Intergenerational differences in the physical activity of UK South Asians

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To my parents

Who have supported and encouraged me in more ways than I can name.

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Abstract

This thesis examines intergenerational change in prevalence of and attitudes to physical activity by comparing first and second-generation South Asians in Britain. British South Asians have poorer health outcomes including a higher prevalence of cardiovascular disease (CVD) and diabetes than White British people. Physical inactivity is one of the risk factors for CVD and diabetes. Physical activity levels are lower among British South Asians than the White British population, for reasons that include cultural factors related to being South Asian, the low socioeconomic status of some South Asian groups, and living in deprived neighbourhoods. However, existing literature on physical activity levels does not clearly distinguish between first and second-generations. Understanding generational differences in the influences on physical activity among South Asians is important for developing appropriate interventions.

First, I review the existing quantitative and qualitative literature on physical activity in second-generation South Asians. There is some evidence that second-generation South Asians are more physically active than the first-generation. Despite this, second-generation South Asians remain less active than White British people. Neither the quantitative nor the qualitative literature has adequately explored the reasons for these findings.

I then use data from the Health Survey for England to explore the ways that adult Indians, Pakistanis and Bangladeshis are physically active. When analysed by age and sex, all South Asians and the White British group were physically active in different ways to each other. However, there was little difference between younger Indians and younger White British people in the contribution of walking to total activity.

Finally, I present a qualitative analysis of how ethnicity influences physical activity in second-generation South Asians. I interviewed 28 Indian women living in Manchester, England. I found that a British schooling and messages from the media had strongly influenced second-generation Indian women's attitudes to physical activity. Consequently, their motivations and barriers to physical activity were generally very similar to those reported for White British women. Second-generation Indian women had mostly adopted Western gender roles, with Indian gender expectations having a limited impact on their physical activity. In contrast, the traditional roles of Indian women constrained the leisure-time physical activity of the first-generation Indian women. There was no generational difference in how the local neighbourhood influenced physical activity.

This thesis demonstrates clear differences in physical activity prevalence and attitudes between first and second-generation South Asian women in the UK. Interventions aimed at improving local environments for physical activity are likely to help all people living in deprived areas, regardless of ethnic background. Changing generic Western social norms around femininity and being physically active may be more important than tailored interventions for second-generation Indian women.

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Glossary

Accelerometer	A device attached to the body that measures acceleration. This provides an objective measure of physical activity.
Pedometer	A device attached to the body that measures the number of steps a person takes. This provides an objective measure of physical activity.
Ethnic group	A social group having common ancestry, religion or language. Members of an ethnic group are conscious of belonging to an ethnic group.
Ethnic minority	An ethnic group that is not the largest ethnic group of a country.
Socioeconomic status	A person's position within a hierarchical social structure. It is usually assessed through education levels, occupation type or income level.
NS-SEC	A social classification system used by the Office for National Statistics, based on the employment relations and conditions of occupations.
Index of Multiple Deprivation	A combined measure of different types of deprivation, including income, employment, health, education, housing, crime and living environment.
First-generation	Migrated to the United Kingdom after age 11.
Second-generation	Born in the United Kingdom, or moved there before age 11.

List of abbreviations

CVD	Cardiovascular disease
CHD	Coronary Heart Disease
DIY	Do It Yourself (usually refers to home improvements)
HSE	Health Survey for England
NS-SEC	National Statistics Socioeconomic Classification
PE	Physical education
UK	United Kingdom

1. Introduction

1.1 Overview of the research

Physical inactivity is associated with an increased risk of cardiovascular disease (CVD), some cancers and lower mental health[1]. It is therefore an established risk factor for some of the world's biggest causes of death, yet the proportion of people achieving basic physical activity recommendations still remains low among most countries in the world. Interventions to increase physical activity have ranged from doctors prescribing gym sessions[2] to the introduction of city-wide cycle schemes, but these vary in effectiveness[3,4]. The prevalence of physical activity remains low in many populations. It also shows variation according to sex, age, education level and ethnicity[5].

Although this variation in physical activity is usually described according to individual attributes such as age, sex and ethnicity, individuals act within social and physical environments. People defined as belonging to ethnic minority groups are no exception. Intervening on variation in any health behaviour by ethnic group is difficult because first one must know whether the variation is due to cultural attitudes, socioeconomic status, environmental conditions or a combination of these. Much research has been published on health behaviours in ethnic minority groups in general and on the difficulties that migrants in particular face with language barriers, unrecognised qualifications and poor neighbourhood resources. Very little is known about the health behaviours of their children. South Asian and Caribbean populations moved to Britain in large numbers after the Second World War and had children in Britain who are now adults. Over half of some UK ethnic minority groups now comprises the second-generation. These descendants of the first-generation migrants who migrated in the decades after the Second World War offer a unique opportunity to study whether cultural attitudes surrounding physical activity are still relevant to the changing profile of ethnic groups and whether the socioeconomic status of

the second-generation has improved in comparison to the first, or migrant, generation. The phrase ‘first-generation migrants’ refers to a person of any age that migrates to a new country, therefore there can be first-generation ethnic minorities who are young, middle-aged or old. Likewise, those who are considered ‘second-generation’ can be of any age, and refers to the children of first-generation migrants who were born in the UK (or ‘host country’) or who moved here at a very young age with their first-generation parents. In this thesis I concentrate on adult second-generation South Asians, therefore the parents of these people are almost all middle-aged or older.

This research aims to explore how physical activity has changed between two generations of South Asian ethnic groups, and in particular to explore how and whether the attitudes to physical activity have changed from the first to the second-generation. This research employs a framework that acknowledges the fact that all behaviours are situated in social and physical environments. I begin by exploring what is already known about physical activity in second-generation South Asian ethnic groups and then go on to explore attitudes towards physical activity in the second-generation of Indian women in the UK.

The question of whether ethnic minority groups require specifically targeted physical activity improvement programs is an important one for public health. All public health professionals face the challenge of finite resources and the inevitable opportunity cost associated with developing interventions, since choosing to intervene in one population or one health behaviour reduces the resources available for other populations and behaviours. Having accurate information about the population targeted for health interventions will help make the interventions more successful, as well as assist decisions about whether specialised programs are necessary at all. In light of this, the conclusions arising from this

research are directed at persons responsible for developing health promotion programs at both the environmental and individual level.

1.1.1 Research aims

The primary aims of this research are to:

1. Determine the prevalence of physical activity in second-generation South Asian ethnic groups in the UK.
2. Examine the types of physical activities that South Asian ethnic groups currently participate in.
3. Explore to what extent ethnic background influences physical activity in a particular South Asian group.
4. Explore how the attitudes towards physical activity have changed between two generations of one South Asian group.

1.2 Overview of the topic

In this section, I begin by discussing the nature of ethnicity and its measurement in epidemiology. I then move on to describe physical activity, its importance for public health and what is already known about physical activity in South Asian groups. Finally, I give an overview of theories of health behaviour, and focus on a model for physical activity.

1.2.1 Ethnicity

1.2.1.1 What is ethnicity?

Before discussing why we measure ethnicity in epidemiology and how it is related to physical activity and health, it is useful to understand what is meant by ethnicity and how it

is commonly measured. The word 'ethnicity' itself comes from the Greek word 'ethnos', meaning race, people or nation. The concept of ethnicity is complicated, with many definitions available in the literature.

Social anthropologists have extensively studied the meaning and nature of ethnic groups, and while there is some disagreement within the discipline of anthropology on how an ethnic group should be defined, most scholars agree on two things: that ethnicity is a social identity and that it has connections to a notion of common ancestry[6]. Eriksen describes an example that highlights the social identity aspect. He notes that when Moerman studied the Lue as part of his study on ethnic relations in Thailand, he realised that they had no exclusive livelihood, language, customs or religion; as Moerman could not find any clear-cut objective boundaries, it led him to the conclusion that ethnicity is an 'emic category of ascription'. i.e. people belong to an ethnic group if they assign themselves to it[6 p15-16].

This concept of self-identifying to an ethnic group has become standard in epidemiology and is considered the best-way way of ascertaining someone's ethnicity. However, in epidemiology, people are usually asked to choose which ethnicity they identify with, such as by choosing from a pre-defined list. While there are many individual studies conducted that measure ethnicity, large-scale nationally representative surveys are often cited and used when discussing the health of ethnic groups in the UK. The majority of UK surveys use the census as their reference for studying difference by ethnic group. A question regarding ethnicity was first introduced into the 1991 census, and a document detailing its rationale and definitions was published five years later in 1996. In this document, ethnicity was defined as:

An ethnic group is a collectivity within a larger population having real or putative common ancestry, memories of a shared past, and a cultural focus upon one or more symbolic elements which define a group's identity, such as kinship, religion, language, shared territory, nationality or physical appearance. Members of an ethnic group are conscious of belonging to an ethnic group.[7 p35]

This definition acknowledges the multifaceted nature of ethnicity, which is in line with the anthropological literature discussing definitions of an ethnic group[8]. This definition also includes religion, which is seen as a marker of difference in its own right and is increasingly being used as an analysis category separate to ethnic group. This is illustrated in recent literature that has shown that there are differences in health and health behaviours by both religion and ethnic group[9]. Despite the nuanced definition in the census document, the measurement item for ethnic groups in the UK census does not reflect the multifaceted nature of ethnicity. Figure 1.1 is list of ethnic groups people could assign themselves as belonging to in the 2011 UK census.

As this shows, when considered without the census document's multifaceted definition of ethnicity, which is the situation of every person answering the census questions, ethnicity is reduced to a combination of country of origin and skin colour. An example of this from the list above would be 'Black African'. When a person marks himself or herself as belonging to a particular ethnicity, it is impossible for the researcher to know whether that person had the same understanding of ethnicity as either themselves or other people answering the census. The potential for measurement error is therefore high, which may affect the results and conclusions of any analyses done using the census data. These issues do not necessarily arise with all variables that have a multifaceted nature; for example socioeconomic status is

complex in meaning, but is measured through simple questions regarding occupation, education and income. As the census is used as the benchmark for national surveys and much academic research, it follows that the use of the census categories would create the same problems of inaccuracy around what is actually being measured in questions regarding ethnicity in these settings too.

Figure 1.1 Ethnicity as measured in the 2011 census


16 What is your ethnic group?

Choose **one** section from A to E, then tick **one** box to best describe your ethnic group or background

A White

- English / Welsh / Scottish / Northern Irish / British
- Irish
- Gypsy or Irish Traveller
- Any other White background, write in

B Mixed / multiple ethnic groups

- White and Black Caribbean
- White and Black African
- White and Asian
- Any other Mixed/multiple ethnic background, write in

C Asian / Asian British

- Indian
- Pakistani
- Bangladeshi
- Chinese
- Any other Asian background, write in

D Black / African / Caribbean / Black British

- African
- Caribbean
- Any other Black / African / Caribbean background, write in

E Other ethnic group

- Arab
- Any other ethnic group, write in

Reviews looking into the use of ethnicity in health research have generally found that the majority of papers over the last twenty years have reported no theoretical framework or definition for ethnicity in their research papers[10–12]. One review, which randomly selected 100 original research papers published in high impact journals, found that 85% of their

papers did not report a conceptualisation of ethnicity, and 98% did not report a measurement item used to measure ethnicity or race[12] .

The terms ‘ethnicity’ and ‘race’ are not synonymous and have different referents. As described, ethnicity is a multifaceted concept that is accepted as referring to a social category that someone identifies with. The term ‘race’ is usually understood to refer to physical characteristics of groups of people. This is important when discussing the impact of racism, which is commonly based on differences in physical appearance. However in this thesis, I am primarily interested in the social behaviours of ethnic groups. Historically the concept of race was widely used in research, but while it is still widely used in some parts of the world, it is now infrequently used in Europe. This thesis will therefore concentrate primarily on ethnicity and not the concept of race.

If ethnicity is used as a potential explanatory factor or risk indicator, then we need a theoretical framework to underpin the variable, so that a useful meaning can be given to statistical correlations and associations. A theoretical framework to justify an epidemiological variable is necessary so that interventions and policies can begin to be developed based on the epidemiological evidence. If what a study has measured is unclear, then it is difficult to ascertain what the causes of any differences might be and so design interventions or policies to address them. In this thesis, I situate ethnicity within a socioecological framework, which I expand on during this introduction and later on in thesis[13–15].

1.2.1.2 Why do we measure ethnicity?

The previous section described the problems with measuring ethnicity. Therefore it is valid to ask why we choose to measure ethnicity at all. Mays et al provide a list of the different purposes for which ethnicity is measured[16 p2-3]:

- To describe vital health and statistics
- As a risk indicator for health outcomes
- To improve the delivery of health services
- As a marker of unmeasured biological differences
- As a proxy for unmeasured social factors

The Equality Act of 2010, which superseded The Race Relations Act of 1976, requires the UK government to monitor inequalities by ethnic group and promote equality. The Race Relations Act of 1976 was created in the context of the UK's long history of immigration from the Commonwealth, particularly after World War II, which meant that the UK population became more diverse. The Act stated that one could not discriminate on the grounds of race, colour, nationality, ethnic and national origin in the fields of employment, the provision of goods and services, education and public functions[17].

In 1948, the UK government made all citizens of the Commonwealth full UK citizens through the British Nationality Act. The Commonwealth included the independent countries of Canada, New Zealand, South Africa, India, Pakistan, Southern Rhodesia and Ceylon. The 1948 Act meant that citizens of these countries could freely enter and work in the UK. Although not intended to encourage mass immigration to the UK, this Act facilitated the migration of citizens from the New Commonwealth (all Commonwealth countries except,

Canada Australia and New Zealand). New Commonwealth citizens were attracted by the UK's economic prosperity, low unemployment and labour shortages in the 1950s and many men from the West Indies and South Asia emigrated to the UK during this period[18].

Migration from the Commonwealth to the UK happened in two waves. The first wave of primary immigration took place between 1948 and 1961. A second wave of secondary immigration occurred between 1962 and 1974, when the spouses and dependents of immigrants previously settled in Britain moved to the UK. The Commonwealth Immigrants Act, which restricted Commonwealth citizens' entry into the UK, was passed in 1962 in response to this mass immigration and public riots. However, in the late 1960s and 1970s, South Asian people living in Uganda and Kenya were forced to leave these countries. Since many South Asians living in Kenya and Uganda still had UK citizenship, the UK was forced to accept them and consequently many South Asians from East Africa moved to the UK[18].

1.2.1.3 Why do second-generation ethnic groups matter?

Some ethnic minorities have therefore been present in the UK in large numbers for a number of decades, and have settled and had families. In the 2011 census, over half of all people in the UK who identified as Indian, Pakistani, Bangladeshi or Black Caribbean were born in the UK. These UK-born ethnic groups have had life experiences and childhoods very different to those of their parents. However we know little about how the health behaviours and attitudes of UK-born ethnic groups differ from those of their parents. By using a general measure of ethnicity, which defines ethnicity as a combination of skin colour and geographical origin, we are ignoring the heterogeneity *within* ethnic groups. This heterogeneity may be considerable if large proportions of ethnic minority populations are not in fact migrants, but born and raised the same country as the majority White British

population. A key problem with research to date is that it often concentrates on examining difference *between* ethnic groups, such as Black Caribbeans and Bangladeshis, with little attention paid to differences within ethnic groups such as differences by generation with respect to health behaviours.

One common method of identifying second-generation ethnic groups in datasets is to combine a country of birth variable with an ethnicity variable, to construct a new variable containing information on the ethnicity and generation of the person. However, once this is analysed by sex or age, or both, the number of people in each subcategory becomes too small to give statistically reliable estimates. This means that statistics on health behaviours by generation are not readily available.

1.2.1.4 What are the explanations for differences in health between ethnic groups?

Common explanations for ethnic differences in the prevalence of CVD risk factors include cultural, socioeconomic and genetic factors[19]. This range of explanations could have developed due to the wide array of definitions for ethnicity because 'ethnic group' is an imprecise term[20,21]. As discussed, identification with an ethnic group is a social process that can change over time and reflects a multifaceted association with a group of people. Categories used in the Census, (and consequently in research and other national surveys), such as 'Black African' in reality only refer to the skin colour and geographical origins of a person's family. Such categories can only ever be a proxy for factors such as culture, language or genetics; therefore exploring the causes of differences between ethnic groups as currently categorised will always be complex. Consequently there is still some debate

surrounding the explanations for ethnic differences in disease risk factors and health inequities.

As this thesis is concerned with physical activity, which is a behavioural risk factor, the arguments around genetic differences are not directly applicable. However, it is useful to understand these genetic theories, as they may offer support for why behavioural changes are important. There is a theory that South Asians may have a genetic pre-disposition to developing diabetes and cardiovascular disease. South Asians have a tendency to develop diabetes and atherosclerosis at a lower level of obesity, and at a younger age, than European origin populations. The thrifty genotype hypothesis postulates that Asian populations may have been exposed to cycles of famine throughout their history, therefore genes for fat-storage have been positively selected to aid survival through times of famine. However, genetic studies have so far provided little evidence for this, and it is difficult to prove whether Asian populations have been exposed to more frequent cycles of famine than European populations. An alternative hypothesis, the thrifty phenotype, postulates that a poor intrauterine environment leads to metabolic changes that are beneficial to the infant's survival. When the person has access to a nutrient-rich environment as an adult, these adaptations from early life pre-dispose the person to diabetes and coronary heart disease. This latter hypothesis, the thrifty phenotype, is a possible scenario for people from South Asia, where rapid urbanisation and change in the nutrition and physical activity environment has resulted in the current generation growing up in a very different environment from that of the previous generations. If this hypothesis is true, it lends support to the argument that we need to create healthy environments to facilitate physical activity and healthy eating[22].

