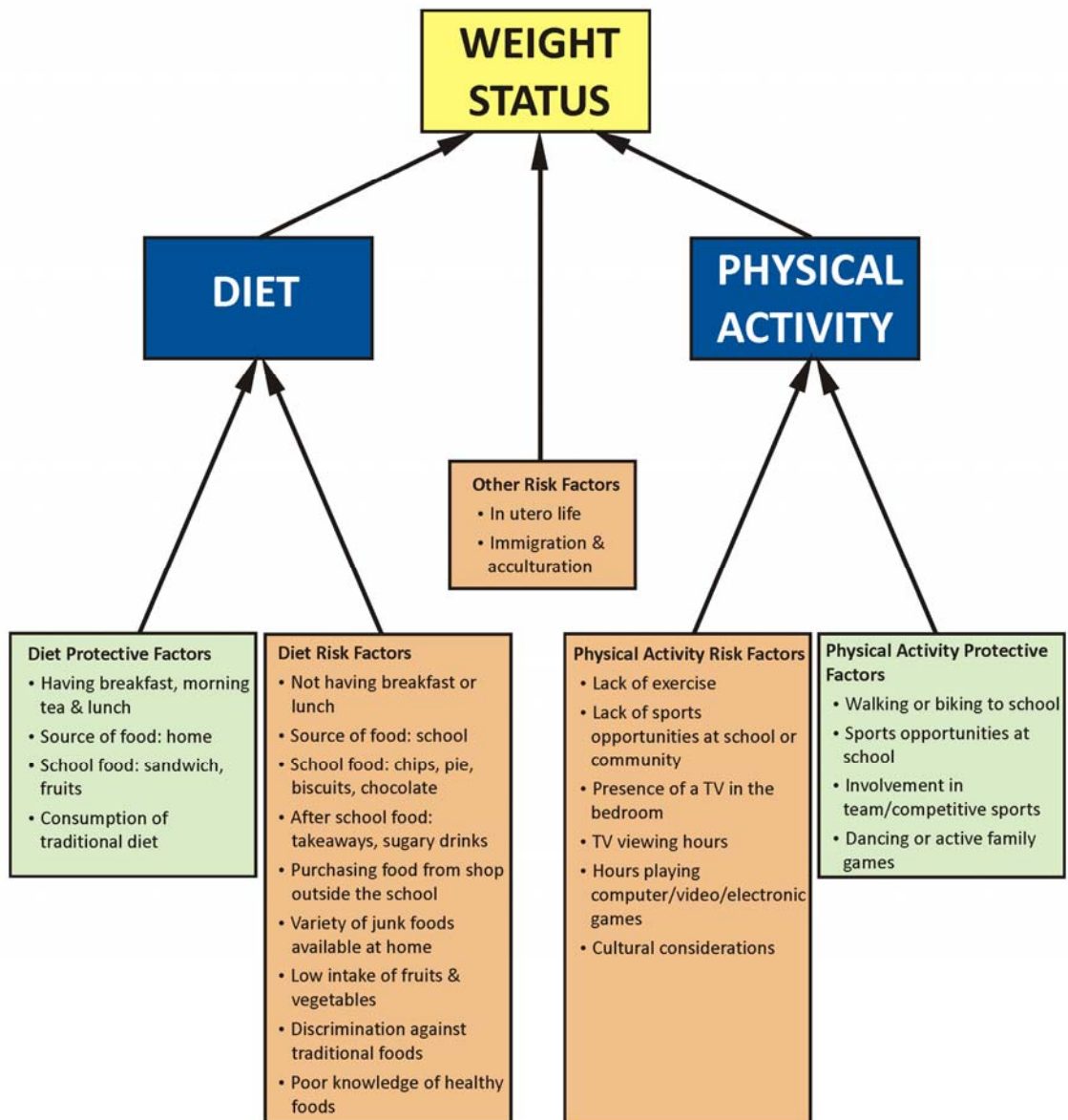
### **6.5.1 Objective One: To determine if overweight/obesity is a problem in New Zealand Asian adolescents**

This was determined through anthropometric measurements together with international literature supporting the findings of this study that overweight and obesity has become a growing problem in Asian adolescents.

### **6.5.2 Objective Two: To identify young New Zealand Asian's nutritional and exercise behaviours and to understand the factors influencing these behaviours**

This was shown by analysing the responses made by young Asians in regards to their food and activity habits, and risk or protective factors that influences their nutritional and exercise behaviours such as family and school environment, opinions and knowledge, access and availability, media, culture, and friends. This gave a picture of the lifestyle of Asian adolescents and it was important to recognise the risk/protective factors before any intervention or health promoting activities (See Figure 6.1).

**FIGURE 6.1. DETERMINANTS OF WEIGHT STATUS IN YOUNG ASIANS**



**6.5.3 Objective Three: To investigate young New Zealand Asian’s understanding and knowledge of heart health**

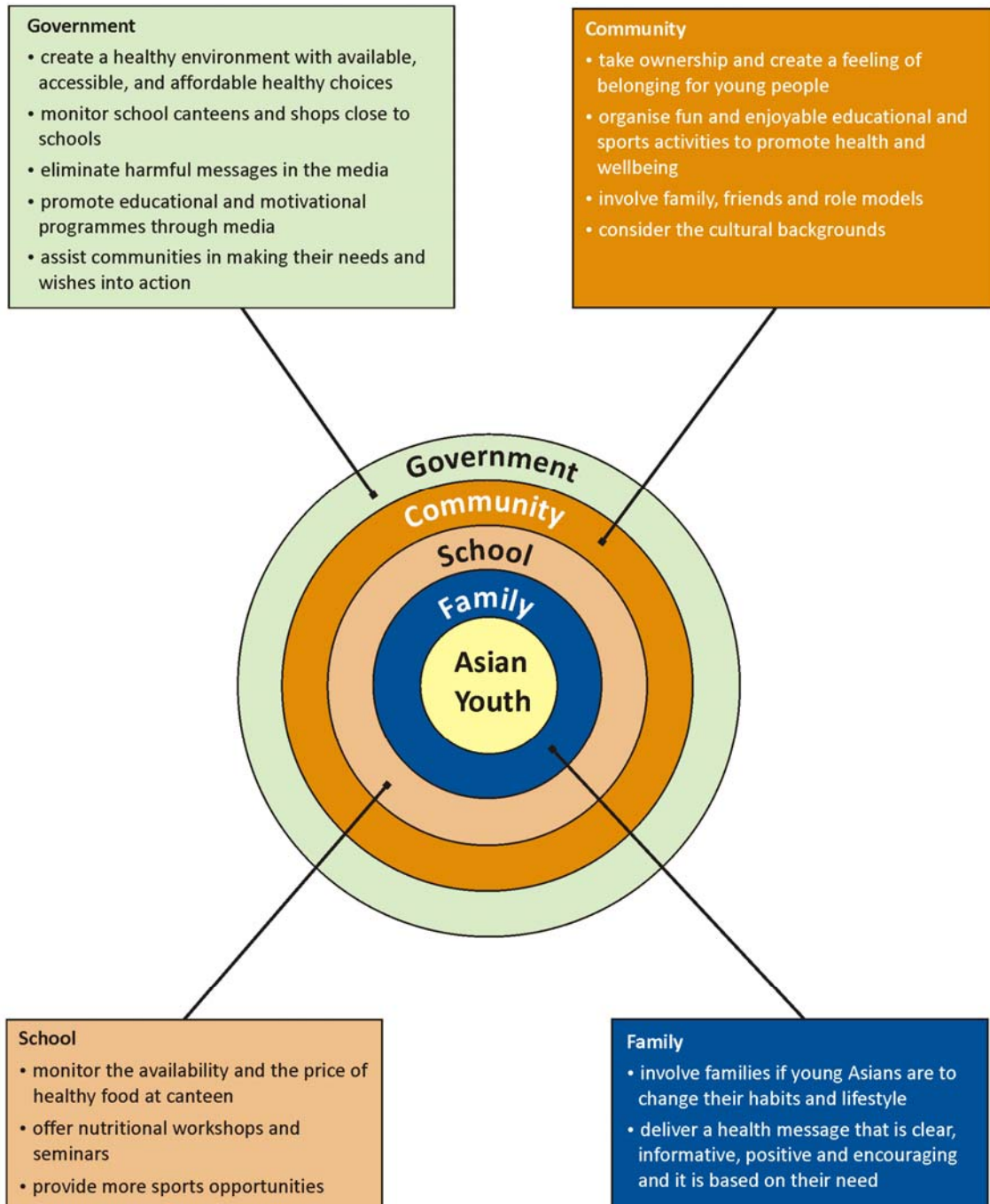
What was found was that the knowledge of Asian adolescents in regards to healthy eating, obesity risk factors, heart health and what contributes to it, was poor or basic. In many cases it was even incorrect, which creates a great cause of concern.

#### **6.5.4 Objective Four: To suggest a health promotion/community development model to empower and improve the health of young New Zealand Asians**

The community should be the primary focus of any health promotion programme. For the long-term sustainability of behavioural change, the community, with the help of others, needs to assess and evaluate any programme that affects them. Therefore it was important to ask the community itself (in this case being Asian adolescents) about the ways that would make a difference to them that promotes a healthy lifestyle to prevent problems associated with the ever growing issue of obesity. The recommendations of young people who participated in the focus groups, along with other literatures are the basis of this study's recommendations (See Figure 6.2).

From the above, it may be seen that the objectives of the research were fully met, and that there is a considerable amount of information and potential action that may arise from this study.

**FIGURE 6.2. RECOMMENDATIONS FOR PREVENTION PROGRAMMES**



# Chapter 7. Conclusion

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This chapter attempts to present a summary of the research and future directions recommended as a result of this research. It concludes the thesis by giving some of its outputs.

## **7.1. The Research**

This research looked at the problem of obesity and being overweight in young Asians in New Zealand. A particular emphasis was given to investigate Asian adolescents' nutritional and exercise behaviours and the factors influencing these behaviours, in order to offer a health promotion approach to empower young Asians to have a healthier lifestyle.

Obesity is characterised by the excessive accumulation of adipose tissue to an extent that health is impaired (International Obesity Task Force, 2009). Obesity in children and adolescents has serious consequences ranging from short-term physical and psychosocial consequences to long-term consequences that persist into adulthood (e.g. heart disease and type 2 diabetes).

High energy foods and lack of exercise along with many other factors contribute to this weight gain. Bearing in mind majority of these factors are modifiable risk factors, early detection and intervention are very important in preventing excessive weight gain in populations. Obesity used to be seen as a non-Asian phenomenon but the emerging research shows that the global pandemic of obesity that is growing at alarming rates is also evident in Asian populations, especially in those who have migrated to Western countries with obesity promoting environments.

According to the latest New Zealand census (2006), there are currently 354,552 people living in New Zealand who identify themselves as Asian, who comprise about 9.2% of total New Zealand population. The Asian population in New Zealand has doubled in the last 10 years and has had the biggest percentage growth (48.9%) since 2001 (Statistics New Zealand, 2008). This population is expected to comprise 13% of New Zealand population by 2021, which will be almost equal to Maori population and will exceed the number of Pacific Island people.



In view of the growth that the Asian population in New Zealand is experiencing, it is timely to study and investigate the overweight and obesity status of this population and target them specifically in our planning, interventions, or policies in regards to obesity prevention and management. Considering the cost of obesity to the country and the quality of life of the young people who are overweight or obese and their families, we cannot afford to ignore a growing ethnic group in our attempts to promote the health of the New Zealand population.

At the beginning of this study, the number of research or intervention projects targeted at the Asian population in New Zealand was very few, based on the assumption that Asians have smaller figures and hence do not experience overweight or obesity issues. Even if that was the case, we were not doing enough to prevent this serious medical condition rising in the Asian population in the years to come.

The international literature supports the findings of this study. Overweight and obesity is a concern faced by Asian adolescents at the same level as European adolescents. In addition, it is suggested that definition of obesity in Asian population needs different criteria (i.e. lower cut-off points) as Asians seem to experience obesity related diseases at lower Body Mass Index (BMI). To date there is no agreed cut-off points for the diverse Asian population and this is another topic that calls for further research.

Additionally, there are number of other major factors suggesting problematic nutritional and exercise behaviours in Asian adolescents in New Zealand. The principal ones of these are considered to be: missing breakfast or lunch, consumption of junk food such as chips, biscuits, chocolates and pie while at school or at home before dinner, purchasing food from school canteen or dairies, discrimination of traditional foods at school, high consumption of sugary drinks, fried and fast foods, having access to more food and more variety, lack of exercise and lack of opportunities to be active, hours spend watching television or playing computer, video or other electronic games.

At the same time, there are a number of factors that play a protective role in maintaining a healthy weight. These protective factors include: having breakfast and lunch, preparing and bringing food from home, having sandwiches and fruits at school and as snacks before dinner, walking or biking to school, doing sports at school, and being involved in an organised or team sport.

To deal with the issue of obesity in Asian adolescents, family, community, school and government all have to play a role.

## **7.2. Future Directions**

The main recommendation from this research to empower and improve the health of young New Zealand Asians to maintain a healthy weight is a family and community centred approach, where the family and the community is the driving force of the programme and is able to sustain the programme. The health promotion programmes that young Asians would benefit from include culturally appropriate educational and physical activity interventions for both young people and their families. Although it is vital for the community to be at the heart of any planning, implementation and evaluation of such programmes, professionals and service providers also play a major role in providing necessary skills and resources.

In addition, schools and various government sectors can help by providing a supportive environment and healthy public policies and regulations targeted at young Asians where making healthy food choices and being physically active is not a complicated task.

It needs to be emphasised that a health promotion programme should be empowering. The message that is trying to be delivered to young people and their families has to be positive, encouraging and motivational with a focus on healthy lifestyles, not weight loss.

This research was certainly not free of limitation. However, considering the available resources it is believed that it provides an awareness of the issue of being overweight or obese among young Asians in New Zealand. It also

explores some of the main determinants of problematic nutritional and exercise behaviours in young Asians so that action can be taken.

### **7.3. Research Outputs of Thesis**

This research has been presented at over 15 national and international conferences and seminars. In addition to the seminars, at the request of the Asian community the findings of this research have been presented in a community gathering attended by young Asians and their families in May 2009, which was very well received. The meeting was held at a high school that was not part of this study.

This study has captured the interest of various government organisations. Representatives of Ministries of Health, Sports and Recreation, and Education invited the researcher to consult about the findings of the study and how this could be incorporated into their work in Auckland, Wellington and Christchurch in 2008.

This thesis is contributing to a book chapter that will be published in 2010 entitled 'Childhood Obesity Prevention - International Research, Controversies and Interventions' commissioned by Oxford University Press.

The findings of this study have also received a lot of national and international media attention. The media interviews and coverage of the topic of study included over 30 national and international newspapers and journals, and eight radio and television interviews.

This research also generated a discussion about the topic of childhood obesity in Asians at the New Zealand Parliament in 2007 with a written response on the parliament's website and the launch of the first National Asian Health (Nutrition & Physical Activity) Forum in November 2008.

This thesis has won the first prize in the University of Auckland postgraduate research presentation competition (Exposure 08), which has been a great source of encouragement.

It is hoped that this thesis has not only contributed to the field of research but also to bring about some action to be taken that the population of study would benefit from. The researcher finds the community of study eager and ready to learn more about their health and nutrition in New Zealand and hopes that this study will stimulate further studies and action in this area.

# Appendices

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# Appendix One: Search History for ‘Obesity in Asian Adolescents’

Database: Ovid MEDLINE(R) <1950 to August Week 2 2009>

Search Strategy:

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- 1 obesity in asians {Including Related Terms} (10957)
- 2 obesity in asian teenagers {Including Related Terms} (10050)
- 3 Obesity/ (86725)
- 4 exp Asian Continental Ancestry Group/ (21208)
- 5 exp asia/ or india/ (353814)
- 6 4 or 5 (363026)
- 7 6 and 3 (3463)
- 8 \*Obesity/ (58874)
- 9 8 and 7 (2185)
- 10 limit 9 to (english language and yr="1990 - 2009") (1955)
- 11 exp \*Asian Continental Ancestry Group/ or (exp \*asia/ or \*india/) (13032)
- 12 11 and 10 (169)
- 13 asian\$.m\_titl. (7964)
- 14 13 and 10 (127)
- 15 12 or 14 (254)
- 16 limit 10 to "adolescent (13 to 18 years)" (606)

\*\*\*\*\*

# Appendix Two: Participant Information Sheet for Students aged 16 years and older

## Information Sheet for Students aged 16 years and older

### Obesity prevention study of high school students

You are invited to take part in this research project which is being carried out by researchers from the School of Population Health, Tamaki Campus, University of Auckland. Students attending several South Auckland high schools are being invited to take part in this study. The research project is funded by the Health Research Council of New Zealand.

#### Why are we doing this study?

Obesity levels are increasing rapidly among young people in New Zealand. The purpose of this research project is to see if obesity levels in high school students can be reduced by programs to prevent obesity in schools and the wider community. During 2005 to 2007, the obesity prevention program will be carried out in half of the schools surveyed, and not in the other half of the schools which will be a control. However, the intervention program will take place in control schools during 2008, so students at all survey schools will receive the obesity prevention program by 2008. If the survey is successful, obesity prevention programs may, in the future, be offered more widely to other schools not involved in the survey.

#### Who is being surveyed?

This study involves about 5000 students enrolled at several schools in South Auckland. Students in Year 9 and above will be approached by study researchers to take part, and if aged less than 16 years will require the written consent of their parent or guardian.

#### Do I have to take part in this survey?

Participation is entirely voluntary and you may decline without giving any reasons. If you choose to participate you may withdraw from the survey, or withdraw any information that may identify you, at any time up to 30 June 2008. If you do not want to participate in the research, the Principal has given an assurance it will not affect your assessment, grades or standing at school.

#### What is involved?

Should you agree to participate in this study, along with other students in your class who have agreed to participate, you will have a baseline interview lasting about an hour. This involves: answering a questionnaire on family contact details, diet, physical activity and neighbourhood environment; and measurement of weight, height, waist circumference and body fat. The interview will be repeated a second time during the 3 year follow-up period of the survey. Year 11 and 12 students in 2005 will be offered a 3<sup>rd</sup> interview (the same as the baseline interview), should they continue into Year 13.

The interviews will take place at school, and will be supervised by our research team. If you do not want to participate, you will continue your school activities in a separate room while participating students are being interviewed.



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**What about my privacy?**

No information that could personally identify you will be used in any reports from this study. Your answers to the questions will be stored securely. Data will be stored indefinitely on computer, but will not contain your name, address, family details or any other information that could identify you.

The results of the survey will be given to participating school boards, local District Health Boards and relevant government ministries.

**What are the benefits and risks of the study?**

Students at the intervention schools may benefit from decreased weight gain if the obesity prevention is successful. This may lead to ways of preventing obesity in young people. Students at control schools will be offered the intervention in 2008.

The only risk involved with taking part is the possibility of embarrassment from talking about obesity. Our research interviewers are trained to respond to this. In the unlikely event of any injury from participating in this survey, you will be covered by the Accident Rehabilitation and Compensation Act 1993.

**Contact persons**

If you have any questions about the survey, please contact the following study researchers in the School of Population Health, University of Auckland;

**Associate-Professor Robert Scragg** (3737 599 ext 86336) or  
**Professor David Thomas** (3737 599, ext 85657) or  
**Mr David Schaaf** (3737 599, ext 86347)

**The Head of Section is:** Professor Rod Jackson  
Epidemiology & Biostatistics Section, School of Population Health, Tamaki Campus  
University of Auckland, Morrin Road, Tamaki Tel: 3737 599 ext 86343

If you have any queries or ethical concerns regarding your rights as a participant of this study, you may wish to contact:

The Chair, **University of Auckland Human Participants Ethics Committee**  
Office of the Vice Chancellor, Research Office,  
Level 2, 76 Symonds St, Auckland Tel: 373 7599 ext 87830

**“APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE on 2 December 2004 to 1 December 2007 for a period of three years, Reference Number 2004/ 429”**



# Appendix Three: Consent Form for Students aged 16 years and older

## Consent Form for Students aged 16 years or above

### Obesity prevention study of high school students



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Telephone: 64 9 373 7599 extn 86336  
Facsimile: 64 9 3737 624  
Email: [r.scragg@auckland.ac.nz](mailto:r.scragg@auckland.ac.nz)

**Researchers:** Associate-Professor Robert Scragg  
Professor David Thomas  
Mr David Schaaf  
School of Population Health, Tamaki Campus, University of Auckland

- I have been given, and have understood, an explanation of this research project. I have had an opportunity to ask questions and have them answered.
- I understand that I may withdraw myself, or any information traceable to me, without giving a reason at any time up to 30 April 2008.
- I agree to take part in this research

Signed by **student:** \_\_\_\_\_

Name: \_\_\_\_\_  
(please print clearly)

Date:

**“APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE on 2 December 2004 to 1 December 2007 for a period of three years, Reference Number 2004/ 429”**

# Appendix Four: Participant Information Sheet for Students aged less than 16 years

## Information Sheet for Students aged less than 16 years



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### Why are we doing this study?