Socioeconomic status is a known driver of inequalities in health. It is acknowledged that the lower socioeconomic status of many ethnic minority groups in the UK is likely to be a major contributing factor to differences in CVD risk factor prevalence and CVD mortality between the White British population and some ethnic minorities[19]. Socioeconomic status is a marker of education level, occupation and income. People with a lower socioeconomic status often lived in more deprived neighbourhoods, which tend to have fewer resources and opportunities. Deprivation indices, such as the Index of Multiple Deprivation (IMD), measure different aspects of deprivation and combine them into one measure, which then allows for comparison between different local areas. A report by the Joseph Rowntree Foundation shows that most of Britain's ethnic minorities live in deprived areas, as many live in inner cities[23].

Cultural background also affects health behaviours, and is likewise postulated as an explanation for differences in health between ethnic groups[19]. Culture has many elements, including norms, beliefs and values; different sections of societies, such as ethnic minority groups, may have particular beliefs and values. Norms are often driven by values, which involve judgements of what is acceptable or unacceptable. When these values differ between social groups, they may result in different behaviours, including health behaviours. Culture, however, is not bounded within social groups and consists of more than norms, beliefs and values. Cultures overlap and so are not discrete or isolated - they fragment along lines of power and encompasses more than just the attitudes, values and beliefs held in an ethnic community. Culture may cross-cut other ethnic communities along lines of gender, sexuality, occupation, generation and any other social identity, but these identities overlap therefore culture does not affect behaviour in a straightforward, simplistic way. Essentially, culture is not a characteristic of individuals, but it is a social, relational

characteristic; this means that the way in which culture affects health behaviour will depend on the social environment a person finds themselves in[24]. Social identities are dynamic and situational, meaning that culture may affect behaviour differently according to where the person is and who they are with.

It is likely that a combination of socioeconomic status, urban environments and culture all contribute towards differences in health behaviours between ethnic groups. The balance of these three factors is likely to vary according to both the ethnic group in question and the health behaviour being studied.

1.2.1.5 What are the explanations for differences in health between generations?

Differences in health behaviours between two generations of an ethnic group may be due to a range of factors. Some of these factors may be specific to ethnic groups, while others may be more general.

Age

When exploring differences between generations, there is usually a difference in age group between the two generations. The majority of migrant South Asians in the UK are aged over 55, and the majority of second-generation South Asians are aged under 50. These age differences are sometimes referred to as 'cohort effects', referring to cohorts born in certain decades or events. An example of this would the 'baby boomer generation', born in the years following the Second World War. Differences in behaviour between generations may be due to factors associated with ageing, such as ill-health, or there may be differences in cultural values and early-life experiences. People born earlier in the 20th century will have experienced different social norms as a child, as compared to people born in the latter half

of the 20th century. The increase in television, computers, smartphones, car use and labour-saving devices are all likely to have contributed to very different physical activity experiences between people born at different decades during the 20th century.

A childhood in the UK, as opposed to in places like South Asia or Africa, will also mean that UK-born ethnic minorities will have had early experiences very different from those of their parents, being exposed to different foods, drinking patterns, attitudes to exercise and facilities. When the commonly accepted life-course theory is taken into account[25], which hypothesises that childhood influences affect adult health outcomes, it seems there is a strong case for exploring differences between migrant and UK-born ethnic minority members.

Physical location and created environment

The urban environments that people live in have also changed significantly over the 20th century. Towns and cities have been optimised for car use, and the train network was significantly reduced in the 1970s in expectation of an increase in car use. Many people also work further away from home, meaning that fewer people walk or cycle to work. However, the number of gyms has risen substantially over the past few decades and facilities at local leisure centres have become accessible to a larger number of people through the increase in car use. The majority of the first-generation South Asian population spent their childhoods in East Africa or India, where the urban and social environment was, and is, very different from the UK urban environment. For example, people growing up in India will not have had access to a safe walking or cycling infrastructure.

The importance of physical fitness and activity is taught in schools and many schools offer opportunities to try new sports. The majority of schools in India are not able to offer these

opportunities, meaning that first-generation South Asians who grew up in India may not have experienced positive messages about physical activity during their time at school.

Social class

The socioeconomic position of migrant populations is often low, and may not always reflect their equivalent socioeconomic position in the country they have migrated from. It could be argued that UK-born ethnic minorities are less likely to experience problems arising from their use of language and unfamiliarity with the UK health and employment systems, often described as problems for migrants to the UK[26]. This is likely to give them an advantage over migrants with regards to attaining qualifications or employment. It is possible, therefore, that the socioeconomic circumstances of some UK-born ethnic minorities will be better than their migrant parents – a factor that, as discussed, has been identified as a major contributor to differences in health between ethnic minorities and the White British population.

Acculturation

Studying ethnic groups that have had a childhood in the UK can also help elucidate the extent to which 'culture' plays a part in differences in health behaviours between ethnic groups. The theory of acculturation has often been used to explain why there may be differences between ethnic groups in health behaviours. A commonly quoted definition of acculturation is from 1936 when it first became an object of study: *those phenomena which result when groups of individuals having different cultures come into continuous first hand contact, with subsequent changes in the original cultural patterns of either or both groups*[27 p72]. Central to the idea of acculturation is the concept of culture. Culture can be defined as a set of attitudes, values, beliefs and traditions shared by a group of people and passed from

one generation to the next. While this implies that different cultures are discrete entities, aspects of cultures overlap with others and vary between geographical regions, generations and sexes. This is also a simplification of what is observed in reality, in that those who are deemed to belong to the same culture, may still behave, experience and perceive the world differently.

Taking these nuances into account, as discussed, culture is a major determinant of a person's behaviour, influencing physical activity levels either directly or indirectly. Bandura's socio-cognitive theory states that the interaction between a person's personal characteristics, behaviour and environment are both reciprocal and dynamic[28]. Following this theory, it is likely that exposure to new attitudes and behaviours may have some influence on a person's behaviour – either positively or negatively.

With regards to cardiovascular disease or physical activity, no research has been done on acculturation in South Asian groups in the UK. Research has been done on acculturation and health generally, although the scope of this is limited. A review published in 2003 found that only six studies had been carried out in the UK regarding South Asian populations, acculturation and health. Only a few studies in the United States and Australia have studied CVD risk factors, however none of these looked at South Asian populations [27]. The majority of research in acculturation has been conducted in the United States on Hispanic populations, or in mental health. Unique measures are needed for migrant populations in different countries as acculturation is the interaction of different cultures (or aspects of cultures), which will be in a combination unique to each minority in every country in the world.

Research that has been conducted on acculturation and health has lacked an explicit or current theoretical base or used only inadequate proxy measures that do not capture the values and attitudes of people[29]. A critical review of acculturation and health in Hispanic populations found that two thirds of studies never defined the term and the remainder gave vague definitions of acculturation[30]. Without defining the term, it is difficult to know exactly what mechanism the authors were aiming to measure or what theory the measure is based on. A similar review concentrating on Asian populations found that those measuring physical health and acculturation had tended to use scales based on outdated theories of acculturation, assuming it to be a linear process of assimilating to the majority culture, rather than a multidimensional process, which it is now considered to be [27]. In addition to this, much research on this topic in relation to public health has used simple descriptive measures such as place of birth, language use or generational status; these do not reflect the underlying attitudes or beliefs that a person holds and are only a proxy[31].

Therefore, while acculturation is a theory commonly used to explain differences in health behaviours within ethnic groups, its uses are limited due to the difficult nature of measuring it accurately. I would argue that to gain an understanding of how 'culture' affects health behaviour, qualitative methods of enquiry might be more useful and appropriate than quantitative methods. The concept of 'culture' is complicated and encompasses more than just the attitudes, values and beliefs held by a specific ethnic community. Culture also encompasses attitudes, values and beliefs around issues such as gender and occupation, which apply to people regardless of their ethnicity. Although ethnic background may influence some of these other aspects of culture, when discussing culture as a determinant of health behaviour, it must be remembered that it is not something limited to, or homogeneous within ethnic minority groups.

With an ever increasing UK-born ethnic minority population, it is important to determine what differences exist between first and second-generation or UK-born ethnic minorities if national and local policies aimed at reducing inequalities are to remain relevant to the population they intend to help.

1.2.2 Physical activity

Tobacco use, alcohol use, poor diet and physical inactivity are all health behaviours that put us at risk for conditions such as cancer, cardiovascular disease and poor mental health, which are the leading causes of mortality and morbidity in the world[32]. Physical activity and diet are not just health behaviours that need to be improved or monitored, but are necessary for day to day life. Together with diet, physical inactivity is also a risk factor for overweight and obesity, which has a high prevalence in the UK population, including South Asians[33]. The dietary quality of UK South Asians' diets is unclear, for example, there are conflicting reports over levels of fat intake[34]. Conversely, physical inactivity in South Asians all over the world has been shown to be highly prevalent, particularly with regards to leisure-time physical activity[35,36].

The link between physical activity and life expectancy is well established. Numerous studies have linked physical activity with all-cause mortality and the majority have demonstrated that the more physical activity a person does, or the more fit a person is, the lower their risk of dying (at a younger age)[1]. In particular, these studies have found that the largest gains in longevity are achieved by those who are the least fit or active when compared to the next fittest or active group of people.

Physical inactivity is a particular risk factor for cardiovascular disease, which is currently the largest cause of death and premature death in the world. The INTERHEART study was an

international cross-sectional study conducted between 1999 and 2003; it established the role of physical inactivity as a risk factor for myocardial infarction independently of other risk factors such as smoking and diet[37]. However, despite its independent effects, physical activity also reduces cardiovascular risk through improving the levels of other risk factors. Physical activity has been shown to lower blood pressure and increase the levels of HDL-cholesterol, which transports cholesterol from the blood cells to the liver for removal, therefore helping to reduce the atherosclerotic build up in the arteries, which can lead to coronary heart disease or ischaemic strokes.

Physical activity is also an important factor in preventing obesity, which is currently extremely prevalent across the world and is increasing, particularly in developing countries. Obesity is a risk factor for cardiovascular diseases, some cancers and musculoskeletal disorders. As excess body fat is essentially a process of thermodynamics, where more energy is consumed than expended, it follows that physical activity is needed to maintain weight status and contributes to weight-loss. There is also evidence that physical activity has a protective effect on the type of fat storage, as it alters the distribution of fat by using central body fat, which carries higher health risks than fat stored around the hips or other areas[38].

1.2.2.1 Definition and context

The most commonly used definition of physical activity comes from Casperson et al, who define it as any bodily movement produced by skeletal muscles that results in caloric expenditure. The total amount of this energy expenditure is governed by force generation

by the total muscle mass producing the movements and by the duration and frequency of these muscle contractions[39 p126].

Throughout human history, physical activity has been necessary for day-to-day survival, being essential for obtaining food, providing and maintaining shelter. As human technology has progressed, we have invented more and more items to reduce the physical nature of our work for daily living, and engineered our physical environment so that we can use minimal physical exertion to get around. For populations living in industrialised nations, there is now little or no link between physical exertion and feeding ourselves, with food readily available in supermarkets and shops, and many people driving to get to these supermarkets.

Hunter-gatherer populations living today can be used as a proxy for estimating the level of physical activity human beings would have been doing when living in a hunter-gatherer type of society[40]. For the majority of human history, humans were hunter-gatherers, turning to an agricultural way of life only 12,000 years ago when the climate became more favourable for farming. The importance of this is that for 95% of human existence we have lived as hunter-gatherers, which means that the activity of a hunter-gatherer lifestyle could be considered the 'usual' level of physical activity for human beings, and the last 12,000 years of activity levels represent a departure from our 'normal' behaviour. For example, Cordain et al (2008) compared Western office workers with contemporary hunter-gatherers and found that the total energy expenditure/kg/day of typical contemporary humans is about 65% of people living the lifestyle of a late stone-ager[41]. While it is not desirable or suggested that we return to this way of life, it is useful to understand how active this way of life was

(and still is for some populations) as it shines as strong spotlight on just how inactive the modern way of living is in comparison to the human potential for physical activity.

For adults, the UK government currently recommends that adults aim for at least 150 minutes of moderate-intensity aerobic activity or 75 minutes of vigorous-intensity aerobic activity, or a mix of these two, combined with muscle strengthening exercises on two or more days per week.

As epidemiological surveys show, it is now possible to live our lives with little or no regular physical movement[5]. The 2012 Health Survey for England showed that 33% of men and 45% of women did not meet the current UK recommended levels of physical activity; 26% of women were inactive, measured as doing less than 30 minutes of moderate physical activity or less than 15 minutes of vigorous physical activity per week.

Summary physical activity levels however mask the socially patterned nature of physical activity participation. In the Health Survey for England, the prevalence of people meeting physical activity guidelines decreases by income level, with those in the lowest income group being the most inactive[42]. Sports participation is also socially patterned. The Active People Survey showed that 43% of people in managerial and professional occupations (NS-SEC classes 1 and 2) participate in 30 minutes of sport per week, but only 25% of those in NS-SEC classes 6,7 and 8 participate in the same level of sport. This relationship between physical activity and social class is particularly pertinent when discussing ethnic groups, because, as discussed, many ethnic groups live in more deprived areas and belong to the lower social classes.

Trends over time have to be measured according the old guidelines, which recommended 30 minutes or more per day of at least moderate intensity activity on at least five days per

week. According to this recommendation, the percentage of adults meeting the physical activity recommendations has increased over the past 15 years. For women in 1997, only 21% did the recommended levels of activity, but in 2012, this had risen to 32% (calculated according to previous guidelines).

While physical activity levels have risen over the past 15 years, longer-term trends give context to this. Physical activity related to daily living significantly reduced during the 20th century. Cars, washing machines, vacuum cleaners, blenders and many more household objects have made traditional domestic housework considerably less physically exerting than it had been before the invention of these technologies. Our ways of getting around have also become less physically demanding, with cars and buses now making up the majority of our transport methods, instead of the more active methods of walking, running or cycling[43,44]. The National Travel Survey shows that in the mid-1970s 59% of adults lived in a household with car; by 2012 this had risen to 80%.

1.2.2.2 Types of physical activity

People are active in different ways, and these ways can be categorised into four main domains, namely domestic activity, leisure-time physical activity, active transport and occupational physical activity. These four areas offer different opportunities for interventions to increase physical activity in populations, and help to focus physical activity research.

These activity types differ in the amounts they contribute to overall physical activity. Allender et al 2008 used the Health Survey for England to examine the relative contribution of occupational physical activity to English adults meeting the old UK government guidelines. They found that occupational physical activity contributed a substantial amount

to overall physical activity; once occupational physical activity was removed from the analyses, men meeting the physical activity guidelines reduced from 36% to 23%[45]. A similar analysis using the 2003 Health Survey for England found that when domestic activity was excluded, the proportion of people meeting physical activity recommendations dropped from 24% in men and 20% in women, to 18% and 13% respectively[46].

Bélanger et al (2011) describe the types of moderate and vigorous physical activity that active adults do, according to their age group. Walking and household activity made up the majority of people's physical activity, with the proportions increasing for the older age-groups; running and aerobics were common activities in the young age-groups[47]. Payne et al conducted a similar analysis in children, finding that the majority of active children were active through active play and that both walking and sports increased as children got older, particularly in children aged over 11[48].

The Active People Survey annually collects information on who plays sport and what types of sport they are playing. In 2013/14, 15.6 million adults played sport at least once a week, although 52% of adults do not play any sport. As with physical activity overall, sports participation is socially pattered, with more people in managerial or professional positions playing sport. Sport participation also declines as we get older, with 55% of 16 to 25 year olds playing sport, but only 32% of adults aged over 26 playing sport. In 2013/14, the most popular sports in England were swimming, athletics, cycling and football.

The National Institute for Health and Care Excellence (NICE) provides recommendations for increasing physical activity in different settings and for the different types of activity. Occupational physical activity has some opportunity for population level intervention, but because type of work determines the level of exertion, the majority of opportunities for

intervention are in the physical environment of the workplace itself. As the majority of adults travel to work on a daily basis, there is also scope to increase active transport when considering occupational physical activity. For the workplace, NICE recommend providing showers, encouraging stair-use, providing cycle parking and supporting recreational activities during lunchtimes or outside of working hours[49]. Other population-level options for increasing active transport include improving the urban environment to encourage cycling and walking, mass media campaigns and targeted behaviour change programmes[50]. Panter et al (2013) analysed a commuting study based in Cambridge, UK and found that those who could not park at work and people who had supportive environments for walking and cycling were more likely to use these methods to travel to work[51].

For leisure-time physical activities, such as walking and sports, there many opportunities for intervention at a population level through improving local facilities and encouraging active hobbies from a young age through school and community groups[52]. However, Ogilvie et al (2004) reviewed the evidence on interventions to promote walking and found that there were more studies targeting individuals and small groups than studies targeting communities and environments. The evidence that was available showed that walking interventions aimed at motivated or sedentary people and delivered at the individual or household level could increase walking by up to 30 to 60 minutes per week[53].

1.2.3 Theories of health behaviour

Theories of health behaviour help us to systematically outline the potential determinants of health behaviours. Theoretical models for why people carry out certain health behaviours help to elucidate potential pathways and areas for intervention, and the subsequent evaluation of those interventions. Without a model of health behaviour, it is possible to

over-emphasise particular determinants, or entirely miss other determinants. To truly understand how to change behaviour, we must first aim to understand what drives people to carry out that behaviour in the first place.