Obesity levels are increasing rapidly among young people in New Zealand. The purpose of this research project is to see if obesity levels in high school students can be reduced by programs to prevent obesity in schools and the wider community. During 2005 to 2007, the obesity prevention program will be carried out in half of the schools surveyed, and not in the other half of the schools which will be a control. However, the intervention program will take place in control schools during 2008, so students at all survey schools will receive the obesity prevention program by 2008. If the survey is successful, obesity prevention programs may, in the future, be offered more widely to other schools not involved in the survey.

### Who is being surveyed?

This study involves about 5000 students enrolled at several schools in South Auckland. Students in Year 9 and above will be approached by study researchers to take part, and if aged less than 16 years will require the written consent of their parent or guardian.

### Do I have to take part in this survey?

Participation is entirely voluntary and you may decline without giving any reasons. If you chose to participate you may withdraw from the survey, or withdraw any information that may identify you, at any time up to 30 June 2008. If you do not want to participate in the research, the Principal has given an assurance it will not affect your assessment, grades or standing at school.

### What is involved?

Should you agree to participate in this study, along with other students in your class who have agreed to participate, you will have a baseline interview lasting about an hour. This involves: answering a questionnaire on family contact details, diet, physical activity and neighbourhood environment; and measurement of weight, height, waist circumference and body fat. The interview will be repeated a second time during the 3 year follow-up period of the survey. Year 11 and 12 students in 2005 will be offered a 3<sup>rd</sup> interview (the same as the baseline interview), should they continue into Year 13.

The interviews will take place at school, and will be supervised by our research team. If you do not want to participate, you will continue your school activities in a separate room while participating students are being interviewed.

**What about my privacy?**

No information that could personally identify you will be used in any reports from this study. Your answers to the questions will be stored securely. Data will be stored indefinitely on computer, but will not contain your name, address, family details or any other information that could identify you.

The results of the survey will be given to participating school boards, local District Health Boards and relevant government ministries.

**What are the benefits and risks of the study?**

Students at the intervention schools may benefit from decreased weight gain if the obesity prevention is successful. This may lead to ways of preventing obesity in young people. Students at control schools will be offered the intervention in 2008.

The only risk involved with taking part is the possibility of embarrassment from talking about obesity. Our research interviewers are trained to respond to this. In the unlikely event of any injury from participating in this survey, you will be covered by the Accident Rehabilitation and Compensation Act 1993.

**Contact persons**

If you have any questions about the survey, please contact the following study researchers in the School of Population Health, University of Auckland;

**Associate-Professor Robert Scragg** (3737 599 ext 86336) or  
**Professor David Thomas** (3737 599, ext 85657) or  
**Mr David Schaaf** (3737 599, ext 86347)

**The Head of Section is:** Professor Rod Jackson  
Epidemiology & Biostatistics Section, School of Population Health, Tamaki Campus  
University of Auckland, Morrin Road, Tamaki Tel: 3737 599 ext 86343

If you have any queries or ethical concerns regarding your rights as a participant of this study, you may wish to contact:

The Chair, **University of Auckland Human Participants Ethics Committee**  
Office of the Vice Chancellor, Research Office,  
Level 2, 76 Symonds St, Auckland Tel: 373 7599 ext 87830

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# Appendix Five: Participant Information Sheet for Parents of Students aged less than 16 years

## Information Sheet for Parents of Students aged less than 16 years



THE UNIVERSITY OF AUCKLAND  
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Telephone: 64 9 373 7599 extn 86336  
Facsimile: 64 9 3737 624  
Email: [r.scragg@auckland.ac.nz](mailto:r.scragg@auckland.ac.nz)

## Obesity prevention study of high school students

Your son/daughter is invited to take part in this research project which is being carried out by researchers from the School of Population Health, Tamaki Campus, University of Auckland. Students attending several South Auckland high schools are being invited to take part in this study. The research project is funded by the Health Research Council of New Zealand.

### Why are we doing this study?

Obesity levels are increasing rapidly among young people in New Zealand. The purpose of this research project is to see if obesity levels in high school students can be reduced by programs to prevent obesity in schools and the wider community. During 2005 to 2007, the obesity prevention program will be carried out in half of the schools surveyed, and not in the other half of the schools which will be a control. However, the intervention program will take place in control schools during 2008, so students at all survey schools will receive the obesity prevention program by 2008. If the survey is successful, obesity prevention programs may, in the future, be offered more widely to other schools not involved in the survey.

### Who is being surveyed?

This study involves about 5000 students enrolled at several schools in South Auckland. Students in Year 9 and above will be approached by study researchers to take part, and if aged less than 16 years will require the written consent of their parent or guardian.

### Do your son/daughter have to take part in this survey?

Participation is entirely voluntary and you son/daughter may decline without giving any reasons. If he/she chooses to participate they may withdraw from the discussion, or withdraw any information that may identify them, at any time up to 30 June 2008. If your son/daughter does not want to participate in the research, the Principal has given an assurance it will not affect his/her assessment, grades or standing at school.

### What is involved?

Should your son/daughter agree to participate in this study, along with other students in your class who have agreed to participate, you will have a baseline interview lasting about an hour. This involves: answering a questionnaire on family contact details, diet, physical activity and neighbourhood environment; and measurement of weight, height, waist circumference and body fat. The interview will be repeated a second time during the 3 year follow-up period of the survey. Year 11 and 12 students in 2005 will be offered a 3<sup>rd</sup> interview (the same as the baseline interview), should they continue into Year 13.

The interviews will take place at school, and will be supervised by our research team. If your son/daughter does not want to participate, he/she will continue his/her school activities in a separate room while participating students are being interviewed.

**What about privacy?**

No information that could personally identify you or son/daughter will be used in any reports from this study. The answers from your son/daughter to the questions will be stored securely. Data will be stored indefinitely on computer, but will not contain the name of your son/daughter, address, family details or any other information that could identify you or your son/daughter.

The results of the survey will be given to participating school boards, local District Health Boards and relevant government ministries.

**What are the benefits and risks of the study?**

Students at the intervention schools may benefit from decreased weight gain if the obesity prevention is successful. This may lead to ways of preventing obesity in young people. Students at control schools will be offered the intervention in 2008.

The only risk involved with taking part is the possibility of embarrassment from talking about obesity. Our research interviewers are trained to respond to this. In the unlikely event of any injury from participating in this survey, you son/daughter will be covered by the Accident Rehabilitation and Compensation Act 1993.

**Contact persons**

If you have any questions about the survey, please contact the following study researchers in the School of Population Health, University of Auckland;

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**Mr David Schaaf** (3737 599, ext 86347)

**The Head of Section is:** Professor Rod Jackson  
Epidemiology & Biostatistics Section, School of Population Health, Tamaki Campus  
University of Auckland, Morrin Road, Tamaki Tel: 3737 599 ext 86343

If you have any queries or ethical concerns regarding the rights of your son/daughter as a participant in this study, you may wish to contact:

The Chair, **University of Auckland Human Participants Ethics Committee**  
Office of the Vice Chancellor, Research Office,  
Level 2, 76 Symonds St, Auckland Tel: 373 7599 ext 87830

**“APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE on 2 December 2004 to 1 December 2007 for a period of three years, Reference Number 2004/ 429”**

# Appendix Six: Consent Form for Students aged less than 16 years and Parents

## Consent Form for Students aged less than 16 years & Parents

## Obesity prevention study of high school students

**Researchers:** Associate-Professor Robert  
Scragg

Professor David Thomas

Mr David Schaaf

School of Population Health, Tamaki Campus, University of Auckland



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Email: [r.scragg@auckland.ac.nz](mailto:r.scragg@auckland.ac.nz)

- I have been given, and have understood, an explanation of this research project. I have had an opportunity to ask questions and have them answered.
- I understand that I may withdraw myself, or any information traceable to me, without giving a reason at any time up to 30 April 2008.
- I agree to take part in this research

Signed by **student**: \_\_\_\_\_

Name: \_\_\_\_\_  
(please print clearly)

Date:

Form / Year: \_\_\_\_\_

I agree for my son/daughter to take part in this research

Signed by **parent**: \_\_\_\_\_  
(or guardian)

Name: \_\_\_\_\_  
(please print clearly)

Date:

**“APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS  
ETHICS COMMITTEE on 01/12/2004 to 31/11/2007 for a period of 3 years, Reference  
Number 2004/429”**

## Appendix Seven: OPIC Baseline Questionnaire

### OPIC BASELINE DATA DICTIONARY (E-STEPS)

15 February 2006

TDAY1	Is this today's date? day	1-31
TMONTH1	Is this today's date? month	1-12
TYEAR1	Is this today's date? year	2004-2008
COUNTRY	Which country is this?	1,Australia 2,Fiji Islands 3,New Zealand
SCHNAM1	What is the name of the school?	1,Aorere College 2,Southern Cross Campus 3,Mangere College 4,Auckland SDA High 5,Hillary Collegiate 6,James Cook High School 7, <i>Papakura</i>
YEAR1NA	What year are you in?	1,9 2,10 3,11 4,12 5,13
ETHNIC1	Which ethnic group do you most identify with? (Choose one)	1,Maori 2,Samoan 3,Cook Island Maori 4,Tongan 5,Niuean 6,Other Pacific 7,NZ European / Pakeha 8,Other European e.g. English/Dutch 9,Chinese 10,Indian 11,Other
BORNNZ1	Were you born in New Zealand?	1,Yes 2,No
LONGNZ1	How long have you lived in New Zealand? Please choose a response closest to the nearest whole year	1,0 2,1 3,2 4,3 5,4 6,5 7,6 8,7 9,8 10,9 11,10 12,11 13,12 14,13 15,14 16,15 17,16 18,17 19,18
SEX1		1,Male 2,Female
DOB1D	What is your date of birth? day	1-31

DOB1M	What is your date of birth? month	1,Jan 2,Feb 3,March 4,April 5,May 6,June 7,July 8,Aug 9,Sept 10,Oct 11,Nov 12,Dec
DOB1Y	What is your date of birth? year	1,1985 2,1986 3,1987 4,1988 5,1989 6,1990 7,1991 8,1992 9,1993
CHURCH1	Do you belong to a Church, Temple or Mosque?	1,No 2,Yes belong to a Church 3,Yes belong to a Temple 4,Yes belong to a Mosque
OFTENCH1	How often have you gone to Church activities in the past 12 months? (including services, Sunday school, youth groups and choir practice)	1,Usually weekly or more often 2,2-3 times a month 3,Once a month 4,Less than once a month
TEMPLE1	How often have you gone to Temple activities in the past 12 months? (including services, youth groups and choir practice)	1,Usually weekly or more often 2,2-3 times a month 3,Once a month 4,Less than once a month
MOSQ1	How often have you gone to Mosque activities in the past 12 months? (including services, youth groups and choir practice)	1,Usually weekly or more often 2,2-3 times a month 3,Once a month 4,Less than once a month
LIVEPAR1	Do you live with your parents/step-parents during the school week?	1,Yes with two parents 2,Yes with one parent 3,Don't live with my parents
LIVEWIT1	Do you live with other ADULT relatives during the school week? (e.g. grandparents, uncle, aunt, cousin)	1,Yes 2,No
HOWMANY1	How many people usually live at your home, including yourself during the school week?	1,1 2,2 3,3 4,4 5,5 6,6 7,7 8,8 9,9 10,10 11,11
BREAKFR1	On school days, where do you usually get your breakfast from?	1,Home 2,School canteen or tuckshop 3,Shop (outside school) 4,From friends 5,I don't eat breakfast



BREAKBS1	In the last 5 school days, on how many days did you have something to eat for BREAKFAST before school started?	1,0 days 2,1 day 3,2 days 4,3 days 5,4 days 6,5 days
MTFROM1	Where do you usually get your morning tea from?	1,Home 2,School canteen or tuckshop 3,Shop (outside school) 4,From friends 5,I don't eat morning tea
RECESS1	In the last 5 school days, on how many days did you eat at morning recess/tea/interval?	1,0 days 2,1 day 3,2 days 4,3 days 5,4 days 6,5 days
LUNFROM1	Where do you usually get your lunch from?	1,Home 2,School canteen or tuckshop 3,Shop (outside school) 4,From friends 5,I don't eat lunch
LUNCH1	In the last 5 school days, on how many days did you eat lunch at lunchtime?	1,0 days 2,1 day 3,2 days 4,3 days 5,4 days 6,5 days
FRUIFR1	How many serves of fruit do you usually eat each day? (a serve = 1 apple or 2 plums or 1 cup of diced fruit)	1,1 serve or less 2,2 to 3 serves 3,4 serves or more
FRUITS1A	How many serves of vegetables do you usually eat each day? (1 serve = 1/2 cup cooked vegetables or 1 cup of raw vegetables/salad)	1,1 serve or less 2,2 to 3 serves 3,4 serves or more
SOFTDRI1	In the last 5 school days (including time spent at home), on how many days did you have regular (non-diet) soft drinks? (Soft drinks = drinks like Coke, Sprite, Fanta)	1,0 days 2,1 day 3,2 days 4,3 days 5,4 days 6,5 days
FRSODFR1	On the last school day, how many glasses or cans of soft drinks did you have?	1,None 2,1 small glass / half a can (150ml) 3,2 small glasses / 1 can (300ml) 4,3 small glasses / 2 cans (600ml) 5,4-5 glasses / 3 cans (1 litre) 6,6 glasses / 4 cans (1.5 litres) 7,7-8 glasses / 6 cans (2 litres) 8,More than 2 litres
FRUDRIN1	In the last 5 school days, on how many days did you have fruit drinks or cordial? (such as Ribena, Raro, Just Juice, Freshup)	1,0 days 2,1 day 3,2 days 4,3 days 5,4 days 6,5 days
FREFRDR1	On the last school day, how many glasses of fruit drinks or cordial did you have?	1,0 2,1 3,2 4,3 5,4

		6,5 7,6 8,7 9,8 10,9
MACCAS1	How often do you usually eat food from a takeaway? (e.g. McDonalds, KFC, Subway, fried chicken, fish and chips, hamburgers, Chinese takeaway)	1,Once a month or less 2,2-3 times a month 3,Once a week 4,2-3 times a week 5,Most days
SNACKFOA	In the last 5 school days, on how many days did you buy snack food from a shop or takeaway after school?	1,0 days 2,1 day 3,2 days 4,3 days 5,4 days 6,5 days
FRUITF1	How often do you usually eat fruit after school?	1,Everyday or almost everyday 2,Most days 3,Some days 4,Hardly ever or never
BREADF1	How often do you usually eat bread, toast, buns or sandwiches after school?	1,Everyday or almost everyday 2,Most days 3,Some days 4,Hardly ever or never
SNACKF1	How often do you usually eat biscuits, potato chips or snacks such as instant noodles after school?	1,Everyday or almost everyday 2,Most days 3,Some days 4,Hardly ever or never
FRIEDF1	How often do you usually eat pies, takeaways or fried foods such as french fries after school?	1,Everyday or almost everyday 2,Most days 3,Some days 4,Hardly ever or never
CHOC1	How often do you usually eat chocolates, lollies, sweets or ice cream after school?	1,Everyday or almost everyday 2,Most days 3,Some days 4,Hardly ever or never
WALK2SC1	In the last 5 school days, how many times did you walk or bike to or from school? (walking from home to school and back on 1 day is 2 times: walking to school and taking the bus home is 1 time)	1,0 2,1 3,2 4,3 5,4 6,5 7,6 8,7 9,8 10,9 11,10 12,more than 10
WALKTIM1	How long does it take you to walk from home to your school?	1,Less than 15 minutes 2,15 - 30 minutes 3,More than 30 minutes
WALKLO1	How long would it take to walk from home to your school?	1,Less than 15 minutes 2,15 - 30 minutes 3,More than 30 minutes
RECESA1	Over the last 5 school days, what did you do most of the time at morning recess/ interval (apart from eating)?	1,Mostly just sat down 2,Mostly stood or walked around 3,Mostly played active games
LUNCHA1	In the last 5 school days, what did you do most of the time at lunch time (apart from eating)?	1,Mostly just sat down 2,Mostly stood or walked around 3,Mostly played active games

ACTIVITA	In the last 5 school days, on how many days after school, did you do sports, dance, cultural performances or play games in which you were active?	1,0 days 2,1 day 3,2 days 4,3 days 5,4 days 6,5 days
TVDAYS1A	In the last 5 school days, how many days did you watch TV, videos or DVDs (in your free time)?	1,0 days 2,1 day 3,2 days 4,3 days 5,4 days 6,5 days
TVHRS1	On the last school day that you watched TV, videos or DVDs, how long did you watch for?	1,Less than 1 hour 2,1 hour 3,2 hours 4,3 hours 5,4 hours 6,More than 4 hours
TVSAT1	Last Saturday, how many hours did you spend watching TV, videos or DVDs?	1,0 2,1 3,2 4,3 5,4 6,5 7,6 8,7 9,8 10,9 11,10 12,more than 10
TVSUN1	Last SUNDAY, how many hours did you spend watching TV, videos or DVDs?	1,0 2,1 3,2 4,3 5,4 6,5 7,6 8,7 9,8 10,9 11,10 12,more than 10
TVLIMIT1	During the school week, do your parents (or caregivers) limit the amount of TV you are allowed to watch? (including videos and DVDs)	1,No limits - I can watch anything 2,Yes - but not very strict limits 3,Yes - strict limits
TVMEAL1A	In the last 5 school days, how many times did you watch TV while eating your evening meal?	1,0 days 2,1 day 3,2 days 4,3 days 5,4 days 6,5 days
TVHOME1	Do you have a TV in your home?	1,Yes 2,No
TVROOM1	Do you have a TV in your bedroom?	1,Yes 2,No
COMPFREA	In the last 5 school days, how many days did you play video games, electronic games or use the computer? (not for homework)	1,0 days 2,1 day 3,2 days 4,3 days

		5,4 days 6,5 days
COMPHRS1	On the last school day that you spent time playing video games or using the computer (not for homework), how long did you play for?	1,Have not played for ages 2,Less than 1 hour 3,1 hour 4,2 hours 5,3 hours 6,4 hours 7,More than 4 hours
COMPSAT1	Last Saturday, how many hours did you spend playing video games or using the computer (not for homework)?	1,0 hours 2,Less than 1 hour 3,1 hour 4,2 hours 5,3 hours 6,4 hours 7,5 hours 8,More than 5 hours
COMPSUN1	Last SUNDAY, how many hours did you spend playing video games, or using the computer? (not for homework)	1,0 hours 2,Less than 1 hour 3,1 hour 4,2 hours 5,3 hours 6,4 hours 7,5 hours 8,More than 5 hours
COMPHO1	Do you have video games, electronic games or a computer in your home?	1,Yes 2,No
DESWEIG1	How would you describe your weight?	1,Very underweight 2,Slightly underweight 3,About the right weight 4,Slightly overweight 5,Very overweight
HAWEIGH1	How happy or unhappy are you with your BODY WEIGHT?	1,Very happy 2,Happy 3,In between / OK 4,Unhappy 5,Very unhappy 6,Never thought about my body weight
HASIZE1	How happy or unhappy are you with your BODY SHAPE?	1,Very happy 2,Happy 3,In between / OK 4,Unhappy 5,Very unhappy 6,Never thought about my shape
STATEMEN	Which of these statements most closely applies to you?  I am...	1,trying to lose weight 2,trying to gain weight 3,trying to stay at my current weight 4,not doing anything about my weight
MUSCLE1	Which of the following statements most closely applies to you?  I am...	1,trying to gain muscle size 2,trying to stay at the same muscle size 3,not doing anything about my muscles
MOTHSUP1	How much does your mother (or female caregiver) encourage you to eat healthy foods?	1,A lot 2,Some 3,A little 4,Not at all 5,Don't live with my mother