The causes of physical inactivity in any population are known to be rooted in more than just individual choice[54]. The choices that people make in their lives are heavily influenced by their social, physical and economic environments, which interact with the more individual levels of knowledge and understanding about the health consequences of a particular behaviour. A number of explanatory theories of health behaviour have been developed. The focus can be on the psychology of the individual, the influence of a person's social network, or the interaction of a person with their physical environment; the latter are often referred to as ecological models.

Psychological models

There are a number of psychological models that aim to explain health behaviour in humans. 'The Health Belief Model', the 'Theory of Reasoned Action/Planned Behaviour' and 'Stages of Change' are three of the most popular. While these theories are often used in health promotion, a major critique is that they neglect the maintenance of behaviour change and minimise the effects of a person's physical environment.

The health belief model was developed in the 1950s by social psychologists[55]; it employs concepts such as perceived barriers, benefits, susceptibility and severity to explain what people take into account before they choose to carry out a certain behaviour or not. Demographic, social and structural variables are all considered to influence a person's perceptions and therefore their choices.

The theories of reasoned action and planned behaviour consider a person's attitudes towards a behaviour to be the most important determinant of whether they carry out that behaviour, along with their subjective norms[55]. A person's attitude is determined by their beliefs about the outcomes or attributes of carrying out the behaviour, whereas a person's subjective norm is determined by their normative beliefs. The theory of planned action also includes the perceived control a person has as vital in whether they act in a certain way. Demographic, social and structural variables are considered as factors that influence a person's attitudes, beliefs and norms.

The first psychological model to include a temporal dimension to health behaviour theories was the transtheoretical model, which describes people going through different stages when changing a behaviour. Originally developed when studying how smokers quit smoking, it has now been applied more generally. While this has become a widely used theory for behaviour change, its usefulness in preventing, as opposed to changing, types of health behaviour is yet to be established[55].

Factors such as the perceived barriers, perceived benefits or attitude to physical activity are aspects that may differ between ethnic groups. These factors can also change between two generations of any ethnic group, due to the difference in childhood experiences and exposure to different attitudes. A person's perception of control over their life could also change within a generation of an ethnic minority group, as migrants may face issues such as language barriers, which affects their confidence in interacting with the wider society.

Psychological theories such as the ones described here, are helpful for understanding how individual behaviour can be changed. However, all these theories state that there are factors beyond an individual's control, such as social and environmental influences, which in

part determine a person's attitudes, norms, perception of barriers and benefits. Despite this, critics of health behaviour models recognise these theories consider only individual factors in depth, and give minimal attention to powerful environmental and social variables.

Bandura formalised 'Social Cognitive Theory' (SCT), which used the concept of reciprocal determinism to explain how human behaviour is a product of the relations between a person's personal, behavioural and environmental influences i.e. humans learn by observing others. SCT prioritises human agency in this relationship because humans have the ability to change and create their environment and to work collectively to make changes beneficial to a large group of people. A major problem with this theory, however, is that because it is so broad and all encompassing, it is not easy to evaluate an intervention using this framework. As with the psychological theories, emphasising that humans learn behaviour from other people, with some impact from the environment they are in is pertinent to ethnic minorities if we assume that ethnic minority groups predominantly learn their behaviour from people in the same ethnic group as themselves. The major flaw in this argument is that it ignores other aspects of identity, such as gender and age.

Ecological models

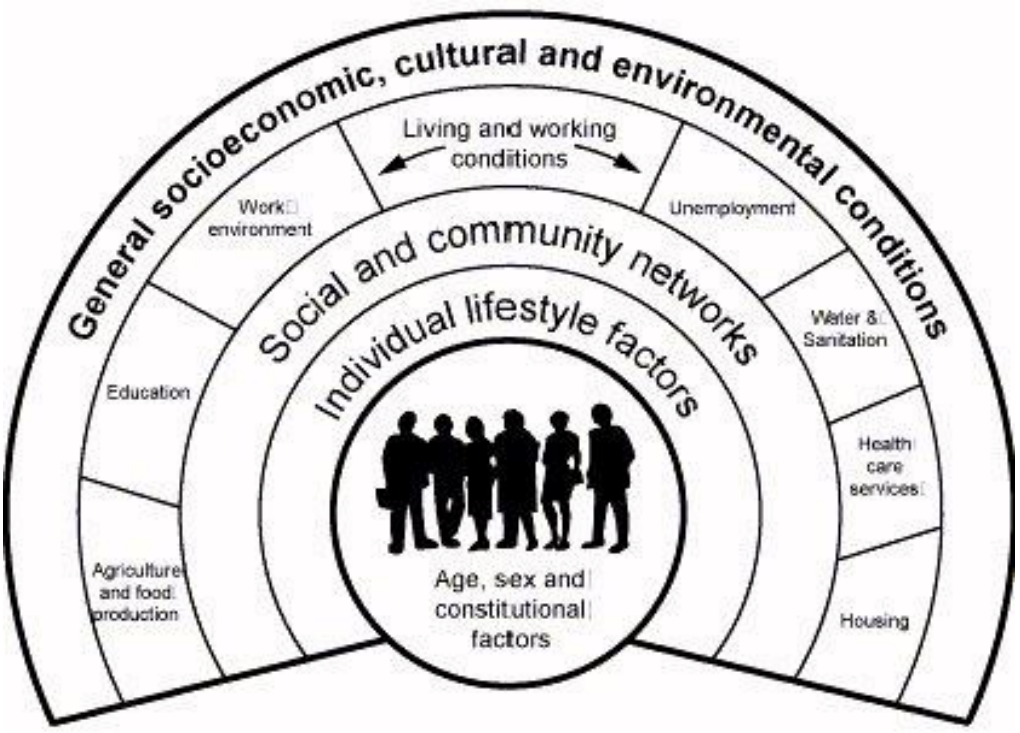
Ecological models (also known as socio-ecological models), like SCT, take many levels of influence into account, but the emphasis is placed at the physical and social environment level, rather than on the role of individual people. A number of different socio-ecological models have been proposed. However, Sallis et al (1999)[56 p466] recommend four core principles for ecological health behaviour models:

1. Multiple influences on specific health behaviours
2. Influences of behaviours interact across these different levels

3. Ecological models should be behaviour-specific
4. Multi-level interventions should be most effective in changing behaviour.

A famous example of this type of model was produced by Dahlgren and Whitehead in 1991[13]. This highlights the different elements involved in how a person decides to carry out a particular health behaviour, although the model is not behaviour specific. Figure 1.2 describes how individual people carry out a behaviour in a social and/or community network, which itself exists within economic, political and physical conditions.

Figure 1.2 Socio-ecological framework by Dahlgren and Whitehead 1991



A major critique of the socio-ecological model is that it does not explicitly take the life-course into account, with experiences of general socioeconomic, cultural and environmental conditions in childhood having a significant impact on health behaviour as an adult. It also appears as a static model, even though physical and social environments change throughout

people's lives. The all-encompassing nature of the model also makes it difficult to evaluate interventions based on it, as it is difficult to measure precisely whether a person's behaviour has changed due to their physical environment, their social environment, or a combination of both.

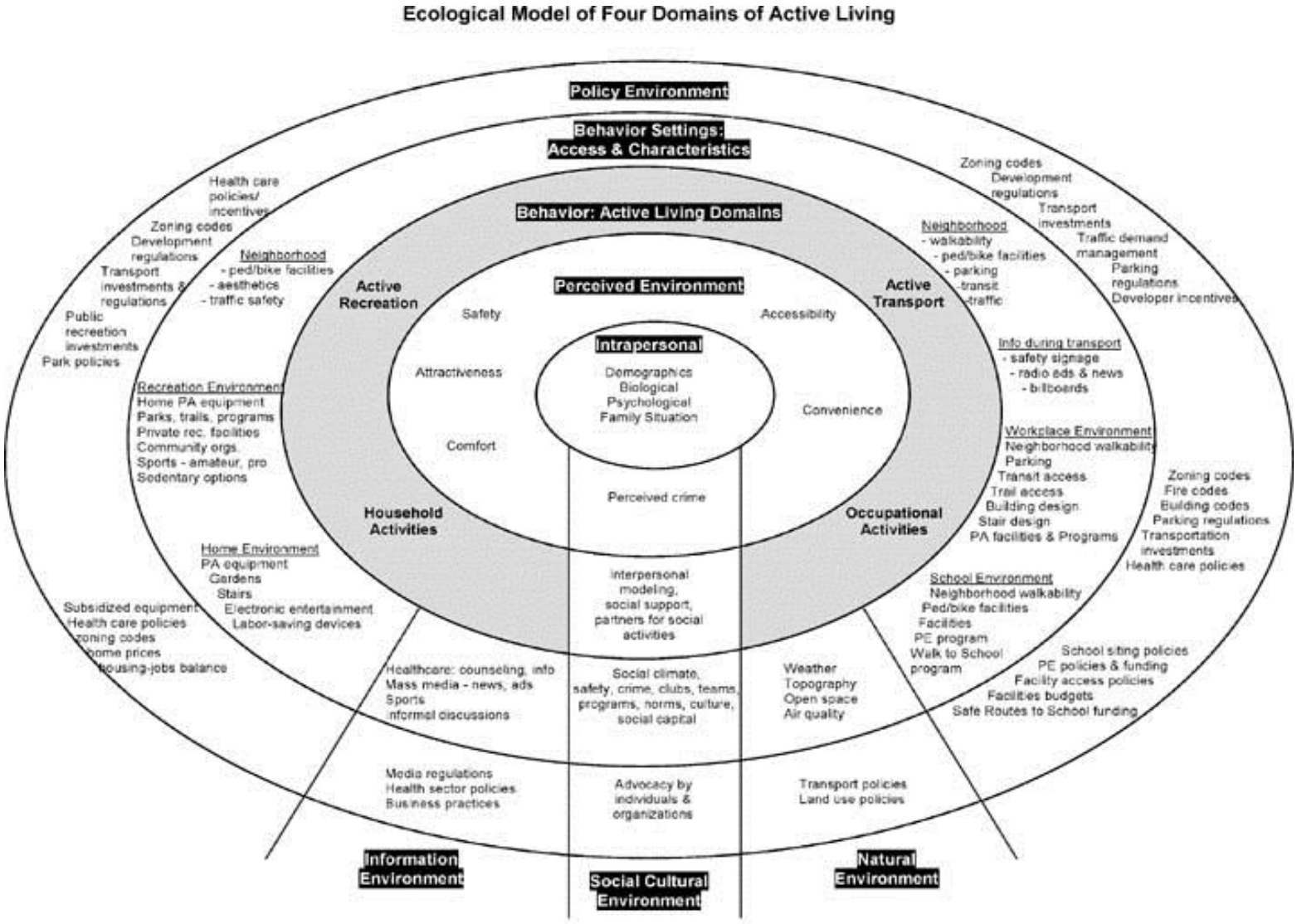
Despite its limitations, the socio-ecological model is very useful when studying health behaviours in ethnic groups, because it helps to contextualise behaviour and remind us that ethnic minority groups often live in the same physical and social environments as the majority population, and so may be equally affected by them.

1.2.3.1 Physical activity in a socio-ecological framework

Sallis et al presented an ecological model for 'active living' in 2006, which describes in detail which aspects of our environments and personal lives influences physical activity (Figure 1.3).

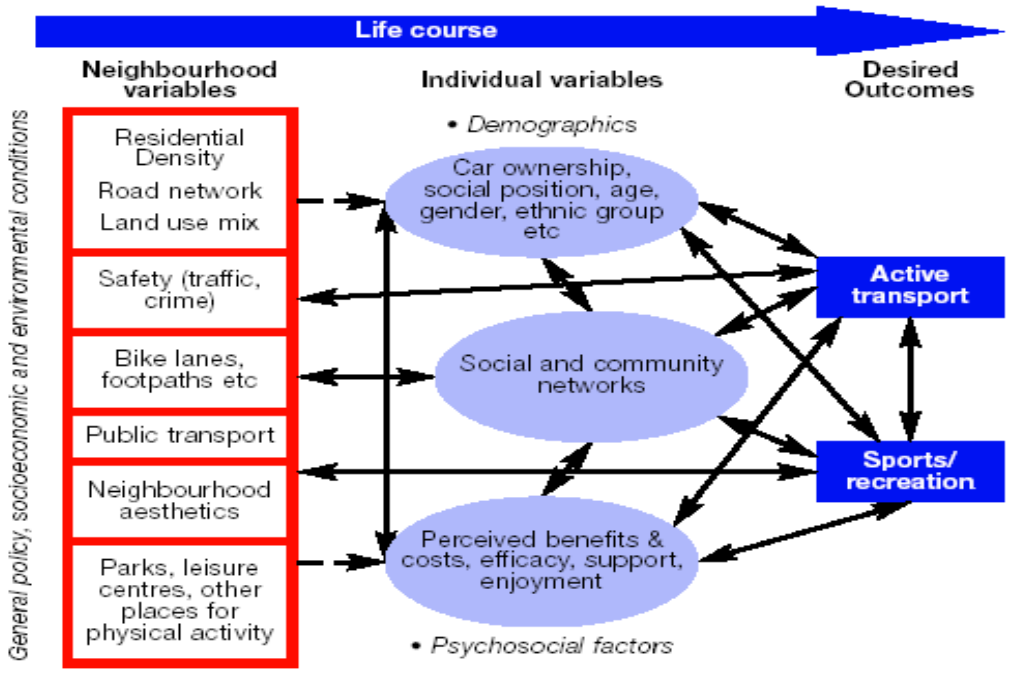
Foster el (2005) also constructed a model specifically for physical activity determinants, which more clearly describes the processes of interaction between the different domains (Figure 1.4). Foster et al (2005) specify the elements of the local environment that might affect physical activity, and how they would interact with a person's networks, status and individual characteristics, to influence how active a person is[57]. The role of the life-course is also integrated into this model, which is an important aspect to consider, as people experience different types of environments and social behaviours at different stages of their lives.

Figure 1.3 Ecological model for four domains of physical activity. From Sallis et al 2006



Sallis JF, et al. 2006.
Annu. Rev. Public Health 27:297–322

Figure 1.4 Socio-ecological framework for physical activity showing how the different variables might interact to influence physical activity, by Foster et al 2005



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in this model ethnicity has been placed at the individual level, while interacting with the social and community networks and the more psychological aspects of behaviour. As a social characteristic, it is legitimate to question whether ethnicity should be placed at the individual level, along with other variables such as car ownership. The discipline of epidemiology struggles with social variables, such as ethnicity, as they are treated as individual characteristics rather than properties of relationships; this makes it easier to place them into statistical models, but means that it is difficult and messy to interpret how a relational variable, such as ethnicity, is affecting a health outcome. Relational variables are studied with more nuance in sociology and anthropology, describing relationships between people and how those relationships affect access to resources and conflicts over power[58].

Intersectionality theory highlights the complex nature of social identities and the ways in which they can affect behaviour. Under intersectionality theory, it is not possible to consider the impact of a person's ethnicity, without also considering their gender, sexuality, socioeconomic status and other aspects of identity. As a person is not only 'Asian' but they also have a gender, social class and sexuality at the same time; this means that all aspects of their identity should be considered simultaneously[59,60]. As the measurement of ethnicity in epidemiology ignores the relational properties of ethnicity, and the fact that it needs to be considered in conjunction with other aspects of identity, fitting it accurately into socioecological models can be problematic.

Similarly, in epidemiological research, socioeconomic status (SES) is regularly included as an explanatory variable for ethnic difference in statistical regression models. However, local environment measures such as sports facilities, perceived crime and walkability of neighbourhoods are infrequently included in papers which investigate the relationship between ethnicity and physical activity[61]. Given that the local environment is an important factor in research investigating the determinants of physical activity, I would argue that it is a significant omission from the current research into the causes of differences in physical activity within and between ethnic groups in the UK. This is particularly the case for South Asian groups, which tend to live in deprived, urban areas of the UK.

As with any health behaviour in epidemiology, there are different stages at which research can be carried out. Sallis & Owen (1999) outline a behavioural epidemiology framework for physical activity and health, which is useful when determining where this thesis fits in the broad scheme of physical activity research. Their framework consists of five phases:

1. Establish the links between physical activity and health

2. Develop methods for accurately measuring physical activity
3. Identify factors that influence the level of physical activity
4. Evaluate interventions to promote physical activity
5. Translate research into practice

Significant inroads have already been made in some of these five areas and we already have a wide knowledge base about physical activity and health. This research focuses largely on 'phase three', aiming to provide further information on what influences physical activity in a particular sub-population.

1.3 Structure of this thesis

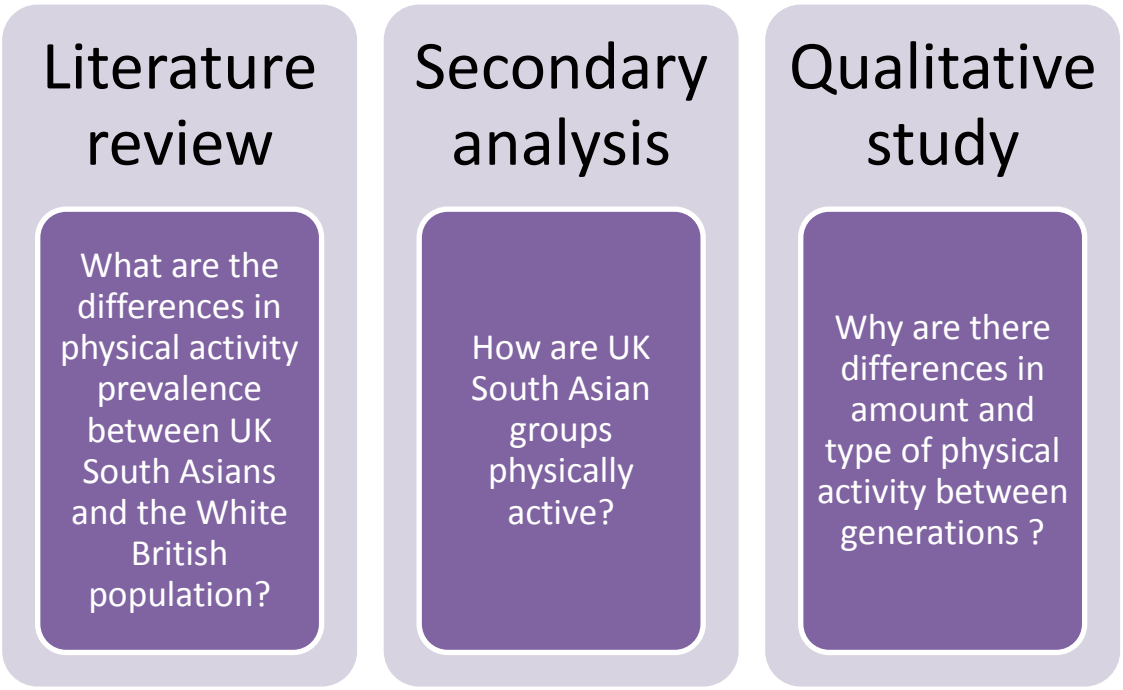
In this introductory chapter I have discussed the complex nature of ethnicity, which is rarely reflected in epidemiological research. I have also outlined the importance of physical activity and the ways in which people can be active. The remainder of this thesis comprises three main stages, which are summarised in Figure 1.5. Together, these three pieces of research help give a more detailed picture of physical activity in second-generation South Asians.

In the first stage (chapter two) I review the existing literature on physical activity in UK South Asians, with an aim to explore whether physical activity has been studied in second-generation South Asians. At the end of chapter two I outline my main research questions for the thesis. The second stage of the thesis is in chapter three, where I analyse how UK South Asian groups are active, and compare this to the White British population. The first two stages feed into the third stage, which is in chapters four to seven. In these four chapters I report on my qualitative study on physical activity in second-generation Indian women, which aims to understand why there are differences in physical activity between first and

second-generation Indian women. The final chapter brings together the findings from the three stages of the thesis, where I have outlined the ways in which the findings from this thesis could inform public health recommendations. In summary then, this thesis comprises:

1. A review of the literature on physical activity in South Asian ethnic groups in the UK.
2. A secondary analysis of a national dataset containing information about South Asian ethnic groups and physical activity.
3. A qualitative study to explore the changes in attitudes to physical activity over two generations of Indian women and the influence of ethnicity in the context of the wider physical and social environment.

Figure 1.5 Structure of this thesis



Throughout this thesis, I will refer to people who migrated to the UK after age 11 as 'first-generation' and people who were born in the UK or moved here before age 11 as 'second-

generation'. The age cut off of 11 corresponds with the start of secondary school in the UK and has also been used previously by Smith at al (2011) in an epidemiological paper examining cardiovascular disease risk factor prevalence in second-generation ethnic groups[62]. While in this thesis I discuss and analyse two generations, the process of categorising the second-generation is not straightforward. It is possible to count the second-generation only as people who were born in the UK, however people who have attended primary school in the UK will have been exposed to similar experiences to people who were born in the UK. As discussed, life-course theories postulate that experiences in childhood affect adult health behaviours and outcomes[25]. Therefore including people who have had significant portions of their childhood in the UK in the second-generation group allows for the fact that early childhood, not just country of birth, can affect adult behaviours. The question becomes about how early a person should have moved to the UK in order for them to have been sufficiently exposed to a UK childhood. I have chosen to use age 11 in this thesis, however I could have also chosen age 4, as a time when children start primary school. Essentially there are three generational groups – one group that was born in the UK, one group that moved to the UK during childhood, and one group that moved to the UK as adults. This thesis concentrates on the latter two groups for practical reasons, but it is possible that people who were born in the UK will have different health behaviours and influences to people who moved to the UK at some point during childhood.

1.3.1 Combining quantitative and qualitative approaches

Mixed methods research can be designed in a number of ways, with different ways of combining qualitative and quantitative work. Although traditionally described as belonging to different paradigms, quantitative and qualitative research can corroborate each other

through complementing and enhancing the information from each other[63]. Usually quantitative research draws on a positivist a paradigm and qualitative research draws on an interpretivist paradigm, but this does not mean that research must be constrained to one method or the other to answer research questions[64]. Together the two different methods of enquiry can help create a bigger or more detailed picture of a topic. Underpinned by the socioecological framework, I hope combining the two types of research will provide a detailed picture of the ways in which UK second-generation South Asians are active, and why they carry out these behaviours.

The research questions in the thesis require different approaches to answer them appropriately and I aimed to use the results from the first (quantitative) piece of work to inform the qualitative study that will answer the second and third research questions. While the main volume of this thesis will be qualitative in nature, further exploring the epidemiology of physical activity in young adult South Asians helped to inform the recruitment process and the actual topics included in the interviews.

To understand fully how ethnicity affects people's behaviour, it is necessary to investigate their experiences in depth and develop a clearer idea of the factors that contribute to ethnic differences in health. As discussed, ethnicity is predominantly a social identity. Social identities are not static in their nature and can change according to the social group you are with, the physical location you are in, or the stage of life you are in[24]. Therefore if we want to understand how ethnicity influences physical activity, a behaviour that is carried out among different social groups, in different localities and throughout life, we must also aim to understand how ethnicity relates to these factors[58].

Qualitative research is ideal for understanding these social relationships. The methods of qualitative research will also allow me to gain a deeper understanding of each participant's local environment and how it impacts on their physical activity choices. The preceding quantitative work on epidemiology provides imperfect but useful information about how the second-generation generation may differ from the migrant generation and the majority White British population in their demographics and physical activity. In the final chapter, I bring together and discuss the findings of both the epidemiological work and the qualitative findings.

2. Physical activity in UK South Asians: a review of the literature

2.1 Introduction

The aim of this chapter is to understand what we know about generational differences in physical activity within UK South Asians. After identifying the gaps in the literature, I go on to outline my research questions and explain how I aim to answer them.

In this chapter, I present a review of literature exploring physical activity in South Asians in the UK. I examine both the quantitative and qualitative literature, to establish how physical activity varies within South Asian ethnic groups, and what motivations and barriers have been reported within South Asian ethnic groups. For the quantitative section, I reviewed the observational quantitative literature to explore if differences in physical activity have been reported by sex, age and generation in UK South Asian groups.

This review is an update of a search I initially conducted in 2011, which focused on generational differences in physical activity in South Asian adults. The aim of this 2014

review was to identify papers reporting the prevalence of physical activity by subgroup of South Asians ethnic groups, specifically Indians, Pakistanis and Bangladeshis living in the UK. This is in relation to the first research question of my thesis.

1. Is the physical activity prevalence of second-generation South Asians reported?

I also aimed to understand what qualitative literature has already been published on physical activity in UK South Asians, in order to help inform my qualitative study. For the qualitative section, I attempted to answer the question:

2. What are the motivators, barriers and influences on physical activity in UK South Asians?
    a. How does this vary by age or generation?

2.1.1 What do we know about the physical activity of UK South Asians?

In this chapter I review the literature on physical activity in UK South Asians to explore how physical activity varies within UK South Asian groups, but there is already information published on the physical activity levels of South Asian groups in general. There have been two reviews on physical activity in South Asian populations during the past decade. Fischbacher et al (2004)[65] reviewed physical activity in UK South Asians, and Babakus & Thompson (2012)[36] reviewed physical activity in South Asian women internationally. Both reviews reported low levels of physical activity in South Asians, with women in particular having a low level of physical activity. Babakus & Thompson (2012) also reported on the barriers and motivations for physical activity in South Asian women found in the literature.

Within the UK, the Health Survey for England 2004 was the latest health survey to boost the ethnic minority sample, therefore it providing the most reliable estimates for physical activity levels in English ethnic minorities. According to the old physical activity guidelines that were in place in 2004, 37% of men and 25% of women in the general population were doing the recommended levels of physical activity. Comparisons between ethnic minorities show that Bangladeshi men and women had the lowest proportion of people meeting the guidelines (26% and 11% respectively)[66]. The Health Survey for England also reported that differences between younger and older people were greater among Indian women and Bangladeshi respondents, than among the general population (mostly the White British group). 18% of Indian women aged 16 to 34 compared to 2% of Indian women aged over 55 were highly active[65].

There are no ethnic-specific cohorts in the UK, although there are studies that have a high-proportion of ethnic groups in their sample. However, these cohorts are all set up to explore the health and behaviour of children, meaning that information on the health behaviours of UK-born ethnic minority adults will not be available for some years. Children's behaviour is heavily influenced by their parents, therefore it is necessary to study adults in order to get an accurate picture of how the second-generation differs from their parents.

It is particularly important to understand the differences in these risk factors between migrant and second-generation ethnic groups because the second-generation of some ethnic groups is still relatively young and may still have a good chance of altering their risk of CVD in later life[67]. A childhood in the UK has exposed second-generation ethnic minorities to many experiences that differ from those of their parents, therefore it is plausible and probably likely that second-generation ethnic minorities differ from their parents in their

health behaviours. Physical activity is known to be low among South Asians compared to the rest of the population[68]. However exposure to activity in school, through the media and the wider social environment may mean that second-generation ethnic groups will have physical activity patterns that differ from the first-generation.

2.2 Methods

I performed systematic searches in MEDLINE, Embase and Psychinfo for papers written in English and published between 1990 and 2014. I also attempted to search literature not published in peer-review journals (the 'grey' literature). The website www.better-health.org.uk has a comprehensive list of resources and organisations that work on ethnicity and health; I searched through the website of each organisation that worked with a relevant ethnic group or on physical activity to find additional papers.

I combined three groups of search terms using the 'AND' command. The search terms related to South Asian ethnicity were, 'Asian', 'Indian', 'Pakistani' and 'Bangladeshi'. The terms on physical activity included 'physical activity', 'exercise', 'walking', 'leisure', 'sports' and 'transport'. The third group limited the search to the United Kingdom, and the MeSH term 'United Kingdom' was used with all its subheadings.

Both MeSH terms and keywords were used; the full search strategy used to search the databases is detailed in Appendix I. I assessed the quality of the papers after determining whether they met the inclusion/exclusion criteria.

The inclusion and exclusion criteria for the reviews were as follows:

Inclusion/exclusion criteria for all:

- Papers must report on South Asian populations residing within the UK (Indian, Pakistani or Bangladeshi).
- Papers must have been published between 1990 and 2014.
- Review articles will be excluded.
- Patient groups will be excluded.

For the quantitative literature:

- Papers must report on the prevalence of physical activity.
- Papers reporting only physiological data on fitness will be excluded.
- Papers reporting observational studies will be included.
- Papers reporting experimental studies will be excluded.

For the qualitative literature:

- Papers must report on the attitudes, influences, barriers or motivators to physical activity.

The search yielded 821 hits altogether. I reviewed the search results by first examining the titles and abstract of those that met the inclusion criteria. If the abstract met the inclusion criteria, I read the paper in full to decide whether or not to include it in the review. Dr Charlie Foster also read through a 20% of the abstracts to judge against the inclusion/exclusion criteria and any disagreements were resolved through discussion. I searched the references of all papers read in full and the publication lists of included authors; I subjected these to the same title and abstract screening process. Figure 2.1 illustrates the review process. Reasons for exclusion at the title and abstract level included

not reporting on the prevalence of physical activity, not reporting on South Asian ethnic groups and not reporting on a UK population.

2.2.1 Data extraction

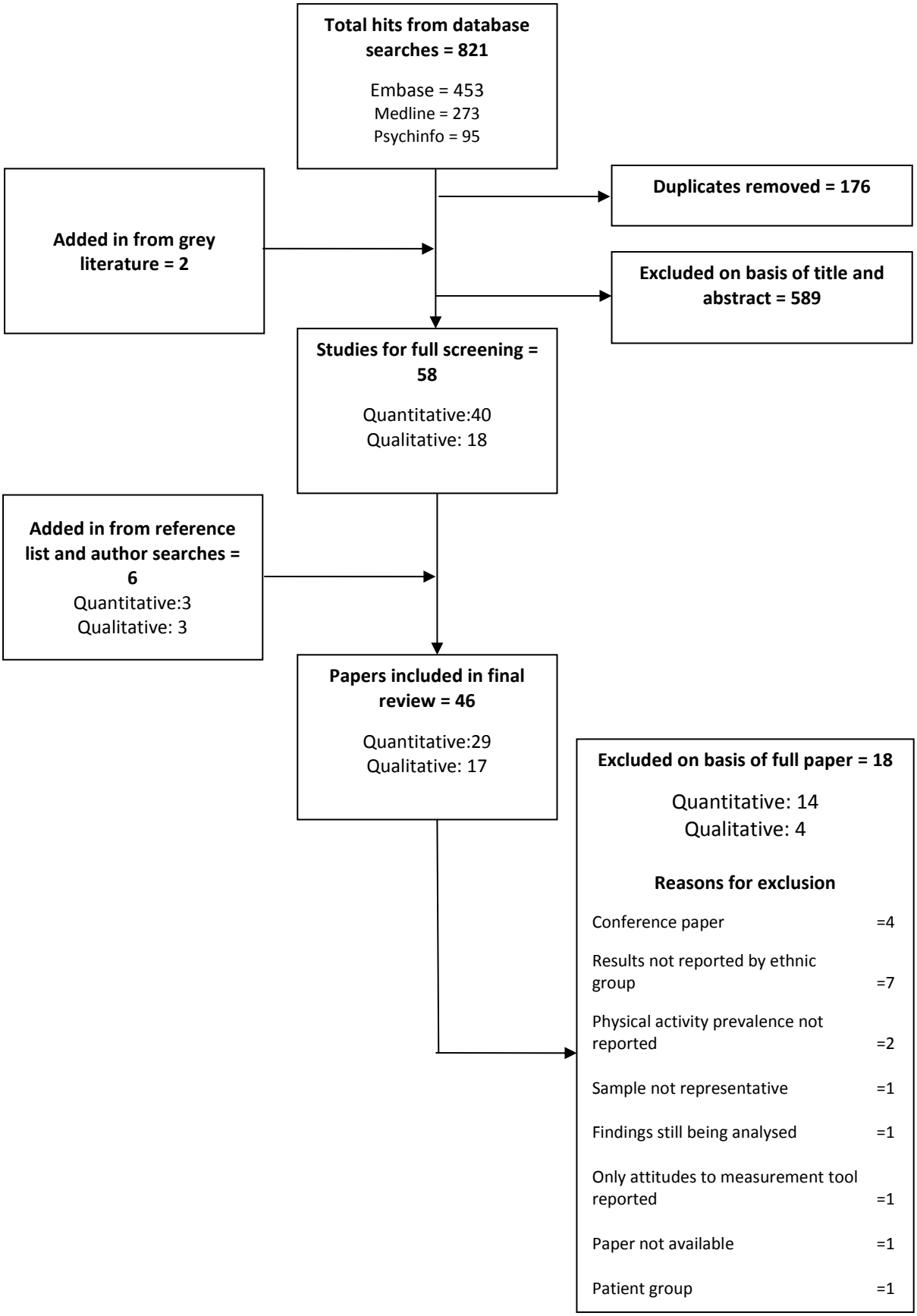
For the quantitative studies, I extracted data on ethnic group, whether there was a comparison to the White British or general population, type of measurement, location of study and sample size. For the qualitative studies I extracted information on data collection method (focus groups or interviews), ethnic group, location, number of participants and analysis approach.

2.2.2 Study quality assessment

I assessed the quality of the papers included in the review, using a quality appraisal tool from the National Institute for Health and Clinical Excellence (NICE) Public Health guidance[69]. Quality appraisal tools are intended as guides, and I used the checklist for studies reporting correlations and associations provided in the document, to assess both the internal and external validity of the papers.

For the quantitative observational studies, I organised the reported prevalence of physical activity according to age-group of ethnic group. For the qualitative literature I synthesised the themes and also reported these according to age-group.

Figure 2.1 Flow chart of review process



2.3 Results

2.3.1 Quantitative studies

Table 2.1 describes the basic characteristics of the included papers, of which there were 29[9,62,70–96]. One study was a prospective cohort[76] and the rest were cross-sectional. Eight studies had participants from central England, six were in London, five studies were based in the North of England, four in Scotland, one in Bristol and the rest were across England or the UK. The age of participants ranged from two to 79, and I have presented the results for children and adults separately. Twelve of the 29 papers reported by sub-group of South Asian ethnicity or religion, with rest grouping Indians, Pakistanis and Bangladeshis into the broader South Asian category. All but one of the included studies compared the physical activity prevalence of South Asians to the White British, therefore I have included the comparison to the White British group in order to give context to how active the second-generation South Asian groups are.

Eight of the studies used accelerometers or pedometers to objectively measure physical activity levels, with all but two of these studies being carried out with school-children. Six studies reported using validated self-report questionnaires, however the rest, which were the majority of papers, used self-report, non-validated questionnaires to measure physical activity.

2.3.2 Qualitative studies

I included 17 studies in this review[97–113] (Table 2.2). The locations of the studies varied, with four based in London, four in the North West of England and four in central England. The rest of the studies were based in Scotland, Wales or Great Britain in general. The age range of participants ranged from eight to 70, and I have presented the findings for children,

second-generation adults and adults of any age, using the socioecological model. Six of the studies reported interviewing South Asians, with the other 11 presenting findings for Indians, Pakistanis or Bangladeshis separately. Interestingly, none of the papers included here specifically reported differences between South Asian groups, usually just stating when a finding or theme was relevant to one of the ethnic groups in particular.