FATHSUP1	How much does your father (or male caregiver) encourage you to eat healthy foods?	1,A lot 2,Some 3,A little 4,Not at all 5,Don't live with my father
TAKEAWD1	How often do you have food from a takeaway shop for dinner?	1,More than once a week 2,About once a week 3,2-3 times a month 4,Once a month or less
FRUITAV1	How often is fruit available at home for you to eat?	1,Everyday or almost everyday 2,Most days 3,Some days 4,Hardly ever or never
CHIPSAV1	How often are potato chips or similar snacks available at home for you to eat?	1,Everyday or almost everyday 2,Most days 3,Some days 4,Hardly ever or never
CHOCAV1	How often are chocolates or sweets available at home for you to eat?	1,Everyday or almost everyday 2,Most days 3,Some days 4,Hardly ever or never
SOFTDAV1	How often are non-diet soft drinks available at home for you to drink? (Soft drinks = drinks like Coke, Sprite, Fanta)	1,Everyday or almost everyday 2,Most days 3,Some days 4,Hardly ever or never
MONSPN1A	On the last school day, how much money did you spend on food or drinks for yourself at takeaway shops or dairies? (not including school canteens)	1,0 2,1 3,2 4,3 5,4 6,5 7,6 8,7 9,8 10,9 11,10 12,11 13,12 14,13 15,14 16,15
SUPMAC1	How much does your mother (or female caregiver) encourage you to be physically active or play sports?	1,A lot 2,Some 3,A little 4,Not at all 5,Don't live with my mother
SUPFACT1	How much does your father (or male caregiver) encourage you to be physically active or play sports?	1,A lot 2,Some 3,A little 4,Not at all 5,Don't live with my father
SUPBACT1	How much do your older brothers or male cousins encourage you to be physically active or play sports?	1,A lot 2,Some 3,A little 4,Not at all 5,Don't have older brother/cousin
SUPSAC1	How much do your older sisters or female cousins encourage you to be physically active or play sports?	1,A lot 2,Some 3,A little 4,Not at all

		5,Don't have older sister/cousin
SUPFRND1	How much do your best friends encourage you to be physically active or play sports?	1,A lot 2,Some 3,A little 4,Not at all
MEALTOGA	In the last 5 school days, how many times did all or most of your family living in your house eat an evening meal together?	1,0 days 2,1 day 3,2 days 4,3 days 5,4 days 6,5 days
SENCSP01	How much does your school encourage ALL students to play organised sport?	1,A lot 2,Some 3,A little 4,Not at all
SENCACT1	How much does your school encourage ALL students to be physically active at lunchtime?	1,A lot 2,Some 3,A little 4,Not at all
TEACHPA1	How do you rate the teachers at your school as role models for being physically active?	1,Excellent 2,Good 3,OK 4,Not very good 5,Poor
TEACHHE1	How do you rate the teachers at your school as role models for HEALTHY EATING?	1,Excellent 2,Good 3,OK 4,Not very good 5,Poor
CANTEEN1	How do you rate the food and drink choices available at your school canteen?	1,Mostly healthy 2,Half healthy / half unhealthy 4,Mostly unhealthy
SENCHE1	How much does your school encourage students to make healthy food choices?	1,A lot 2,Some 3,A little 4,Not at all
SAFEA1	How safe do you feel being out alone in your neighbourhood at night?	1,Very safe 2,Safe 3,Unsafe 4,Very unsafe
SAFEPAR1	How safe do your parents (or caregivers) think it is for you to be out alone in your neighbourhood at night?	1,Very safe 2,Safe 3,Unsafe 4,Very unsafe 5,Don't know
SAFDOG1	How much do dogs bother you when you are walking in your neighbourhood?	1,A lot 2,Somewhat 3,A little 4,Not at all
SAFETRA1	How much does traffic bother you when you are walking in your neighbourhood?	1,A lot 2,Somewhat 3,A little 4,Not at all
SAFSTR1	How much do other people bother you when you are walking in your neighbourhood?	1,A lot 2,Somewhat 3,A little 4,Not at all
CHHEAT1	How much does your Church support healthy eating?	1,A lot 2,Somewhat 3,A little

		4,Not at all
TEHEAT1	How much does your Temple support healthy eating?	1,A lot 2,Somewhat 3,A little 4,Not at all
MOHEAT1	How much does your Mosque support healthy eating?	1,A lot 2,Somewhat 3,A little 4,Not at all
LEADHE1	How do you rate the leaders at your Church as role models for EATING HEALTHY FOODS?	1,Excellent 2,Good 3,OK 4,Not very good 5,Poor
LEADT1	How do you rate the leaders at your Temple as role models for EATING HEALTHY FOODS?	1,Excellent 2,Good 3,OK 4,Not very good 5,Poor
LEADM1	How do you rate the leaders at your Mosque as role models for EATING HEALTHY FOODS?	1,Excellent 2,Good 3,OK 4,Not very good 5,Poor
LEADPAC1	How do you rate the leaders at your Church as role models for PHYSICAL ACTIVITY?	1,Excellent 2,Good 3,OK 4,Not very good 5,Poor
LEADPAT1	How do you rate the leaders at your Temple as role models for PHYSICAL ACTIVITY?	1,Excellent 2,Good 3,OK 4,Not very good 5,Poor
LEADPAM1	How do you rate the leaders at your Mosque as role models for PHYSICAL ACTIVITY?	1,Excellent 2,Good 3,OK 4,Not very good 5,Poor
SKIPBR1	Skipping breakfast or lunch is a good way to lose weight	1,Strongly agree 2,Agree 3,Neither agree nor disagree 4,Disagree 5,Strongly disagree
DRINKSU1	Fruit drinks and cordials have less sugar than non-diet soft drinks like Coke and Sprite.	1,Strongly agree 2,Agree 3,Neither agree nor disagree 4,Disagree 5,Strongly disagree
TVWEIGH1	Watching a lot of TV does not lead to weight gain.	1,Strongly agree 2,Agree 3,Neither agree nor disagree 4,Disagree 5,Strongly disagree
FVWEIG1	Eating a lot of fruit and vegetables is bad for your weight	1,Strongly agree 2,Agree 3,Neither agree nor disagree 4,Disagree 5,Strongly disagree

# Appendix Eight: Living for Life Questionnaire

## Living for Life Questionnaire

Instructions: Please write your answers on the lines.

School \_\_\_\_\_ ID \_\_\_\_\_ . \_\_\_\_\_  
(PDA) (Interview)

Date \_\_\_\_\_

1. Your name \_\_\_\_\_  
(First name) (Middle name) (Last name)

2. Your date of birth? \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
(Day) (Month) (Year)

3. Are you...(please circle ONE) 1. Male 2. Female

4. What is your home address? a. Street number \_\_\_\_\_  
b. Street name \_\_\_\_\_  
c. Suburb \_\_\_\_\_

5. What is your home phone number? \_\_\_\_\_

6. What is the name of your *mother / stepmother / female caregiver* living with you?

\_\_\_\_\_  
(First name) (Last name)

7. What is the name of your *father / stepfather / or male caregiver* living with you?

\_\_\_\_\_  
(First name) (Last name)



ID \_\_\_\_\_ . \_\_\_\_\_  
(PDA) (Interview)

Your date of birth? \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
(Day) (Month) (Year)

Do you go to Church, Temple or Mosque?

1. No, I do not go to Church, Temple or Mosque.  
*If no, please go on to the next page.*

2. Yes, I usually attend:

\_\_\_\_\_  
Name of Church, Temple or Mosque

Street \_\_\_\_\_

Suburb \_\_\_\_\_

Office  
Use


The next set of questions ask about your quality of life.

You answer each question by circling the number next to the response that best fits your situation.



### Example answer

*Most of the time Tom enjoys a good relationship with his family so he marks the second box from the top to show his answer :*

How happy do my relationships with my family make me?

1. Very happy.
2. Generally happy.
3. Neither happy nor unhappy.
4. Generally unhappy.
5. Very unhappy.
6. This question is not relevant to me.

## Physical ability

Questions 1 to 4 are about how well I am physically able to do things for myself.

Office  
Use

**Q1** How much help do I need when I do jobs around the house (eg. cleaning my room, helping with meals, working in the garden)?

1. I can do all these jobs very quickly and easily without any help.
2. I can do these jobs quite easily without help.
3. I can do these jobs only very slowly without help.
4. I cannot do most of these jobs unless I have help.
5. I can do none of these jobs by myself.
6. I never do jobs around the house although I am able to do so.

**Q2** How easy or difficult is it for me to get around by myself outside my home (eg. at school, going out with my friends)?

1. Getting around is enjoyable and easy.
2. I have no difficulty getting around outside my house.
3. A little difficulty.
4. Moderate difficulty.
5. A lot of difficulty.
6. I cannot get around unless somebody is there to help me.



**Q3 How well can I walk or run?**

1. I find walking or running very easy.
2. I have no real difficulty with walking or running.
3. I find walking or running slightly difficult.  
*(I cannot run to catch a bus or train, I find walking uphill difficult.)*
4. Walking is difficult for me.  
*(I walk short distances only. I have difficulty walking up stairs.)*
5. I have great difficulty walking.  
*(I cannot walk without a walking stick or frame, or someone to help me.)*
6. I am bedridden.

**Q4 How easy is washing myself, going to the toilet, dressing, eating, and looking after my appearance?**

1. These tasks are very easy for me.
2. I have no real difficulty in carrying out these tasks.
3. I find some of these tasks difficult, but I manage to do them on my own.
4. Many of these tasks are difficult, and I need help to do them.
5. I cannot do these tasks by myself at all.



## Social and family relationships

Questions 5 to 7 are about my relationships and involvement with my family, friends and local community, and how they are affected by my health.

Office  
Use

**Q5 How happy do my close friendships make me?**

1. Very happy.
2. Generally happy.
3. Neither happy nor unhappy.
4. Generally unhappy.
5. Very unhappy.

**Q6 Does my health affect my relationship with my family?**

1. My relationship with my family is unaffected by my health.
2. Some parts of my relationship with my family are affected by my health.
3. Many parts of my relationship with my family are affected by my health.
4. Every part of my relationship with my family is affected by my health.

**Q7 How does my health affect my involvement in groups, clubs, sporting or school activities?**

1. My involvement with such groups is not affected by my health.
2. There are some group activities I am not involved in because of my health.
3. There are many group activities I am not involved in because of my health.
4. I am not involved in any group activities because of my health.



7

**Mental health**

Questions 8 to 11 are about my mental health.



**Q8** How often did I feel in despair (lost and hopeless) over the last seven days?

- 1. Never.
- 2. Occasionally.
- 3. Sometimes.
- 4. Often.
- 5. All the time.

Office  
Use

**Q9** How often did I feel worried over the last seven days?

- 1. Never.
- 2. Occasionally.
- 3. Sometimes.
- 4. Often.
- 5. All the time.

**Q10** How often do I feel sad?

- 1. Never.
- 2. Rarely.
- 3. Sometimes.
- 4. Usually.
- 5. Nearly all the time.