Table 2.1 Characteristics of quantitative studies

Author and year	Study design	South Asian Ethnic groups (N)	Comparator (N)	Sex	Age-group	Location	Physical activity measurement instrument
Duncan et al 2006[70]	Cross sectional	Asian (67)	White (176), Black (33)	Male and Female	11 to 14	Birmingham	Self-report, validated questionnaire - Four by one day
Duncan et al 2008[71]	Cross sectional	South Asian (209)	White (397)	Male and Female	11 to 14	Birmingham	Self-report, validated questionnaire - Four by one day
Duncan et al 2012[72]	Cross sectional	South Asian (67)	White (469)	Male and Female	8 to 11	Coventry	Pedometers worn over 4 days
Eyre et al 2013[73]	Cross sectional	South Asian (65)	White European (96)	Male and Female	8 to 9	Coventry	Physical activity and heart rate worn monitor for 7 days
Falconer et al 2014[74]	Cross sectional	South Asian (607)	White (1,904), Black/Black British (226)	Male and Female	4 to 5 and 10 to 11	5 PCTs in England	Self-report questionnaires
Ghouri et al 2013[75]	Cross sectional	South Asian (87)	European (99)	Male	40 to 70	Scotland	Accelerometers worn for 7 days
Griffiths et al 2013[76]	Prospective cohort	Indian (139), Pakistani (177), Bangladeshi (70)	White (5,710), Mixed (168), Black (142), Other (90)	Male and Female	Age 7	UK	Accelerometer worn for 7 days, during waking hours.
Harding et al 2008[77]	Cross sectional	Indian (218) Pakistani/Bangladeshi (222)	White UK (589), White Other (218), Black Caribbean (453), Black African (593), Mixed (279)	Male and Female	11 to 13	London	Self-report physical activity questions on vigorous sports
Hayes et al 2002[78]	Cross sectional	Indian (249), Pakistani (287), Bangladeshi (117)	European (749)	Male and Female	25 to 74	Newcastle	Self-report physical activity questionnaire, then created an index
Hemmings et	Cross	South Asian (12)	British White (11)	Male	14 to 15	London	Accelerometer worn for 7

al 2011[79]	sectional pilot						days
Hine et al 1995[95]	Cross sectional	Indian (52), Pakistani (79), Bangladeshi (21)	None	Female	18 to 74	Bristol	Self-report questionnaire
Karlsen et al 2010[9]	Cross sectional	Muslim Indian (270), Pakistani (2,120), Bangladeshi (1,943) Sikh (657), Hindu (1,195)	Christian by White British (10,577), Irish (1,729), Caribbean and No religion by White British (2,371), Caribbean (309)	Male and Female	Above 2	England	Self-report question on taking no regular physical activity
Khunti et al 2007[80]	Cross sectional	South Asian (2,732)	White European (447)	Male and Female	11 to 16	Leicester	Self-report questionnaire derived from Four by one day
Knight et al 1993[81]	Cross sectional	Asian (128)	Non-Asian (160)	Male	20 to 65	Bradford	Self-report lifestyle questionnaire including exercise
Lean et al 2001[82]	Cross sectional	South Asian (119)	Italian (90), General Population (50)	Female	20 to 42	Glasgow	Self-report question on sport and recreational exercise
McMinn et al 2011[83]	Cross sectional	South Asian (487)	White European (508), Black African-Caribbean (576)	Male and Female	9 to 10	London, Birmingham, Leicester	Accelerometer worn for 7 days, during waking hours.
De Munter et al 2013[84]	Cross sectional	Indian (1,264)	English European (14,723), English African (1,112)	Male and Female	35 to 64	England	Self-report questionnaire based on Allied Dunbar National Fitness Survey
Owen et al 2009[85]	Cross sectional	South Asian (494)	White European (562), Black African-Caribbean (607)	Male and Female	9 to 10	London, Birmingham, Leicester	Accelerometer worn for 7 days, during waking hours.
Pollard et al 2008[86]	Cross sectional	British Pakistani (60)	European (25)	Female	20 to 40	North East England	Self-report, validated questionnaire - International Physical Activity Questionnaire
Pollard et al	Cross	British Pakistani (67)	White British (70)	Female	9 to 11	North East	Accelerometer worn for 2

2012[87]	sectional					England	school days
Pomerleau et al 1999[88]	Cross sectional	South Asian (291)	European (559), Afro-Caribbean (303)	Female	40 to 69	London	Self-report questionnaire
Riste et al 2001[89]	Cross sectional	Pakistani (132)	European (471), African-Caribbean (316)	Male and Female	35 to 79	Manchester	Self-report validated questionnaire
Smith et al 2012[62]	Cross sectional	Indian, Pakistani, Bangladeshi	White	Male and Female	16 to 55	England	Self-report questionnaire based on Allied Dunbar National Fitness Survey
Williams et al 1994[90]	Cross sectional	South Asian (173)	General population (344)	Male and Female	30 to 40	Glasgow	Self-report questionnaire.
Williams et al 1998[91]	Cross sectional	British Asian (334)	Other origin (490)	Male and Female	14 to 15 in South Asians Age 35 in General population	Glasgow	Self-report questionnaire.
Williams et al 2010[96]	Cross sectional	South Asian Sikhs (571), Muslims (179), Hindus (315)	Whites (818)	Male and Female	35 to 75	London	Self-report, validated questionnaire - International Physical Activity Questionnaire
Williams et al 2011 - JECH[93]	Cross sectional	South Asian (5,421)	Whites (8,974)	Male and Female	Over 16	England	Self-report questionnaire based on Allied Dunbar National Fitness Survey
Williams et al 2011 - Heart[92]	Cross sectional	Indian (1,244), Pakistani/Bangladeshi (876)	White (13,293)	Male and Female	Over 16	England	Self-report questionnaire based on Allied Dunbar National Fitness Survey
Yates et al 2010[94]	Cross sectional	South Asian (1,164)	White European (4,310)	Male and Female	25 to 75 in South Asians 40 to 75 in White European	Leicester	Self-report, validated questionnaire - International Physical Activity Questionnaire

Table 2.2 Characteristics of qualitative studies

	South Asian Ethnic group	Location of study	Main focus of study	Data collection method	Number of participants	Sex of participants	Age groups	Reporting of adult second-generation information?
Brophy et al 2011[97]	Bangladeshi	South Wales	Asking teenager to suggest recommendation to increase their physical activity	4 Focus groups	24	Male and Female	16 to 18	No
Eastwood et al 2013[98]	South Asian	London	Assessing the risk of CVD in religious and community settings	Semi-structured interviews	24	Male and Female	30 to 67	No
Farooqi et al 2000[99]	South Asian	Leicester	Understanding attitudes and knowledge of lifestyle risk factors for CHD	6 Focus groups	44	Male and Female	Over 40	Yes
Grace et al 2008[100]	Bangladeshi	London	Preventing diabetes	17 Focus groups and Semi-structured interviews	129 in Focus groups 8 interviews	Male and Female	Mean age 35	Yes
Horne et al 2009[101]	South Asian	North West England	Fall prevention in 60 to 70 year olds	Participant observation, 15 Focus groups and	87 in Focus groups 40 interviews	Male and Female	60 to 70	No

				Semi-structured interviews				
Horne et al 2010[102]	South Asian	North West England	Influence of primary health-care professionals on physical activity	Participant observation, 15 Focus groups and Semi-structured interviews	87 in Focus groups 40 interviews	Male and Female	60 to 70	No
Horne et al 2012[103]	Indian and Pakistani	North West England	To identify the attitudes and beliefs associated with the uptake and adherence of physical activity among community-dwelling South Asians	Focus groups and Semi-structured interviews	29 in Focus groups 17 interviews	Male and Female	In 60s	No
Horne et al 2013[104]	Indian and Pakistani	North West England	Understanding the barriers to maintaining physical activity	15 Focus groups and Semi-structured interviews	29 in Focus groups 17 interviews	Male and Female	In 60s	No
Jepson et al 2008 (report)[105]	Indian, Pakistani, Bangladeshi	Aberdeen, Glasgow, Edinburgh	To explore the barriers, facilitators and motivators for	9 Focus groups and Semi-structured interviews	59 in Focus groups 10 interviews	Male and Female	Ages 20 to 40	No

			South Asians					
Jepson et al 2012[106]	Indian, Pakistani, Bangladeshi	Aberdeen, Glasgow, Edinburgh	Describing the types of and motivators for physical activities that South Asians do	9 Focus groups and Semi-structured interviews	59 in Focus groups 10 interviews	Male and Female	Unknown	No
Johnson 2000[107]	Indian, Pakistani, Bangladeshi	Midlands	To fill the gap in knowledge about ethnic minority lifestyles and health	Not reported	Not reported	Male	Unknown	No
Khunti et al 2008[108]	South Asian	Leicester	Understanding the impact of an Action Research Partnership to prevent diabetes	18 Focus groups	Not reported	Male and Female	11 to 15	No
Pallan et al 2012[109]	South Asian	Birmingham	Understanding the contextual influences on obesity	9 Focus groups	68	Male and Female	Unknown (adults talking about children)	No
Rai & Finch 1997[110]	Indian, Pakistani, Bangladeshi	England	To investigate attitudes towards and barriers to physical activity in South Asian and Black communities	14 Focus groups	109	Male and Female	18 to 50	Yes

			in England					
Rawlins et al 2013[111]	Indian, Pakistani, Bangladeshi	London	Perceptions of healthy eating and physical activity in young children	13 Focus groups	70	Male and Female	8 to 13	No
Rogers et al 1997[112]	Bangladeshi	London	To describe the contributing factors to variations in health-related behaviours and attitudes in 12 year olds	Semi-structured interviews	41	Male and Female	Age 12	No
Victor 2014[113]	Bangladeshi and Pakistani	Great Britain	Physical activity during the daily life of elders	Semi-structured interviews	109	Male and Female	Over 50	No

2.3.3 Quality assessment

2.3.3.1 Quantitative papers

Children

Of the papers reporting on children, only one paper reported a power calculation for the sample size[91]. The other 11 papers provided no justification of their sample size; the majority only reported the number of people they had recruited, implying that their aim was to recruit as many children as possible into their studies. Three of the studies on children had fewer than 70 South Asian participants[70,72,73]. Without a sample size calculation, we cannot know whether the difference found between the two ethnic groups is a true finding; this is known as a Type I error in epidemiology, when the null hypothesis is incorrectly rejected (in this case, that there is no difference in physical activity levels between South Asian and White British children)[114]. Sample size estimation is also necessary to know how many participants would be needed to correctly ascertain if the null hypothesis is false (i.e. there is a difference in physical activity levels between the two ethnic groups). The fact that only one of these papers reports a sample size calculation means that doubt can be cast on whether the reported difference in prevalence is a true finding. The fact that all of the studies do report a difference, despite using different measurements, indicates that the results might be true, but without a sample size calculation we cannot be sure.

There were also issues with the quality of measurement, both for ethnicity and physical activity. For the studies on children, ethnicity was measured through self-identification to pre-defined categories[72,76,77,80,83,85,87] (often through the parents) or through school records, where ethnicity is reported by the parents[70,71,73,74,91]. As discussed in the introduction, the

current categories of ethnic group are very restricted in what they actually measure. While self-identifying ethnicity is regarded as the best way to measure it, by assigning people to these pre-defined categories, or asking people to choose from a pre-defined list, the process of self-identification, and therefore the meaning of ethnicity is restricted.

Five of the 12 studies on children measured physical activity using an objective measurement tool, either an accelerometer or a pedometer[72,73,76,83,85], and the rest used a physical activity self-report questionnaire, or in one case, a single physical activity question[91]. While objective measures of physical activity are more reliable than questionnaires, which are subject to recall bias or social desirability bias, particularly for children[115], there are still potential pitfalls. The placement of the accelerometer on the body (at the hip, ankle or wrist) may affect the output of the device, and the devices cannot be worn during wet activities such as swimming. Although accelerometers and pedometers are able to provide objective data on physical activity, a criticism of them is that they are unable to measure the context in which the physical activity is carried out in. Of the studies using questionnaires, three used a validated questionnaire[70,71,80] and one used a non-validated questionnaire on vigorous sports[77].

Of the twelve studies on children, only four included socioeconomic or deprivation factors in their analyses[72,74,76,77]. This is surprising given that socioeconomic factors and neighbourhood deprivation are common explanations for why South Asians do less physical activity than the White British population[19]. The exclusion of these socioeconomic factors from analyses that have accounted for other potential confounding factors such as age and sex points to the lack of theoretical models in the papers. No paper, on either children or adults, reported using a theoretical model to describe the potential causes of physical

inactivity in populations. By not referring to any theoretical model, the authors have excluded a potential confounder from their analyses – which they had often measured as part of the study. The exclusion of socioeconomic status or deprivation means that it is possible that the differences found between ethnic groups could actually be due to their socioeconomic circumstances, rather than their ethnic background.

Second-generation adults

Three of the four of papers reporting on second-generation South Asian adults did not have power calculations[62,86,116], therefore it was not possible in these cases to determine whether the sample sizes obtained were large enough to detect a difference in prevalence between generations, or between the UK-born ethnic groups and the White British ethnic groups. Only one of the adult second-generation papers reported a sample size calculation[82]. The other three papers in the review either used existing survey data or simply recruited as many participants as they could. Without a reported sample size calculation it is difficult to know whether the sample size obtained was sufficient enough to detect associations or differences (or a true lack of an association). Low sample sizes may also mean that the samples are biased towards a particular age group, sex or other characteristic and may not give accurate snapshots of the prevalence of risk factors in second-generation ethnic minorities in the UK. Two of the papers used the snowball sampling technique to increase their sample size[82,86]. This is commonly used in populations where it is difficult to get enough participants, but this technique does not give an unbiased sample, as recruitment is done through the contacts of existing participants. This is likely to affect the generalisabilty of the study to the wider ethnic minority populations that were studied, although the authors did not discuss this issue.

Three papers used non-validated self-report measures to estimate prevalence[62,82,93]. Self-report data is open to recall bias and there is a real possibility of reporting an inaccurate prevalence. No study reporting on second-generation adults used an objective measure of physical activity.

As with the studies on children, three papers measured ethnicity through people self-identifying to pre-defined categories. In the fourth paper, the authors obtained ethnicity through identifying South Asian surnames in birth records[82]. The authors do not report confirming the participant's ethnicity with them, therefore each participant has had their ethnicity assigned for them, based on ancestry. This is essentially only a physical measure of ethnicity; as people have not self-identified as South Asian, we cannot be sure that the participant has a cultural or social identification with that ethnic group.

The analysis of two papers was not sufficient[82,86]. Where regression models were conducted, important confounders, such as socioeconomic measures, were not included, even when the data was available in the study. As discussed with the studies on children, this highlights the absence of theoretical frameworks when constructing statistical models, which are important when trying to explain behaviour. When known confounders are not included, any associations or differences found cannot be ruled out as being due to this factor and the conclusions drawn from the study are affected. The dearth of these measures in the regression models raises concerns around the methods and theories used to identify potential confounders in the studies as a whole.

2.3.3.2 Qualitative papers

Children

Four papers reported on motivations or barriers to physical activity in South Asian children in the UK[97,108,109,111]. All of these papers were of reasonable quality, but none of the papers discussed how the researcher themselves might have influenced the data collection or analysis, through their own background or attitudes. Reflecting on how the interviewer themselves might influence the interview or focus group is important because interviewees may offer more or less information according to how they perceive the person interviewing them[117].

Only one study on children reported using an existing theoretical model, which they used to guide their analysis of the data[100]. Theoretical models in qualitative research can be used to develop hypotheses, to develop interview guides, or as in this paper, used to guide the analysis[57]. Most papers conducted a thematic analysis of their data, however placing these themes into a theoretical framework is useful for interpretation and can aid understanding of the practical value of the findings.

Second-generation adults

Three studies reported information on the attitudes, motivations and barriers to physical activity in second-generation South Asian adults[99,100,110]. One of these was a report, rather than a peer-reviewed article and had limitations around the reporting of the methods, context and analysis[110]. The authors do not describe the sampling approach, the context in which focus groups were held or the detail of how they analysed the focus groups. Without this information it is difficult to assess the quality of the study accurately.

As with the studies on children, none of these reported how the researcher may have affected data collection. Only Grace et al (2008)[100] reported receiving ethical approval for their study. Ethical approval is important in any research project in order to protect research participants and ensure researchers and universities are carrying out appropriate research. Farooqi et al (2000)[99] report on a study carried out using general practice registers and state their project is funded by the Department of Health; approval from the National Health Service would normally be required for this, but the authors do not report if they received this. Rai & Finch (1997)[110] also did not report on whether they received ethical approval for their study. The study was commissioned by the Health Education Authority, the national health promotion agency of the time but it is as important for national agencies to acquire ethical approval for their research as it is for universities or other institutions. All three studies neglected to discuss the limitations of their studies, a key element of high quality research. Reporting the limitations of your study allows the reader to ascertain whether the author themselves understands the extent to which their findings are valid, and also allows the reader to gauge the transferability of the findings.

The two peer-review articles only provided fleeting remarks on adult second-generation physical activity attitudes, however the report by Rai & Finch (1997)[110] provided some more information, although the information was not reported separately for the second-generation. Poor discussion of the study limitations, analysis approach and detailed methods means that although the findings reported are rich in their description, the only study with detailed information on second-generation South Asian adults in the UK is low in quality and does not report on whether they received ethical approval for their study.