**Q11** How often do I feel calm or agitated (stressed)?

- 1. Always calm.
- 2. Usually calm.
- 3. Sometimes calm, sometimes agitated.
- 4. Usually agitated.
- 5. Always agitated.

## Coping

Questions 12 to 14 are about my ability to cope with things.

Office  
Use

**Q12 How much energy do I have to do the things I want to do?**

1. Always full of energy.
2. Usually full of energy.
3. Occasionally full of energy.
4. Usually tired and lacking energy.
5. Always tired and lacking energy.

**Q13 How often do I feel I manage my life well?**

1. Always.
2. Mostly.
3. Sometimes.
4. Only occasionally.
5. Never.

**Q14 How much do I feel I can cope with life's problems (such as conflict with family or friends, doing exams etc.)?**

1. Completely.
2. Mostly.
3. Partly.
4. Very little.
5. Not at all.



## Pain



Questions 15 to 17 are about my experiences of physical pain.

**Q15 How often do I experience serious physical pain?**

1. Very rarely.
2. Less than once a week.
3. Three to four times a week.
4. Most of the time.

Office  
Use

**Q16 How much physical pain or discomfort do I experience?**

1. None at all.
2. I have moderate pain.
3. I suffer from severe pain.
4. I suffer unbearable pain.

**Q17 How often does physical pain interfere with my usual activities?**

1. Never.
2. Rarely.
3. Sometimes.
4. Often.
5. Always .





## Vision, hearing and communication

Questions 18 to 20 are about seeing, hearing and communicating.

**Q18** How good is my vision (with my glasses or contact lenses if I wear them)?

1. I have excellent sight.
2. I see normally.
3. I have some difficulty focusing on things, or I do not see them sharply. (eg. *small print, writing on the board or seeing objects in the distance.*)
4. I have a lot of difficulty seeing things. (*My vision is blurred. I can see just enough to get by with.*)
5. I only see general shapes. I need a guide to move around.
6. I am completely blind.

**Q19** How good is my hearing (with my hearing aid if I wear one)?

1. I have excellent hearing.
2. I hear normally.
3. I have some difficulty hearing or I do not hear clearly. (*I have trouble hearing softly-spoken people or when there is background noise.*)
4. I have difficulty hearing things clearly. (*Often I do not understand what is said. I usually do not take part in conversations because I cannot hear what is said.*)
5. I hear very little indeed. (*I cannot fully understand loud voices speaking directly to me.*)
6. I am completely deaf.

**Q20** How well can I communicate with others (eg. by talking, listening, writing or using sign language)?

1. I have **no** difficulty speaking to them or understanding what they are saying.
2. I have **some** difficulty being understood by people who do not know me. I have no trouble understanding what others are saying to me.
3. I have **great** trouble understanding what others are saying to me. I am understood only by people who know me well.
4. I cannot communicate with others.

Office  
Use

### DIRECTIONS

On the following page is a list of things that might be a problem for you. Please tell us **how much of a problem** each one has been for you in the **LAST MONTH** by circling:

- 0 if it is **never** a problem
- 1 if it is **almost never** a problem
- 2 if it is **sometimes** a problem
- 3 if it is **often** a problem
- 4 if it is **almost always** a problem

There are no right or wrong answers.  
If you do not understand a question, please ask for help.



In the **LAST MONTH**, how much of a **problem** has this been for you ...

<b><u>A. About My Health and Activities (PROBLEMS WITH...)</u></b>	Never	Almost Never	Some-times	Often	Almost Always
1. It is difficult for me to walk more than 100 metres	0	1	2	3	4
2. It is difficult for me to run	0	1	2	3	4
3. It is difficult for me to play sport or do exercise	0	1	2	3	4
4. It is difficult for me to lift something heavy	0	1	2	3	4
5. It is difficult for me to have a bath or shower by myself	0	1	2	3	4
6. It is difficult for me to help around the house	0	1	2	3	4
7. I get aches and pains	0	1	2	3	4
8. I have low energy	0	1	2	3	4

<b><u>B. About My Feelings (PROBLEMS WITH...)</u></b>	Never	Almost Never	Some-times	Often	Almost Always
1. I feel afraid or scared	0	1	2	3	4
2. I feel sad	0	1	2	3	4
3. I feel angry	0	1	2	3	4
4. I have trouble sleeping	0	1	2	3	4
5. I worry about what will happen to me	0	1	2	3	4

<b><u>C. How I Get Along with Others (PROBLEMS WITH...)</u></b>	Never	Almost Never	Some-times	Often	Almost Always
1. I have trouble getting along with other teenagers	0	1	2	3	4
2. Other teenagers do not want to be my friend	0	1	2	3	4
3. Other teenagers tease me	0	1	2	3	4
4. I cannot do things that other people my age can do	0	1	2	3	4
5. It is hard to keep up with other teenagers	0	1	2	3	4

<b><u>D. About School (PROBLEMS WITH...)</u></b>	Never	Almost Never	Some-times	Often	Almost Always
1. It is hard to pay attention in class	0	1	2	3	4
2. I forget things	0	1	2	3	4
3. I have trouble keeping up with my school work	0	1	2	3	4
4. I am away from school because I feel sick	0	1	2	3	4
5. I am away from school to go to the doctor or hospital	0	1	2	3	4

THANK YOU FOR ANSWERING  
THIS QUESTIONNAIRE!



## Appendix Nine: Coding System for 'other' Ethnicity

All responds to ETHNICN1 (other ethnicity) coded as 11 in the Baseline Data 2005, have been further divided into the following codes:

Other Ethnicity	Coding
Other Asian	1
Cambodian	2
Chinese	3
Filipino	4
Taiwanese	5
Thailand	6
Vietnamese	7
Indian	8
Pakistani	9
Afghani	10
Iraqi (Middle Eastern)	11
Fijian	12
Samoan	13
Tokelauan	14
Cook Island Maori	15
Tongan	16
Maori	17
Any European (including NZ)	18
African origin	19
Latin/South American	20
Other	21

This has been then incorporated into analysis.sas as follow:

e.g.

```
if id=10067 then other_eth=1;
```

```
if id=11012 then other_eth=2;
```

...

## Appendix Ten: SAS Codes

```
data temp; set sd2.nz_130808;

if agey_t1=2 or agey_t1=3 then age_gp=1;
else if agey_t1=4 then age_gp=2;
else if agey_t1=5 then age_gp=3;
else if agey_t1=6 then age_gp=4;
else if agey_t1>=7 then age_gp=5;
age = agey_t1 + 10;

if bornnz_t1=2 then do;
if longnz_t1<=1 then yearnz=1;
else if longnz_t1=2 or longnz_t1=3 then yearnz=2;
else if longnz_t1=4 or longnz_t1=5 then yearnz=3;
else if longnz_t1>=6 then yearnz=4; end;

if 2<=ethninc_t1<=6 then ethnic=1;           /*Pacific      */
else if ethninc_t1=1 then ethnic=2;         /*Maori        */
else if ethninc_t1>=9 then ethnic=3;       /*Asian-Other  */
else if ethninc_t1=7 or ethninc_t1=8 then ethnic=4; /*European    */

/* #1-11: Asian/MID; #18: European; #12-17&19-21: Others (e.g. PI, Maori,
African, L/S American) */
if ethninc_t1=10 or 8<=other_eth<=10 then asian_eth=1;
/* creates South Asians */
else if ethninc_t1=9 or 1<=other_eth<=7 then asian_eth=2;
/* creates Chinese & Other Asians */
else if other_eth=10 or other_eth=11 then asian_eth=3;
/* creates Middle East */
else if ethnic=4 or other_eth=18 then asian_eth=4;
/* creates Europeans */
else if ethnic=1 or 12<=other_eth<=16 then asian_eth=5;
/* creates Pacific */
else if ethnic=2 or other_eth=17 then asian_eth=6;
/* creates Maori */
else if 19<=other_eth<=21 then asian_eth=7;
/* creates Other */

if asian_eth=1 or asian_eth=2 then asian_euro=1;
/* combines South and East Asians to compare with Europeans */
else if asian_eth=4 then asian_euro=2;
if asian_eth=1 or asian_eth=2 or asian_eth=4;
/* select South, East & Other Asians plus Europeans */

if 0<howmany_t1<=3 then housesize=1;
else if howmany_t1=4 then housesize=2;
else if howmany_t1=5 then housesize=3;
else if howmany_t1=6 then housesize=4;
else if howmany_t1=7 or howmany_t1=8 then housesize=5;
else if 8<howmany_t1<=16 then housesize=6;

/* Table 3: combine categories of food variables */
if breakbs_t1=2 or breakbs_t1=3 then breakbs_t1=2;
if breakfr_t1=1 then breakfr_t1=1;
else if breakfr_t1=2 or breakfr_t1=3 then breakfr_t1=2;
else if breakfr_t1=5 then breakfr_t1=3;

if recess_t1=2 or recess_t1=3 then recess_t1=2;

if mtfrom_t1=1 then mtfrom_t1=1;
else if mtfrom_t1=2 or mtfrom_t1=3 or mtfrom_t1=4 then mtfrom_t1=2;
else if mtfrom_t1=5 then mtfrom_t1=3;
```

```

if lunch_t1=2 or lunch_t1=3 then lunch_t1=2;

if lunchfrom_t1=1 then lunchfrom_t1=1;
else if lunchfrom_t1=2 or lunchfrom_t1=3 or lunchfrom_t1=4 then
lunchfrom_t1=2;
else if lunchfrom_t1=5 then lunchfrom_t1=3;

if fruitf_t1=1 or fruitf_t1=2 then fruitf_t1=1;
if breadf_t1=1 or breadf_t1=2 then breadf_t1=1;
if snackf_t1=1 or snackf_t1=2 then snackf_t1=1;
if friedf_t1=1 or friedf_t1=2 then friedf_t1=1;
if choc_t1=1 or choc_t1=2 then choc_t1=1;

if monspna_t1=1 then monspna = 0;
else if 2<=monspna_t1<=5 then monspna = 5;
else if 6<=monspna_t1<=10 then monspna = 10;
else if 11<=monspna_t1<=16 then monspna = 15;

if frsodfr_t1>=5 then frsodfr_t1=5;
if frefrd_t1>=5 then frefrd_t1=6;
if maccas_t1=4 or maccas_t1=5 then maccas_t1=4;

if mealtog_t1=2 or mealtog_t1=3 then mealtog_t1=2;
if mealtog_t1=5 or mealtog_t1=6 then mealtog_t1=5;

if fruitav_t1=1 or fruitav_t1=2 then fruitav_t1=1;
if chipsav_t1=1 or chipsav_t1=2 then chipsav_t1=1;
if chocav_t1=1 or chocav_t1=2 then chocav_t1=1;
if softdav_t1=1 or softdav_t1=2 then softdav_t1=1;

/* Table 4: calculation of time walking to school in last 5 days */
if walk2sc_t1=1 then walktimes_gp = 1;
else if walk2sc_t1=2 or walk2sc_t1=3 then walktimes_gp = 2;
else if walk2sc_t1=4 or walk2sc_t1=5 then walktimes_gp = 3;
else if walk2sc_t1=6 or walk2sc_t1=7 then walktimes_gp = 4;
else if walk2sc_t1=8 or walk2sc_t1=9 then walktimes_gp = 5;
else if walk2sc_t1=10 or walk2sc_t1=11 then walktimes_gp = 6;

/* Table 4: combine categories of activity & TV variables */
if walk2sc_t1=1 then walk2sc_t1 = 0;
else if walk2sc_t1=2 or walk2sc_t1=3 then walk2sc_t1 = 2;
else if walk2sc_t1=4 or walk2sc_t1=5 then walk2sc_t1 = 4;
else if walk2sc_t1=6 or walk2sc_t1=7 then walk2sc_t1 = 6;
else if walk2sc_t1=8 or walk2sc_t1=9 or walk2sc_t1=10 then walk2sc_t1 = 8;
else if walk2sc_t1=11 or walk2sc_t1=12 then walk2sc_t1 = 10;

if tvdaysa_t1=2 or tvdaysa_t1=3 then tvdaysa_t1=2;
if tvhrs_t1=1 or tvhrs_t1=2 then tvhrs_t1=1;

if tvsat_t1=1 then tvsat1 = 0;
else if tvsat_t1=2 then tvsat1 = 1;
else if tvsat_t1=3 then tvsat1 = 2;
else if tvsat_t1=4 then tvsat1 = 3;
else if tvsat_t1>=5 then tvsat1 = 4;

if tvsun_t1=1 then tvsun1 = 0;
else if tvsun_t1=2 then tvsun1 = 1;
else if tvsun_t1=3 then tvsun1 = 2;
else if tvsun_t1=4 then tvsun1 = 3;
else if tvsun_t1>=5 then tvsun1 = 4;