For the rest of the studies, the overall quality of the papers was affected by the fact that all but one[106] failed to discuss reflexivity and on the impact of the researcher on the data collection and analysis. Two papers were of fairly low quality[107,112], with poor reporting of the data collection methods, the context the research was carried out in, the analysis techniques, no discussion of the study limitations or reporting of whether ethical approval was received for their studies. Only one paper reported using a theoretical model in their study[113].

2.3.4 Prevalence of physical activity

2.3.4.1 South Asian children

One study on children was a prospective cohort, which collected physical activity data from the children in year seven of their study. The rest of the studies on children were cross-sectional. Seven studies were located in the Midlands, with two of those also recruiting children from London. One study was based in London exclusively, one study was based in the North East of England and another in Glasgow. Two studies were spread throughout the UK or England.

Information on the number of UK-born South Asian children is only available for three studies. Griffiths et al (2013)[76] used the Millennium Cohort Study, which recruited children born in the UK in the year 2000, therefore all the children included in their paper are second-generation (139 Indian, 177 Pakistani and 70 Bangladeshi). Harding et al (2008)[77] report on results from the DASH Study, which is based in London; they report that 76.1% of the Indian group and 82.9% of the Pakistani/Bangladeshi group were born in the UK (166 and 184 respectively). Williams et al (1998)[91] report that 287 (86%) of their South Asian sample were born in the UK.

Studies reporting on the physical activity prevalence of South Asian children all reported a lower prevalence of physical activity when compared to the White British, irrespective of the measurement tool (Table 2.3). Studies that had measured boys and girls separately consistently reported than girls were less physically active than boys were, for both South Asian and White British groups.

Differences between males and females

Owen et al (2009)[85] used an accelerometer to measure physical activity in South Asian children and White European children, and also examined differences between boys and girls. South Asians were less physically active than White European children for all measures, however there were large differences between girls and boys for both ethnic groups. South Asian girls were the least active, spending the largest number of minutes being sedentary and least number of minutes being moderately or vigorously active. Harding et al (2008)[77] combined the Pakistani and Bangladeshi group and found that Pakistani/Bangladeshi girls were the least active compared to the White British and Indian groups. Interestingly, almost a third of Pakistani/Bangladeshi boys were in the most active quartile, compared to around a quarter of Indian and White British boys.

Only one study (Griffiths et al 2013[76]) studied Indian, Pakistani and Bangladeshi groups separately. Measured using accelerometers, in this study the Bangladeshi group was the least active and the Indian group the most active (33% versus 40% respectively meeting recommended physical activity levels).

Activity during break-time

Eyre et al (2013)[73] used a pedometer and heart-rate monitor to measure activity levels in children aged between eight and nine years. The authors found that South Asian children

were less physically active than White European children for all measures included in their study. They found significant differences between the two ethnic groups for the average counts per minute overall and during break-time, with South Asians being less active during break-time. Pollard et al (2012)[87] examined differences in activity during break time in school, and found that British Pakistani girls were less active than White British children, which concurs with the findings from Eyre et al (2013)[73].

Weekend and Weekday activity

While not reported in Table 2.3, Eyre et al (2013)[73] also found that South Asian children were less active than the White European children at the weekends and after school. Duncan et al (2012)[72] report on the average steps per day taken by South Asian children, according the weekend or weekday. They found that South Asian children were less active than the White children on both the weekday and weekend, which is in line with the results reported by Eyre et al (2013)[73].

2.3.4.2 Second-generation South Asian adults

Four studies reported on the physical activity of second-generation adult South Asian groups[62,82,86,93]. While using different measures, all four reported that the second-generation of South Asians were more active than the first-generation. The three studies comparing between South Asian and White British groups showed that the second-generation is still less active than the White British population. Results are presented in Table 2.4.

Lean et al (2001)[82] and Smith et al (2012)[62] both used a single question on physical inactivity to compare between migrant South Asians, second-generation South Asians and White British or European origin populations. Both reported that adult second-generation South

Asians were more active than the migrant generation, but still less active than the White British or European origin population. Smith et al (2012)[62] reported on physical activity in Indians, Pakistanis and Bangladeshi separately. The pattern of lower physical inactivity in the second-generation compared to the first-generation was the same for all three ethnic groups, although the actual levels of inactivity were different between the three groups. Within the South Asian ethnic group, the Indian ethnic group had the lowest prevalence of physical inactivity (31.5%) and the Bangladeshi group had the highest prevalence of physical inactivity (49.4%); the White ethnic group had the lowest prevalence physical inactivity overall (26.7%). The difference in mean age between the first and second-generation was less than 10 years in both papers.

Pollard et al (2008)[86] used the International Physical Activity Questionnaire to measure physical activity in Pakistani women, which asks a range of questions. As with the results from Lean et al (2001)[82] and Smith et al (2012)[62], the second-generation Pakistani women were more active than the migrant generation, but less active than the European origin population. Metabolic Equivalent (MET) is another way of measuring activity levels, with 1 MET considered to be the rate of energy expenditure at rest. By combining the number of minutes an activity is performed for with the MET value for that activity, we get MET-minutes. Pollard et al (2008)[86] found a significant difference between the groups for median MET-minutes ($p=0.03$) but not for median pedometer-counts ($p=0.12$). The difference in mean age between the migrant and British-born generation was about 2 years. Williams et al (2011)[93] also calculated METs from a questionnaire and found significantly higher mean METs in the UK-born South Asians as compared to the migrant South Asians.

2.3.4.3 South Asian adults in general

As with the review by Fischbacher et al (2004)[65], the papers reporting on the physical activity of adult South Asians in general all reported that physical activity was low, and lower than the White British or European population (Table 2.5).

Two papers reported on differences in physical activity prevalence by religion. Both papers found that Muslim groups had the lowest prevalence of physical activity when compared with Sikhs and Hindus. Irrespective of religion, people belonging to the White ethnic group were more physically active than South Asian people of any religious group.

Table 2.3 Physical activity prevalence in South Asian children

Author and year	Age-group	Location	Physical activity measurement instrument	Main findings – all children	Main findings – Male	Main findings – Female
Griffiths et al 2013[76]	Age 7	UK	Accelerometer worn for 7 days, during waking hours.	**Meeting recommended activity levels:** White: 51.4% Indian: 40.0% Pakistani: 45.2% Bangladeshi: 32.8% **Overall counts/minute:** White: 597 Indian: 511 Pakistani: 563 Bangladeshi: 538 **Sedentary hours/day:** White: 6.5 Indian: 6.9 Pakistani: 6.4 Bangladeshi: 6.5 **Moderate and vigorous minutes/day:** White: 60.2 Indian: 52.6 Pakistani: 58.2 Bangladeshi: 52.9 **Steps/day:**		

				White: 10,343 Indian: 8,699 Pakistani: 9,419 Bangladeshi: 8,894		
Falconer et al 2014[74]	4 to 5 and 10 to 11	5 PCTs in England	Self-report questionnaires	**Child does not achieve ≥1 hr of physical activity/day** White: 56.2% Asian: 59.4%		
Eyre et al 2013[73]	8 to 9	Coventry	Physical activity and heart rate worn monitor for 7 days	**Meeting WHO recommended activity levels:** White European: 73% South Asian: 35% **Wake hour average counts/minute:** White European: 116 South Asian: 102 **Sedentary hours/day:** White European: 15.2 South Asian: 15.7 **Moderate and vigorous hours/day:** White European: 1.3 South Asian: 1.0 **Counts/minute during break-time:** White European: 341		

				South Asian: 317		
McMinn et al 2011[83]	9 to 10	London, Birmingham, Leicester	Accelerometer worn for 7 days, during waking hours.	**Average counts/minute:** White European: 481 South Asian: 452		
Owen et al 2009[85]	9 to 10	London, Birmingham, Leicester	Accelerometer worn for 7 days, during waking hours.	**Average counts/minute:** White European: 498 South Asian: 457 **Sedentary minutes/day:** White European: 554 South Asian: 593 **Moderate and vigorous minutes/day:** White European: 70 South Asian: 65 **Mean number of steps:** White European: 10,220 South Asian: 9,314	**Average counts/minute:** White European: 537 South Asian: 510 **Sedentary minutes/day:** White European: 551 South Asian: 579 **Moderate and vigorous minutes/day:** White European: 77 South Asian: 73 **Mean number of steps:** White European: 10,882 South Asian: 10,202	**Average counts/minute:** White European: 463 South Asian: 414 **Sedentary minutes/day:** White European: 556 South Asian: 604 **Moderate and vigorous minutes/day:** White European: 62 South Asian: 57 **Mean number of steps:** White European: 9,660 South Asian: 8,571
Pollard et al 2012[87]	9 to 11	North East England	Accelerometer worn for 2 school days			**Percentage of time sedentary during recess:** White British: 54.5% British Pakistani: 57.3% **Percentage of time in moderate and vigorous activity during recess:** White British: 15.4% British Pakistani: 12.9%

Duncan et al 2012[72]	8 to 11	Coventry	Pedometers worn over 4 days	**Average weekday steps/day:** White: 14,734 South Asian: 13,023 **Average weekend steps/day:** White: 11,135 South Asian: 10,383 **Average total steps/day (PB calculation):** White: 12,935 South Asian: 11,703		
Harding et al 2008[77]	11 to 13	London	Self-report physical activity questions on vigorous sports		**Percentage in most active 1st quartile:** White UK: 23.9% Indian: 23.8% Pakistani/Bangladeshi: 31.3% **Percentage in least active 4th quartile:** White UK: 21.4% Indian: 18.0% Pakistani/Bangladeshi: 17.2%	**Percentage in most active 1st quartile:** White UK: 12.6% Indian: 16.5% Pakistani/Bangladeshi: 14.9% **Percentage in least active 4th quartile:** White UK:38.0% Indian: 46.3% Pakistani/Bangladeshi: 38.3%
Duncan et al 2006[70]	11 to 14	Birmingham	Self-report, validated questionnaire - Four by one day	**Very Inactive:** White: 20.9% Asian: 14.9% **Inactive:** White: 43.5%		

				Asian: 44.8% **Moderately Active:** White: 21.5% Asian: 26.9% **Active:** White: 14.1% Asian: 13.4%		
Duncan et al 2008[71]	11 to 14	Birmingham	Self-report, validated questionnaire - Four by one day	**Average daily minutes spent in moderate and vigorous physical activity:** White: 90.0 South Asian: 68.2		
Khunti et al 2007[80]	11 to 16	Leicester	Self-report questionnaire derived from Four by one day	**Light aerobic exercise on six or more days during previous two weeks:** White European: 39% South Asians:40% **Hard aerobic exercise on six or more days during previous two weeks:** White European: 41% South Asians: 37%	**Light aerobic exercise on six or more days during previous two weeks:** White European: 42% South Asians: 40% **Hard aerobic exercise on six or more days during previous two weeks:** White European: 52% South Asians: 48%	**Light aerobic exercise on six or more days during previous two weeks:** White European: 37% South Asians: 39% **Hard aerobic exercise on six or more days during previous two weeks:** White European: 32% South Asians: 25%
Williams et al 1998[91]	14 to 15	Glasgow	Self-report questionnaire		**Physical exercise for 20 minutes once a week or less:** Other origin: 8%	**Physical exercise for 20 minutes once a week or less:** Other origin: 15%

					British Asian: 18% **Physical exercise for 20 minutes 2-3 times/ week:** Other origin: 22% British Asian: 29% **Physical exercise for 20 minutes 4-6 times/week:** Other origin: 40% British Asian: 26%	British Asian: 16% **Physical exercise for 20 minutes 2-3 times/ week:** Other origin: 39% British Asian: 53% **Physical exercise for 20 minutes 4-6 times/week:** Other origin: 26% British Asian: 15%
Hemmings et al 2011[79]	14 to 15	London	Accelerometer worn for 7 days		**Low activity in counts/minute:** British White: 267.4 British South Asian: 260.2 **Moderate activity in counts/minute:** British White: 70.5 British South Asian: 78.1 **Vigorous activity in counts/minute:** British White: 5.2 British South Asian: 5.1	

Table 2.4 Physical activity prevalence in second-generation South Asian adults

Author and year	Sex	Age-group	Location	Physical activity measurement instrument	Main findings
Lean et al 2001[82]	Female	20 to 42	Glasgow	Self-report question on sport and recreational exercise	**Engaging in no sport or recreational exercise:** Migrant South Asians: 82% British-born South Asians: 77% Italian/General Population: 50%
Pollard et al 2008[86]	Female	20 to 40	North East England	Self-report, validated questionnaire - International Physical Activity Questionnaire	**Median MET-minutes:** Migrant British Pakistani: 1,040 British-Born British Pakistani: 1,626 European: 2,394 **Median pedometer counts:** Migrant British Pakistani: 3,371 British-Born British Pakistani: 3,506 European: 3,781
Williams et al 2011 - JECH[93]	Male and Female	Over 16	England	Self-report questionnaire based on Allied Dunbar National Fitness Survey	**Mean total METs:** Male UK-born South Asian: 1,385.23 Male born outside UK South Asian: 935.53 Female UK-born South Asian: 972.50 Female born outside UK South Asian: 843.66
Smith et al 2012[62]	Male and Female	16 to 55	England	Self-report questionnaire based on Allied Dunbar National Fitness Survey	**Three or fewer occasions of moderate/vigorous activity in the past four weeks:** White: 26.7% First-generation Indian: 43%

					Second-generation Indian: 31.5% First-generation Pakistani: 50.2% Second-generation Pakistani: 38.5% First-generation Bangladeshi: 60.8% Second-generation Bangladeshi: 49.4%

Table 2.5 Physical activity prevalence in all South Asian adults

Author and year	Age-group	Location	Physical activity measurement instrument	Main findings – both sexes	Main findings – men	Main findings – women
Ghouri et al 2013[75]	40 to 70	Scotland	Accelerometers worn for 7 days		**Percentage of wear time sedentary** European: 64.2% South Asian: 66.5% **Percentage of wear time in light physical activity** European: 30.8% South Asian: 30.4% **Percentage of wear time in moderate or vigorous physical activity** European: 4.1% South Asian: 2.8%	
De Munter et al 2013[84]	35 to 64	England	Self-report questionnaire based on Allied Dunbar National Fitness Survey	**Age-standardised percentage walking 30 minutes** English European: 61.6% English Indian: 53.5% **Age-standardised percentage any cycling** English European:		

				26.7% English Indian: 10.0% **Age-standardised percentage any gardening** English European: 60.1% English Indian: 33.6% **Age-standardised percentage any dancing** English European: 16.8% English Indian: 8.1% **Age-standardised percentage any sports** English European: 50.5% English Indian: 35.9%		
Williams et al 2011 - Heart[92]	Over 16	England	Self-report questionnaire based on Allied Dunbar National Fitness Survey	**No weekly physical activity:** White: 28.1% Indian: 37.1% Pakistani/Bangladeshi: 56.7% **Some weekly physical activity:** White: 71.9% Indian: 62.9%		

				Pakistani/Bangladeshi: 43.3%		
Karlsen et al 2010[9]	Above 2	England	Self-report question on taking no regular physical activity	**Participating in no regular physical activity:** White British Christian: 10% White British no religion: 6% Muslim Pakistani: 20% Muslim Bangladeshi: 24% Muslim Indian: 18% Sikh: 16% Hindu: 12%	**Participating in no regular physical activity:** White British Christian: 8% White British no religion: 6% Muslim Pakistani: 17% Muslim Bangladeshi: 18% Muslim Indian: 20% Sikh: 15% Hindu: 9%	**Participating in no regular physical activity:** White British Christian: 12% White British no religion: 6% Muslim Pakistani: 23% Muslim Bangladeshi: 29% Muslim Indian: 16% Sikh: 17% Hindu: 15%
Williams et al 2010[96]	35 to 75	London	Self-report, validated questionnaire - International Physical Activity Questionnaire	**Age/sex adjusted prevalence of sedentary more than 3 hours/day:** Whites: 47.5% Sikhs: 44.2% Muslims: 54.9% Hindus: 43.1% **Age/sex adjusted prevalence of some**		

				physical activity: Whites: 79.4% Sikhs: 74.2% Muslims: 63.4% Hindus: 77.3%		
Yates et al 2010[94]	25 to 75 in South Asians 40 to 75 in White European	Leicester	Self-report, validated questionnaire - International Physical Activity Questionnaire		**Low physical activity:** White European: 22% South Asian: 37% **Moderate physical activity:** White European: 28% South Asian: 25% **High physical activity:** White European: 50% South Asian: 38%	**Low physical activity:** White European: 27% South Asian: 40% **Moderate physical activity:** White European: 33% South Asian: 28% **High physical activity:** White European: 40% South Asian: 32%
Hayes et al 2002[78]	25 to 74	Newcastle	Self-report physical activity questionnaire, then created an index		**30 minutes of at least moderate activity on most days of the week:** European: 48.4% Indian: 29.2% Pakistani: 12.2% Bangladeshi: 13.2%	**30 minutes of at least moderate activity on most days of the week:** European: 36.5% Indian: 16.8% Pakistani: 19.1% Bangladeshi: 9.2%
Riste et al 2001[89]	35 to 79	Manchester	Self-report validated questionnaire		**Physically active 3 x 50 minutes/week:** European: 37.8% Pakistani: 6.8%	**Physically active 3 x 50 minutes/week:** European: 29.4% Pakistani: 5.2%
Pomerleau et al 1999[88]	40 to 69	London	Self-report questionnaire			**Age-adjusted prevalence walking**

						≥2.5km/day: Europeans: 43.5% South Asians: 21.5% **Age-adjusted prevalence cycling:** Europeans: 4.9% South Asians: 0.0% **Age-adjusted prevalence sports participation:** Europeans: 20.1% South Asians: 1.3%
Hine et al 1995[95]	18 to 74	Bristol	Self-report questionnaire			**In week prior to interview, not taking at least one 20 minute session of light exercise:** Pakistani: 86% Indian: 29% Bangladeshi: 19% **In week prior to interview, not taking at least one 20 minute session of moderate exercise:** Pakistani: 100% Indian: 73% Bangladeshi: 100%

						In week prior to interview, not taking at least one 20 minute session of strenuous exercise: Pakistani: 100% Indian: 85% Bangladeshi: 100%
Williams et al 1994[90]	30 to 40 in South Asians Age 35 in General population	Glasgow	Self-report questionnaire.	**Ever takes vigorous exercise:** General population: 51% South Asians: 42%	**Ever takes vigorous exercise:** General population: 59% South Asians: 46%	**Ever takes vigorous exercise:** General population: 44% South Asians: 38%
Knight et al 1993[81]	20 to 65	Bradford	Self-report lifestyle questionnaire including exercise		**Percentage doing light exercise during leisure time:** Non-Asian: 28.1% Asian: 43.0% **Percentage doing moderate exercise during leisure time:** Non-Asian: 55.6% Asian: 78.9% **Percentage doing strenuous exercise during leisure time:** Non-Asian: 83.8% Asian: 91.4%	

2.3.5 Attitudes, motivators and barriers to physical activity

The review of quantitative observational papers revealed that there is not only evidence of variation in physical activity prevalence within UK South Asians, but also between the first and second-generation. The quantitative papers had limited information on potential explanations for those differences, therefore with this review of the qualitative literature I aimed to ascertain what studies had been done exploring the attitudes, beliefs, motivators and barriers towards physical activity in UK South Asians, with a particular focus on the second-generation.

2.3.5.1 Attitudes, motivators and barriers for physical activity in children

Four papers reported on the motivations and barriers to physical activity in South Asian children, but only two of these discussed generational differences in health behaviours within South Asian groups. Table 2.6 summarises these themes using the socioecological framework as a guide. Placing the themes into a socioeconomic framework helps to understand if the motivations and barriers are at an individual-level, social-level or neighbourhood-level; once we know this, we can begin to understand in which areas interventions might be necessary. The majority of the themes focused on barriers, which were situated at all levels of the socioeconomic model, including Asian cultural factors, school facilities, the neighbourhood environment and parental concerns over the cost of physical activity.

Only three themes relating to motivations are present in the literature for children, with two of these focusing on boys. One of the themes was a motivator for boys but a barrier for girls, in that boys were described in one paper as being more interested sports than girls are. One

paper also reported that family activities would be more appealing to Asian people, which would help children be more physically active.

2.3.5.2 Attitudes, motivators and barriers around physical activity in second-generation adults

There were 12 papers which reported on motivators and barriers to physical activity in South Asian adults in the UK, however only three of these reported any information on the second-generation. Two papers and one report described that there was a change in behaviour or attitudes in the second-generation, although there was no further no detail in the papers. Grace et al (2008)[100] report that the younger and second-generation Bangladeshi women resist the traditional norms and expectations of women in Bangladeshi culture. Farooqi et al (2000)[99] report a single comment that in contrast to the first-generation women being quoted, her daughter-in-law takes her own children swimming. While only brief, both these papers indicate that there may be a positive change in attitude towards physical activity in the second-generation of South Asian women.

The report by Rai and Finch (1997)[110] describes differences in attitudes between younger and older people; all of their study participants aged under 30 were born in the UK. Rai and Finch (1997)[110] studied both Black and South Asian people and combine the findings from these two ethnic groups in their discussion. They note that younger people do not share some of the beliefs of older people and that their views are more shaped by the media as compared with older people. The authors state that the experience of early life in the UK underpins the differences between the younger and older people, who had grown up in other countries.

While Rai and Finch have not explicitly reported the differences between second-generation and first-generation South Asians within their report, I was able to analyse the quotes by South Asians aged under 30 (stated as all being born in the UK). Table 2.7 summarises the themes discussed by participants in both the report by Rai and Finch, and the two peer-reviewed papers. While there were some Asian cultural and religious barriers, there is an indication that there may be a change in attitudes in younger and second-generation towards the commonly reported barriers found in South Asian women[36]

2.3.5.3 Attitudes, motivators and barriers around physical activity in South Asian adults in general

The rest of the papers included in this review reported on motivations and barriers to South Asian adults in general. The themes found in these papers were the same as reported in a recent review by Babakus et al (2012)[36]. South Asian women reported that the notion of formal exercise is a Western concept that is alien to South Asian women. The responsibilities of women in the home also mean that South Asian women are expected to prioritise the family over themselves.

As with the themes reported for children and second-generation adults, I have organised the reported themes in my review using the socioecological model as a guide (Table 2.8). Unlike for children, the majority of motivators and barriers for South Asian women are located within the individual level of the socioecological model. Themes relating to the influence of income or local neighbourhood do not appear to have been widely reported in the literature on motivations and barriers to physical activity in South Asians.

Table 2.6 Motivators and barriers to South Asian children in the UK

	Religious factors	Asian cultural factors	Western gender factors	Other individual factors	School Facilities	Neighbourhood environment	Economic
Motivators		Family activities	Boys are motivated by their peers and siblings (Bangladeshi boys) Boys are more interested in sports than girls are				
Barriers	Attending the Mosque after school limits time	Pakistani and Bangladeshi parents themselves are inactive Being physically active might have a negative effect on their schoolwork (Bangladeshi girls)	It's embarrassing to exercise (Bangladeshi girls) Lack of interest in PE classes in girls, for all ethnic groups	Parents have limited awareness of physical activity recommendations Parents who work do not have time to take their children to leisure activities	Lack of changing rooms and storage facilities	Fear of unsafe roads in high socioeconomic groups Concern over security of their children playing outside It is quicker and easier to use the car for parents. Lack of facilities	Concern about the cost of physical activities

		Girls not encouraged to play out because of people looking at them (Bangladeshi)				in the local area	

Table 2.7 Motivators and barriers to adult second-generation South Asians in the UK

	Religious factors	Asian cultural factors	Other individual factors	Local facilities	Economic factors
Motivators		Younger and second-generation women resist traditional norms and expectations of women in Bangladeshi culture	South Asian men described having positive role model as children People like challenges Women want to look good Men want to socialise through activity		
Barriers	Religious activities such as Namaz restricts time Islam restricts clothing women can wear Muslim women do not want to use mixed-sex facilities	Asian women are more reluctant to use child-minders and so caring for children means they have less time. Experience of racism at gyms	Tiredness after work Young people don't think about being physically active for health	Lack of facilities in local area	Cost of using facilities

Table 2.8 Motivators and barriers to physical activity in South Asian adults of any age

	Religious factors	Asian cultural factors	Other individual factors	Local Facilities
Motivators	Physical activity is important for mental wellbeing and caring for the body, which is central to Islam Islamic religious leaders felt that more exercise than Namaz is necessary	Social interaction and enjoyment are motivators Role models would be helpful	Physician advice about physical activity is motivating, but it always given in relation to a disease	Classes targeting Bangladeshi women have had good attendance
Barriers	Namaz is referred to as exercise and some people think this is enough exercise (Bangladeshi)	The Western sense of formal exercise is alien to the South Asian culture Sport is inappropriate for Bangladeshi women and older people Cultural norms such as not being active outdoors (Bangladeshi/Pakistani) Bangladeshi women can be socially restricted may be less likely to do exercise Expectation for women to remain in the home, dress modestly and prioritise the family	It is time consuming to be healthy There is limited awareness about the recommended levels of physical activity There was no time for exercise when younger, so there is no exercise routine (Indian and Pakistani) Lack of time and motivation to exercise, even when the GP has recommended it (Bangladeshi/Pakistani) Exercise for preventing falls is unnecessary	

2.4 Discussion

2.4.1 Summary of results

The papers in this review indicate that the physical activity levels of second-generation South Asians are still lower than the White British. The four quantitative studies on adults indicated that the prevalence of physical activity is higher for the second-generation as compared to the first-generation, signifying that there has been a positive physical activity change within South Asian groups. The qualitative studies had limited information on second-generation South Asian adults but there was an indication that second-generation South Asians may have a more favourable attitude towards physical activity.

2.4.2 Generational differences in physical activity prevalence

This review demonstrated that there is some evidence of differences in the prevalence of physical activity between first and second-generation South Asians in the UK, and between second-generation South Asians and the White British population. Four of the papers reporting on children or second-generation adults had small sample sizes without information on a sample size calculation. The absence of a theoretical approach resulted in fundamental confounders being omitted from regression models. With the exception of six papers[62,72,74,76,77,86,93], the omission of socioeconomic measures was notable and unexpected given the large amount of literature given over to this aspect in the ethnic minority literature as a whole.

There have been no other reviews on this topic within the UK, however there is evidence from the Netherlands to support generational differences in CVD risk factors in ethnic minority groups[118,119]. Hosper et al find differences in levels of obesity, smoking, physical

activity and alcohol consumption in Turkish and Moroccan migrants to the Netherlands. They also find that socioeconomic status in women was higher in the second-generation compared to the first-generation. While caution must be made in comparing the socioeconomic status changes of two different ethnic groups in two different countries, it is plausible that the advantages of being born in a country compared to migrating to it would benefit the second-generation of an ethnic minority, as appears to be the case for Turkish and Moroccan immigrant women to the Netherlands. This finding corroborates with the findings of Smith et al (2012), who use Health Survey for England data in their paper and also report higher socioeconomic positions in the UK-born ethnic minority groups compared to the first-generation[62]. Unfortunately there was no information available by gender from the papers included in this review to compare to Hosper et al's findings[118,119].

The National Longitudinal Study of Adolescent Health in the United States is a nationally representative school-based study; it includes people aged 12 to 22. When examining activity patterns by ethnic group, Gordeon-Larsen et al (1999) found that Asian females had low levels of physical activity, when compared to other ethnic groups in the United States[120]. This corroborates the findings of the UK studies in this review, which report that South Asians and South Asian girls have lower levels of physical activity than White British or White European girls. Gordeon-Larsen et al (1999) also found that Asian girls were less inactive than other ethnic groups, which conflicts with the results in this review. The definition of 'Asian' is different in the United States, and the authors of this paper report Asian as referring to Chinese, Filipino and Other Asians. Indians, Pakistanis and Bangladeshis would come under 'Other Asians' in this categorisation, therefore it is possible that the different reports of inactivity in Asian girls between the UK studies and this paper are due to the different definition of Asian, in that the results reflect a different population.

Small samples and failure to adjust for important confounding variables limited the generalisability of results that would have otherwise been highly valuable in ethnicity and physical activity research. Papers studying ethnic minorities can suffer from low sample sizes due to the lower number of ethnic minorities in the population compared to the general population. It is perhaps, therefore, unsurprising that studies trying to report on subsections of the ethnic minority population in the UK may also struggle to recruit enough participants for a quantitative examination of the pooled results.

The age structure of the second-generation may have caused an issue with the sample size for recruiting second-generation adults. However, some of these studies were conducted over ten years ago and it is possible that there may now be enough adults in the UK-born ethnic minority groups to improve sample sizes. It should also be noted that the age structure of ethnic minorities will be different for each group, with the average age at migration to the UK and time since the majority of migration took place for each ethnic group affecting the current age structure of the second-generation.

Results from this review indicate that there is some evidence of UK-born ethnic minorities obtaining a higher socioeconomic position than their parents. This is coupled with an increase in physical activity prevalence between the generations. Smith et al's (2012) paper indicates that higher socioeconomic status may be the cause behind changes in obesity prevalence for some ethnic minorities, but much more information is needed before accurate recommendations for policy can be made. What we do know is that the epidemiology of CVD in twenty to thirty years' time is likely be different for second-generation ethnic minorities if their physical activity behaviours are not the same as the migrant generation.

At present a limited amount is known about the epidemiology of physical activity in second-generation South Asians, although it is apparent that there are increases from the migrant populations; even less is known about the causes behind these changes or in what ways they have changed. More quantitative research with theoretical approaches and adequate sample sizes needs to be carried out in order to firmly establish the differences in prevalence between the generations of ethnic minorities. Future research also needs to separate out South Asian groups to reflect the heterogeneity of the groups comprising 'South Asian'; appropriate strategies for physical activity improvement can only be developed if research presents results separately for each ethnic group.

2.4.3 Attitudes, motivations and barriers to physical activity

This review has shown that second-generation South Asian adults appear to have different attitudes to physical activity as compared to the first-generation. The studies that have explored physical activity in children have predominantly focused on barriers, but do show that factors in the neighbourhood and school environment affect the physical activity of South Asian children in the UK. This is an important finding, as it shows that factors other than ethnic background are impacting on the physical activity of South Asian children. The report by Rai & Finch (1997)[110], while having issues on the reporting of methods, was the only study to report detail on the attitudes, motivations for and barriers to physical activity in second-generation South Asian adults. They highlight the importance of a childhood in the UK and also suggest that the second-generation are more influenced by the media.

Grieser et al (2006) explored the physical activity attitudes, preferences and practices of African American, Hispanic and Caucasian girls aged 11 to 13 in the United States[121]. While the authors do not state whether the participants have been born in the United States, we

do know that the girls are having part of their schooling in the United States. The authors found few differences in attitudes towards physical activity between the ethnic groups, with only a few issues that they thought could be related to the ethnic background of the girl, for example, many Hispanic girls reported doing childcare in the past seven days. There were differences in the favoured activities of the ethnic groups. Although Grieser et al (2006) studied different ethnic groups in a different country, the principle that ethnic minority adolescents may have similar physical activity attitudes to the majority ethnic group, or ethnic groups is important to note. The report by Rai & Finch highlights the importance of a childhood in the UK, citing the importance of childhood experiences in developing attitudes towards physical activity[110]. Some of the motivators and barriers to physical activity described by Rai & Finch (1997) are similar to those described in a review by Allender et al (2006). Their review on understanding participation in sport and physical activity in the UK reports issues such as cost and being motivated by wanting to maintain appearance[57]. While there is not enough information from my review to know whether second-generation South Asians have similar physical activity attitudes to the White British population in the UK, if childhood and school experiences are relevant for physical activity attitudes, it is theoretically possible.

2.4.4 Strengths and limitations of the review

As far as I am aware, this is the first study to review and assess studies reporting on physical activity in second-generation UK South Asians. I systematically searched the literature although it is feasible that I may have missed research published in the 'grey' literature.

Ideally systematic reviews are conducted independently by two researchers and their findings compared and combined, however the systematic search for this review was carried out by myself. While I am confident that all relevant papers were included, as only one person screened the papers for inclusion I cannot rule out the possibility that extra papers may have been eligible for inclusion in the study. The search for papers was limited to those written in English; however as I aimed to include papers reporting on UK populations, it is unlikely that relevant papers written in other languages were excluded.

My analysis of the papers was hindered by the different groupings of ethnic minorities used in the papers. A number of the papers used the broad categorisation of 'South Asian', which is not directly comparable to the more detailed categories of 'Indian', 'Pakistani' and 'Bangladeshi' as these three groups have differences in their socioeconomic and CVD risk factor profiles[19]. While I attempted to compare all the papers, this should be taken into account.

The inclusion of both quantitative and qualitative literature is a strength. Quantitative methods are limited in their ability to explain the causes of differences between populations. Qualitative methods are ideally suited to this, and the papers in this review indicate that second-generation South Asians have a different attitude towards physical activity as compared to the first-generation, something which could not be gleaned from the quantitative literature.

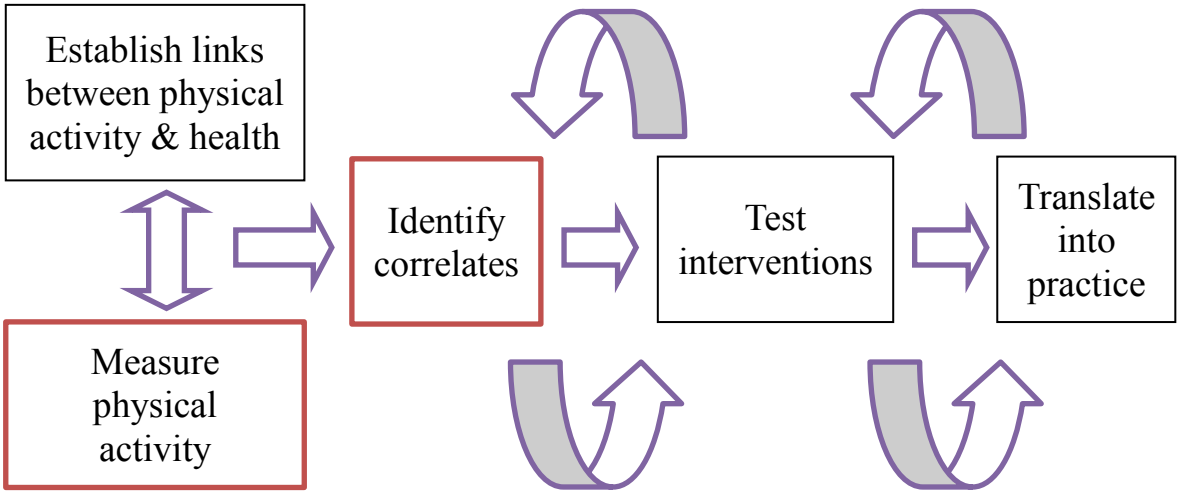
2.5 Conclusions from review of the literature

The lack of qualitative research papers reporting on physical activity in second-generation UK South Asians is striking. The four qualitative studies I did find did not explicitly analyse the second-generation, and none of the papers had this as one of their primary aims. The one study that did have a reasonable amount of information on the attitudes of second-generation adults was not peer-reviewed and was poorly reported. From the papers found here, it would seem that second-generation South Asians are noticed as a group distinct from their migrant parents, but not considered worth studying as a group in their own right. It is almost certain that second-generation ethnic groups have had different early experiences and influences on their lives compared to migrants, therefore when attempting to explore social and cultural contexts and constructions of physical activity, it would make sense to analyse these two groups of people separately. By discussing first and second-generation migrants together for these topics, it is assuming that the ethnicity of these people, essentially the country of origin of their parents or grand-parents, is more important than other relevant factors such as early life experiences and the influence of other social networks.