```



```

if comphrs_t1=1 then comphrs1=1;
else if comphrs_t1=2 or comphrs_t1=3 then comphrs1=2;
else if comphrs_t1=4 then comphrs1=3;
else if comphrs_t1=5 then comphrs1=4;
else if comphrs_t1=6 or comphrs_t1=7 then comphrs1=5;

if compsat_t1=1 then compsat1=1;
else if compsat_t1=2 or compsat_t1=3 then compsat1=2;
else if compsat_t1=4 then compsat1=3;
else if compsat_t1=5 then compsat1=4;
else if compsat_t1=6 or compsat_t1=7 or compsat_t1=8 then compsat1=5;

if compsun_t1=1 then compsun1=1;
else if compsun_t1=2 or compsun_t1=3 then compsun1=2;
else if compsun_t1=4 then compsun1=3;
else if compsun_t1=5 then compsun1=4;
else if compsun_t1=6 or compsun_t1=7 or compsun_t1=8 then compsun1=5;

/*      Table 5      */
if teachpa_t1=1 or teachpa_t1=2 then teachpa_t1=1;
if teachpa_t1=4 or teachpa_t1=5 then teachpa_t1=4;

if teachhe_t1=1 or teachhe_t1=2 then teachhe_t1=1;
if teachhe_t1=4 or teachhe_t1=5 then teachhe_t1=4;

if safea_t1=1 or safea_t1=2 then safea_t1=1;
if safea_t1=3 or safea_t1=4 then safea_t1=3;

if safepar_t1=1 or safepar_t1=2 then safepar_t1=1;
if safepar_t1=3 or safepar_t1=4 then safepar_t1=3;

/*      Table 6      */
if desweig_t1=1 or desweig_t1=2 then desweig1=1;
else if desweig_t1=3 then desweig1=2;
else if desweig_t1=4 or desweig_t1=5 then desweig1=3;

if havweigh_t1=1 or havweigh_t1=2 then havweigh1=1;
else if havweigh_t1=3 then havweigh1=2;
else if havweigh_t1=4 or havweigh_t1=5 then havweigh1=3;
else if havweigh_t1=6 then havweigh1=4;

if hasize_t1=1 or hasize_t1=2 then hasize1=1;
else if hasize_t1=3 then hasize1=2;
else if hasize_t1=4 or hasize_t1=5 then hasize1=3;
else if hasize_t1=6 then hasize1=4;

/*      Table 7      */
if skipbr_t1=1 or skipbr_t1=2 then skipbr1=1;
else if skipbr_t1=3 then skipbr1=2;
else if skipbr_t1=4 or skipbr_t1=5 then skipbr1=3;

if drinksu_t1=1 or drinksu_t1=2 then drinksu1=1;
else if drinksu_t1=3 then drinksu1=2;
else if drinksu_t1=4 or drinksu_t1=5 then drinksu1=3;

if tvweigh_t1=1 or tvweigh_t1=2 then tvweigh1=1;
else if tvweigh_t1=3 then tvweigh1=2;
else if tvweigh_t1=4 or tvweigh_t1=5 then tvweigh1=3;

if fvweig_t1=1 or fvweig_t1=2 then fvweig1=1;
else if fvweig_t1=3 then fvweig1=2;
else if fvweig_t1=4 or fvweig_t1=5 then fvweig1=3;

run;

```

# Appendix Eleven: Guidelines for Focus Groups

## Preamble

Thank you for taking part in this study. We seek to identify ways of effectively engaging the Asian communities in health promotion activities to reduce and/or maintain a healthy weight for a healthy life.

Members of the research team have reviewed previous research on this topic, and have also gathered some quantitative information on young New Zealand Asian's lifestyle in regards to eating and exercise habits in comparison to Europeans living here. In addition to this, we believe it is important to incorporate a more in-depth view of people like you for further analysis and recommendations.

## Introductions

-Ground rules – confidentiality, note taking and use of data, optional audio-taping

- Understanding and commitment to consent sheet.
- Understanding as research project not practice audit.
- Maintain courteous and respectful of colleagues' opinions.
- Maintain respect and confidentiality of all service users – attempt to reflect on process rather than content.
- Although this is a 'participatory process in knowledge building', it is acceptable to pass occasionally.
- One person speaking at a time.
- Omission of all names when reporting the findings.

-You are invited to make comments to the questions asked, but please don't feel you are under any pressure to tell us anything you don't wish to disclose in the group

## Discussion

The following questions are developed as a general guide to facilitate the discussion.

### Theme ONE: Food Patterns

- Q1:** What are your favourite foods and drinks? (Prompt: sugary drinks, takeaway food, etc)
- Q2:** What do you usually eat during school and where do you get it from?
- Q3:** What do you usually eat after school and where do you get it from?
- Q4:** What are the differences between the traditional diet of East/South Asians back in the country of origin and in New Zealand? (This question is for South and East Asian Focus Groups only)

### Theme TWO: Activity Patterns

- Q5:** What are your hobbies? What do you do in your spare time or for fun? (Prompts: sports/TV/video/computer games/etc)
- Q6:** Do you get any exercise? What sort? How much?
- Q7:** Are there any cultural considerations that might influence your physical activities/recreation?

### Theme THREE: Influencing Factors

- Q8:** How do you decide which food you eat every day? (Prompts: friends/school/teachers/money/cultural considerations/etc)
- Q9:** Does your family have an influence on your food choice?  
(How do you see the family's influence on your eating patterns and habits? Would you say that the parents are in control or children? To what extent do parents influence eating patterns of young people at home or elsewhere?)
- Q10:** Do you tend to like particular food if you are happy or sad? Or for special occasions?

### Theme FOUR: Knowledge and Experience

- Q11:** How would you rate young people's (East Asians/South Asians/Europeans') knowledge of healthy food and what to eat?
- Q12:** Where do you think they get their knowledge from?
- Q13:** What do you know about heart health and its contributing factors?
- Q14:** Where do you get this information from?

### Theme FIVE: Recommendations for Prevention Programmes

- Q15:** What would be a good way to get young people to eat healthy and become physically more active?
- Q16:** How can we engage the individuals and the community in these intervention programs?

### Theme Six: Others

- Q17:** Is there anything else you would like to discuss in relation to a healthy lifestyle and maintaining a healthy weight?

# Appendix Twelve: Participant Information Sheet for Students

## Information Sheet for Focus Groups For Students



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Facsimile: 64 9 373 7624  
Email: [s.foroughian@auckland.ac.nz](mailto:s.foroughian@auckland.ac.nz)

## Obesity prevention study of high school students

My name is Shirin Foroughian, and I am a PhD student from the School of Population Health, Tamaki Campus, University of Auckland, and would like to invite you to take part in this research project. Students attending several South Auckland high schools are being invited to take part in this study. The research project is funded by the Health Research Council of New Zealand.

### Why are we doing this study?

Obesity levels are increasing rapidly among young people in New Zealand. The purpose of this part of the research project is to see what aspects of the life of young Asians in New Zealand are protective factors, and what aspects of their life are risk factors for becoming overweight and obese. During 2005 to 2007, students from the participating schools have already participated in quantitative interviews. The proposed study is a more in-depth analysis of the lifestyle of young New Zealand Asians in comparison to other Europeans living in New Zealand.

### Who is being surveyed?

This study involves about 50 students enrolled at several schools in South Auckland. Students in Year 9 and above will be approached by study researchers to take part, and if aged less than 16 years will require the written consent of their parent or guardian.

### Do I have to take part in this survey?

Participation is entirely voluntary and you may decline without giving any reasons. If you chose to participate you may withdraw from the survey, or withdraw any information that may identify you, at any time up to 31 July 2007. For students aged less than 16 years, even if the parents agree for you to take part in this research, you can still say No and do not participate. In addition, if you do not want to participate in the research, the Principal has given an assurance it will not affect your assessment, grades or standing at school.

### What is involved?

Should you agree to participate in this study, along with 3-4 other students in the school who have agreed to participate, you will have a focus group interview lasting about an hour. This involves participating in an open discussion on topics such as food and activity patterns, knowledge and experience, and opinions on practice.

The interviews will take place at the school and during the school hours.

**What about my privacy?**

No information that could personally identify you will be used in any reports from this study. Your answers to the questions will be stored securely. Data will be stored for up to six years, but will not contain your name, address, family details or any other information that could identify you.

Given the nature of the focus group, confidentiality cannot be guaranteed, however your name will not be used and your data would be identified by codes only. If the information you provide is reported or published, this will be done in a way that does not identify you as its source.

The researchers will take notes while talking. The interview will also be audio-taped and you will be requested to not talk about recognizable incidents. The tapes are for our records only and if there is a need for them to be transcribed for further analysis, the researchers will transcribe the tapes. After the completion of the project the tapes would be immediately erased by the researchers. The transcriptions and any other information will be kept by the researchers in a locked cabinet on University premises.

A summary of research findings may be sent to the participating schools and appropriate community groups.

**What are the benefits and risks of the study?**

You may benefit from increased knowledge of weight related issues. This may lead to ways of preventing obesity in young people.

The only risk involved with taking part is the possibility of embarrassment from talking about obesity. Our research interviewers are trained to respond to this.

**Contact persons**

If you have any questions about the survey, please contact the following study researchers in the School of Population Health, University of Auckland;

**Shirin Foroughian** (373 7599 ext 88586) or  
**Associate-Professor Robert Scragg** (373 7599 ext 86336) or  
**Professor David Thomas** (373 7599 ext 85657)

**The Head of Section is:** Professor Rod Jackson  
Epidemiology & Biostatistics Section, School of Population Health, Tamaki Campus  
University of Auckland, Morrin Road, Tamaki Tel: 3737 599 ext 86343

If you have any queries or ethical concerns regarding the rights of your son/daughter as a participant in this study, you may wish to contact:

The Chair, **University of Auckland Human Participants Ethics Committee**  
Office of the Vice Chancellor, Research Ethics and Biological Safety Administration,  
Room 005, Alfred Nathan House, 24 Princes Street, Auckland Tel: 373 7599  
ext 87830

**"APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE on 6 December 2006 for three years from 06.12.2006 to 06.12.2009, Reference Number 2006/ 455"**

# Appendix Thirteen: Consent Form for Students aged 16 years or above

## Consent Form for Students aged 16 years or above

### Obesity prevention study of high school students



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Telephone: +64 9 373 7599 ext 88586  
Facsimile: 64 9 373 7624  
Email: [s.foroughian@auckland.ac.nz](mailto:s.foroughian@auckland.ac.nz)

**Researchers:** Shirin Foroughian  
Associate-Professor Robert Scragg  
Professor David Thomas  
School of Population Health, Tamaki Campus, University of Auckland

- I have been given, and have understood, an explanation of this research project. I have had an opportunity to ask questions and have them answered.
- I understand that I may withdraw myself, or any information traceable to me, without giving a reason at any time up to 31 July 2007.
- I agree that I will be audio taped.
- I understand that given the nature of the focus group, confidentiality cannot be guaranteed, but if the information I provide is reported or published, this will be done in a way that does not identify me as its source.
- I understand that if I do not want to participate in the research, the Principal has given an assurance that participation or non participation will not affect my assessment, grades or standing at school.
- I agree to take part in this research

Signed by **student:** \_\_\_\_\_

Name: \_\_\_\_\_  
(please print clearly)

Date:

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# Appendix Fourteen: Consent Form for Students aged less than 16 years

## Consent Form for Students aged less than 16 years

## Obesity prevention study of high school students



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Email: [s.foroughian@auckland.ac.nz](mailto:s.foroughian@auckland.ac.nz)

**Researchers:** Shirin Foroughian  
Associate-Professor Robert  
Scragg  
Professor David Thomas  
School of Population Health, Tamaki Campus, University of Auckland

- I have been given, and have understood, an explanation of this research project. I have had an opportunity to ask questions and have them answered.
- I understand that I may withdraw myself, or any information traceable to me, without giving a reason at any time up to 31 July 2007.
- I agree that I will be audio taped.
- I understand that given the nature of the focus group, confidentiality cannot be guaranteed, but if the information I provide is reported or published, this will be done in a way that does not identify me as its source.
- I understand that if I do not want to participate in the research, the Principal has given an assurance that participation or non participation will not affect my assessment, grades or standing at school.
- I understand that even if my parents (or guardian) agree for me to take part in this research, I can still say No and do not participate.
- I agree to take part in this research

Signed by **student:** \_\_\_\_\_

Name: \_\_\_\_\_  
(please print clearly)

Date:

**“APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE on 6 December 2006 for three years from 06.12.2006 to 06.12.2009, Reference Number 2006/ 455”**

# Appendix Fifteen: Participant Information Sheet for Parents of Students aged less than 16 years

## Information Sheet for Focus Groups For Parents of Students aged less than 16 years



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Telephone: +64 9 373 7599 ext 88586  
Facsimile: 64 9 373 7624  
Email: [s.foroughian@auckland.ac.nz](mailto:s.foroughian@auckland.ac.nz)

## Obesity prevention study of high school students

My name is Shirin Foroughian, and I am a PhD student from the School of Population Health, Tamaki Campus, University of Auckland, and would like to invite your son/daughter to take part in this research project. Students attending several South Auckland high schools are being invited to take part in this study. The research project is funded by the Health Research Council of New Zealand.

### Why are we doing this study?

Obesity levels are increasing rapidly among young people in New Zealand. The purpose of this part of the research project is to see what aspects of the life of young Asians in New Zealand are protective factors, and what aspects of their life are risk factors for becoming overweight and obese. During 2005 to 2007, students from the participating schools have already participated in quantitative interviews. The proposed study is a more in-depth analysis of the lifestyle of young New Zealand Asians in comparison to other Europeans living in New Zealand.

### Who is being surveyed?

This study involves about 50 students enrolled at several schools in South Auckland. Students in Year 9 and above will be approached by study researchers to take part, and if aged less than 16 years will require the written consent of their parent or guardian.

### Does your son/daughter have to take part in this survey?

Participation is entirely voluntary and your son/daughter may decline without giving any reasons. If he/she chooses to participate they may withdraw from the discussion, or withdraw any information that may identify them, at any time up to 31 July 2007. If your son/daughter does not want to participate in the research, the Principal has given an assurance it will not affect his/her assessment, grades or standing at school. Moreover, even if the parents agree for their son/daughter to take part in this research, the student can still disagree and does not participate.

### What is involved?

Should your son/daughter agree to participate in this study, along with 3-4 other students in the school who have agreed to participate, students will have a focus group interview lasting about an hour. This involves participating in an open discussion on topics such as food and activity patterns, knowledge and experience, and opinions on practice.

The interviews will take place at the school and during the school hours.



**What about privacy?**

No information that could personally identify you or your son/daughter will be used in any reports from this study. The answers from your son/daughter to the questions will be stored securely. Data will be stored for up to six years, but will not contain the name of your son/daughter or any other information that could identify you or your son/daughter.

Given the nature of the focus group, confidentiality cannot be guaranteed, however your son's/ daughter's name will not be used and your data would be identified by codes only. If the information they provide is reported or published, this will be done in a way that does not identify you as its source.

The researchers will take notes while talking. The interview will also be audio-taped and students will be requested to not talk about recognizable incidents. The tapes are for our records only and if there is a need for them to be transcribed for further analysis, the researchers will transcribe the tapes. After the completion of the project the tapes would be immediately erased by the researchers. The transcriptions and any other information will be kept by the researchers in a locked cabinet on University premises.

A summary of research findings may be sent to the participating schools and appropriate community groups.

**What are the benefits and risks of the study?**

Students may benefit from increased knowledge of weight related issues. This may lead to ways of preventing obesity in young people.

The only risk involved with taking part is the possibility of embarrassment from talking about obesity. Our research interviewers are trained to respond to this.

**Contact persons**

If you have any questions about the survey, please contact the following study researchers in the School of Population Health, University of Auckland;

<b>Shirin Foroughian</b>	(373 7599 ext 88586) or
<b>Associate-Professor Robert Scragg</b>	(373 7599 ext 86336) or
<b>Professor David Thomas</b>	(373 7599 ext 85657)

**The Head of Section is:** Professor Rod Jackson  
Epidemiology & Biostatistics Section, School of Population Health, Tamaki Campus  
University of Auckland, Morrin Road, Tamaki Tel: 3737 599 ext 86343

If you have any queries or ethical concerns regarding the rights of your son/daughter as a participant in this study, you may wish to contact:

The Chair, **University of Auckland Human Participants Ethics Committee**  
Office of the Vice Chancellor, Research Ethics and Biological Safety Administration,  
Room 005, Alfred Nathan House, 24 Princes Street, Auckland Tel: 373 7599 ext 87830

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# Appendix Sixteen: Consent Form for Parents of Students aged less than 16 years

## Consent Form for Parents of Students aged less than 16 years

## Obesity prevention study of high school students



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Telephone: +64 9 373 7599 ext 88586  
Facsimile: 64 9 373 7624  
Email: [s.foroughian@auckland.ac.nz](mailto:s.foroughian@auckland.ac.nz)

**Researchers:** Shirin Foroughian  
Associate-Professor Robert  
Scragg  
Professor David Thomas  
School of Population Health, Tamaki Campus, University of Auckland

- I have been given, and have understood, an explanation of this research project. I have had an opportunity to ask questions and have them answered.
- I understand that my son/daughter may withdraw himself/ herself, or any information traceable to my son/daughter, without giving a reason at any time up to 31 July 2007.
- I agree that my son/daughter will be audio taped.
- I understand that given the nature of the focus group, confidentiality cannot be guaranteed, but if the information my son/daughter provides is reported or published, this will be done in a way that does not identify my son/daughter as its source.
- I understand that if my son/daughter does not want to participate in the research, the Principal has given an assurance that participation or non participation will not affect his/ her assessment, grades or standing at school.
- I understand that even if I agree for my son/daughter to take part in this research, he/ she can still disagree and do not participate.
- I agree for my son/daughter to take part in this research

Signed by **parent:** \_\_\_\_\_  
(or guardian)

Name: \_\_\_\_\_  
(please print clearly)

Date:

**“APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS  
ETHICS COMMITTEE on 6 December 2006 for three years from 06.12.2006 to  
06.12.2009, Reference Number 2006/ 455”**

## Appendix Seventeen: Gathering of Demographics

Focus Group # \_\_\_\_\_

### Gathering of Demographics

- Name: \_\_\_\_\_
- Ethnic Origin: \_\_\_\_\_ Years of residency in NZ: \_\_\_\_\_
- Age: \_\_\_\_\_
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