Figure 2.2 depicts the behavioural epidemiology framework as described by Sallis & Owen (1999). This framework describes the phases of behavioural epidemiology, from establishing links between physical activity and health, to measuring physical activity through to applying research findings in practice or policy. This review has shown that for second-generation South Asians, particularly adults, we are still to accurately measure the level of physical activity. Some work has begun on identifying the factors that influence physical activity, however the majority of quantitative literature has omitted socioeconomic factors from

analysis and I found no qualitative literature studying physical activity in second-generation South Asian adults in their own right. There were some studies on South Asian children, although this research has mainly focused on the barriers to physical activity. The red boxes illustrate the phases in which research into the physical activity of second-generation South Asian adults is still concentrated.

Figure 2.2 Behavioural epidemiology framework[1]



Sallis and Owen (1999)

From the papers found in this review, I would argue that there is a significant gap in the literature on the perceptions, attitudes and experiences of physical activity in second-generation South Asians in the UK, which potentially has importance for health and social inequalities policies in the UK.

Before going on to qualitatively explore the influences, attitudes and barriers to physical activity in second-generation Indian women, I first aim to build on the quantitative findings from this review. The papers in this review indicate that second-generation South Asian

adults have a higher prevalence of physical activity than the first-generation. In the next chapter I aim explore the different ways in which UK South Asians are physically active, examining the different types of physical activity that South Asians of different ages do in their leisure-time, and comparing this to the White British population. This review and the analysis in the next chapter will both help to inform the qualitative study in providing information on both the amount and types of physical activity that UK South Asians do.

2.6 Research questions

The main aim of this thesis is to explore generational differences in health behaviours in ethnic groups in the UK, with a particular focus on physical activity. The main objective of studying this is to gain an understanding of whether health behaviours are different for people who have had a childhood in the UK and to then consider whether specific interventions for second-generation ethnic groups are necessary.

The role ethnicity has in influencing health behaviours, in the context of the wider physical and social environment, has to date not been studied in detail, and generational differences in ethnic groups have also been understudied. Epidemiological literature has already demonstrated that there are differences in physical activity behaviour between ethnic groups in the UK. This review indicates that there are also generational differences in physical activity within UK South Asians, but we know little about the ways in which second-generation UK South Asians are active, in comparison to the first-generation. Given the crude measurement of ethnicity and the social nature of it, it is important to explore all the possible causes of generational differences in physical activity behaviour. To understand

further the patterns and causes of generational differences in physical activity, I seek to answer the following research questions:

1. What are the patterns of physical activity among South Asians in the UK?
    a. How does this differ by sex?
    b. How does this differ by age?

The ideal method to answer my first research question would involve conducting my own nationally representative prospective study on the types of physical activities that UK South Asians do. This would be underpinned by a theoretical framework to ensure I collected information on all the relevant confounders, such as socioeconomic status and neighbourhood. I would objectively measure physical activity, allow people to identity their own ethnicity and measure religion separately. However, achieving this within the time limit and budget of my thesis was unrealistic. Given this, I decided to analyse an existing national dataset that contained information on both ethnicity and the different types of physical activity that people do, despite its limitations with physical activity measurement and ethnicity. I used the socioecological model to identify which variables in the dataset could be relevant to types physical activity performed by South Asians in the UK.

The rest of the research questions in this thesis concentrate on women. These questions require qualitative methods to answer them and I felt that I would be able to analyse my data in more depth if I limited my research to one gender. I chose to research South Asian women because reviews have shown that they consistently have low physical activity levels, in comparison to both South Asian men and other ethnic groups. I also felt that if there were

any sensitive issues that came up during the interviews, women may have been more comfortable discussing these with another woman.

2. What aspects of ethnicity influence physical activity choices in the second-generation of Indian women?
    a. How do other aspects of their identity affect their physical activity choices?
    b. What aspects, not related to their identity, influence their physical activity choices?

3. How do their physical activity influences compare to the physical activity influences of their parents, or the first- generation?

Research questions two and three are suited to qualitative research methods. To understand thoroughly how the ethnic background of my participants influences physical activity, a full ethnographic study using participant observation and interviews would have been the best method to answer these research questions. Full ethnographic studies require immersion into social groups and so are very time-intensive for the researcher. As my job in Oxford University has funded my PhD, I was unable to move to the study location and carry out a full ethnographic study. I was able to conduct a number of semi-structured interviews with the women in my study, which allowed me to gain an understanding of how ethnicity influences physical activity. I used the socioecological model to ensure I covered all the possible influences on physical activity.

2.7 Conclusion

In this chapter, I have reviewed the literature and highlighted the lack of high quality studies reporting on physical activity in second-generation South Asian groups in the UK. My research questions aim to fill the gaps I identified in the literature. In the next chapter I use a nationally representative dataset to try and understand the ways in UK South Asian groups are active.

3. The physical activity profile of ethnic groups in England

3.1 Introduction

Despite the known benefits of physical activity, more than a third of the adult population in England is not physically active enough to meet the UK government's recommendations for physical activity[122] of at least 150 minutes of moderate-intensity aerobic activity every week.

The UK government's recommendations are based on the current evidence and are an update of previous guidelines, which advised 30 minutes of moderate to vigorous exercise five times per week. The new guidelines were published in 2011 so at the time of conducting this analysis, the majority of the data currently available to evaluate whether people meet the recommended levels was designed to measure activity levels against the old guidelines.

As discussed in the introductory chapter, the prevalence of people meeting physical activity guidelines varies by ethnic group. Some ethnic minority groups in the UK are known to do less physical activity than the White British population and this is particularly true of some women from ethnic minority groups[66], although it should be noted that the most recent data available for ethnic groups were collected to measure physical activity against the old physical activity recommendations. Differences in physical activity prevalence between ethnic groups are most often attributed to cultural differences and socioeconomic factors. Little, however, is known about differences in cultural preference for physical activity types in ethnic minority groups in the UK. The Active People Survey provides information on the

different types of sports that ethnic minorities do, but there are currently no surveys or studies that have investigated the different types of activities by ethnic group.

People can get enough physical activity in a number of ways, which include walking, sports, housework, DIY and through their occupation. Previous research has investigated the types of activities that physically active adults undertake and found that younger active adults tend to do more sports and older active adults tend to do more walking[47]. Similar research has also been done in children to assess the ways in which activity changes as children grow up[48]. Policies to increase physical activity need to be targeted appropriately for different sections of the population, but after reviewing the literature, it became clear that there is little or no information on the ways in which ethnic groups are active. It is important to know how ethnic groups differ in the types of activities they report doing, as this allows health promotion interventions to be appropriately targeted, as well as determining whether specific interventions are necessary at all.

In this chapter I investigate what types of activities South Asian ethnic groups do, stratified by sex and age. Socioeconomic differences are often reported as a potential explanation for differences between ethnic groups. I therefore also examined whether any differences in activity types were confounded by social class.

3.2 Method

3.2.1 The Health Survey for England

This study used information from the Health Survey for England (HSE) 1999 and 2004, which is a nationally representative cross-sectional survey. In these two years the HSE boosted the ethnic minority sample; so by combining these two survey years I was able to obtain a larger

sample size. In 2008 and 2012 the HSE focused on physical activity, but there are not enough ethnic minority participants in these two years to analyse information by sub-group.

In both the 1999 and 2004 ethnic boost samples, about 26,500 (1999) and 41,400 (2004) addresses were randomly selected. All the sampled addresses were fully screened and only informants from the specified minority ethnic groups were eligible for inclusion in the survey. This methodology was not used for boosting the number of Chinese informants in 1999, who were followed up from an earlier survey in 1998 that had looked at the health of the Chinese in England. In the 2004 survey, the Chinese sample was supplemented with people who had 'Chinese sounding' surnames found in the Electoral Register.

To combine the two survey years, I identified all variables to be included in the final dataset in both years. I then prepared the data in each year for merging by making sure the definitions, categories and variable names of each variable in both years matched. I then merged the files using Stata 11 to create a master dataset. Physical activity was only available in both years for the 'number of days in the last four weeks that you have done [*insert activity name here*] for 30 minutes or more'. This information was available for the broad domains of walking, sports, DIY and housework, and these were all included in the final dataset.

The survey also included questions on occupational activity, however I chose to restrict the analysis to physical activity done outside of work. Physical activities done outside of work have more potential for intervention as people have choice around their activity outside work. Occupational physical activity is largely determined by the nature of the job and building design, whereas activities such as walking and sports can be intervened on at an individual level, neighbourhood level or a political level.

3.2.1.1 Physical activity variables

Physical activity questions were adapted from the Allied Dunbar National Fitness Survey and were asked of all people aged over 16. All respondents were asked questions about their physical activity in the last four weeks. For heavy housework, heavy manual work, walking and sports, respondents were asked to recall the total number of days in the past four weeks that they had done that particular activity for 30 minutes or more.

Housework corresponds to heavy housework, and participants were asked to state whether the housework was heavy or general. Show cards were used to give people examples of heavy housework and included moving heavy furniture, spring cleaning, walking with heavy shopping for more than five minutes, cleaning windows and scrubbing floors with a scrubbing brush.

DIY work included gardening, DIY and heavy manual work. Participants were shown cards to distinguish heavy manual work from general manual work, and included digging or clearing rough ground, building in stone or bricklaying, mowing large areas with a hand mower, chopping trees or wood, mixing or laying concrete, moving heavy loads or refitting a kitchen or bathroom. Examples on the show card for gardening, building and DIY work included weeding, pruning, planting, decorating, minor household repairs, car washing and maintenance. In this chapter, for the purposes of simplicity, these groups of activities will be referred to only as DIY.

Questions on walking included all walks lasting 30 minutes or more. Country walks and walking to and from work were both included. Walking as part of a sport, walking as part of a job, being on your feet for 30 minutes and walks of less than 30 minutes that add up to 30 minutes or more were all excluded.

Questions on recreational sport or exercise included activities such as swimming, cycling, gym workouts, aerobics, dancing, running or jogging, team sports such as football or rugby, badminton, tennis, squash or other exercises.

3.2.1.2 Demographic variables

To identify ethnic groups in the household, initial screening involved asking the person whether anyone from a list of ethnic groups lived at the household. Once this had been established, individual respondents were asked to confirm their ethnic background, by choosing from a pre-defined list with an option of 'any other group'. South Asian groups included Indian, Pakistani and Bangladeshi. Although other ethnicities were included in the HSE 1999 and 2004, in this analysis I have only analysed South Asian groups compared to the White British group; I re-coded all other ethnic groups into one code.

Although I have not analysed the data by generation, I created a generational variable in order to ascertain the age-group distribution of those born in the UK versus those born abroad. To create the generation variable, I combined the ethnicity variable with a country of birth variable. This created a new variable that had information on the ethnic background of the individual and whether or not they were born in the UK.

Socioeconomic status of the individual classifies people according to their occupation, and included professionals, managerial technical, skilled manual and non-manual, semi-skilled manual and unskilled manual. People in the armed forces, full-time students and others who have never worked were included in the analysis. While NS-SEC is now usually used for socioeconomic status, this was not developed until 2001 and so was not available in the HSE 1999.

The age and sex of the respondents were obtained by asking whether people were male or female and asking their date of birth. I grouped age into three categories, to retain a larger sample size when analysing by subgroup of age. The HSE provides an age variable grouped into ten year age-bands, so I combined these to create age-groups 16 to 34, 35 to 54 and 55 and above for this analysis.

3.2.2 Analysis

Ideally I would have liked to conduct analyses by generation (first or second), age and sex, but the low numbers of ethnic minorities recorded in national surveys, meant that it was not possible to analyse by both generation and age. I therefore present analyses by age and sex, in order to allow for simpler comparisons with the White British group.

After creating the dataset, I produced descriptive information on the basic characteristics of the people in the dataset and how active the different ethnic groups were. The nature of the physical activity questions meant that the only measure of physical activity was the number of days that each person had done an activity for 30 minutes or more, in the last 28 days. I created a total physical activity variable by combining the individual responses for heavy housework, heavy manual work and gardening, walking and sports; this contained the total number of physical activity events for each person. I then calculated the proportion of total physical activity events that came from each physical activity domain. For each individual in the dataset, I now had information on the total number of days they were active for 30 minutes or more (or physical activity 'events'), and the contribution of each domain to that total number of physical activity 'events'. Using this information, I created descriptive stacked bar-graphs for each ethnic group, by age and sex, to illustrate the different contributions of the different physical activity domains to overall physical activity.

Appendix II also contains descriptive information on each ethnic group stratified by social class.

After describing the different contributions of physical activity domains to total physical activity, I examined whether there were statistical differences in the physical activity domains between ethnic groups, and then within ethnic groups. To test for differences in physical activity types between ethnic groups, I used analysis of variance tests (ANOVAs) to explore whether there was a difference in the mean total number of physical events for total activity and for each physical activity domain. I used bonferroni tests to explore how each ethnic group differed from the others, for total physical activity and for each domain. All bonferroni test results are presented in Appendix II. These analyses were all stratified by age and sex, after determining that there was an overall difference between the ethnic groups.

After establishing there was a difference between the ethnic groups, I used ANOVAs to test the association of socioeconomic status and ethnicity with both the numbers of physical activity events for each domain, and the proportion of total physical activity coming from each domain. This allowed me to explore the extent to which socioeconomic status was associated with physical activity types in South Asian and White British ethnic groups. As discussed in the introduction, socioeconomic status is a potential confounder of the relationship between ethnicity and physical activity, as some South Asian groups live in deprived areas and have a low socioeconomic status.

I then went on to conduct ANOVAs for each ethnic group separately, stratified by sex. For men and women in each ethnic group I assessed the contribution of socioeconomic status and then age-group to the total number of physical activity events and the proportion of

total physical activity comprised by each domain. Age group allowed for a comparison with the White British group, however for the South Asian groups, I also assessed the association of generational status with the same outcomes as socioeconomic status and age-group (results in Appendix II). This was to ascertain more precisely whether generational differences within each ethnic minority group were significant. Generational comparisons are not meaningful within the White British group, as the 95% of this ethnic group were born in the UK.

3.3 Results

Table 3.1 Number of people included in final dataset, by ethnic group, sex and age

	MEN				WOMEN				MEN AND WOMEN			
	16 to 34	35 to 54	55+	Total	16 to 34	35 to 54	55+	Total	16 to 34	35 to 54	55+	Total
Indian	429	493	243	1,165	503	549	231	1,283	932	1,042	474	2,448
Pakistani	541	359	142	1,042	656	366	121	1,143	1,197	725	263	2,185
Bangladeshi	478	291	164	933	665	260	107	1,032	1,143	551	271	1,965
White	1,537	1,997	2,194	5,728	1,837	2,580	2,733	7,150	3,374	4,577	4,927	12,878

The final dataset contained 26,539 people, once people from other ethnic groups are also included). When sample size was stratified by age, sex and generation, there were very low numbers in some of the UK-born groups, as they have a much younger age-profile (see Appendix II for table). When I analysed the percentage of those who were born in the UK within each age-group (see Appendix II for table), over 90% of Indians, Pakistanis and Bangladeshis aged over 35 were born abroad. For those aged 16 to 34, 73% of Bangladeshis were born abroad, however only 40% of Indians and 46% of Pakistanis in this age-group were born abroad. Due to the age-profile of these UK-born and migrant ethnic groups in the

dataset, it is reasonable to assume that any findings pertaining to the people aged over 35 are likely to be the first-generation, or migrant group.

Tables 3.2 to 3.4 describe the basic characteristics of the sample and provide information on how physically active each ethnic group is. For all ethnic groups, the majority of people did not meet the pre-2011 recommended levels of physical activity, with particularly low levels in the Pakistani and Bangladeshi groups. As with the percentage of people meeting the recommended levels of physical activity, the mean number of physical activity events lasting 30 minutes or more decreased with age for all ethnic groups. The highest mean numbers of physical activity events were in the White British group and the Indian ethnic group.

Table 3.2 Characteristics of participants by ethnic group

	Indian	Pakistani	Bangladeshi	White
	n = 2,448	n = 2,185	n = 1,965	n = 12,878
	%	%	%	%
Age-group				
16-34	38	55	58	26
35-54	43	33	28	36
55+	19	12	14	38
Generation				
UK-born	26	31	17	95
Born abroad	74	69	83	5
Sex				
Men	48	48	47	48
Women	52	52	53	56
Social class				
I	7	3	1	5
II	23	11	7	27
III	21	15	11	25
IV	11	14	15	19

V	21	17	19	16
	3	2	2	5
Meets pre 2011 PA guidelines				
Yes	26	21	17	27
No	74	79	83	73

Table 3.3 Percentage of men and women meeting the pre-2011 physical activity guidelines, by ethnic group, sex and age

	Doesn't meet guidelines					Meets guidelines				
	16 to 34	**35 to 54**	**55+**	**Total**	**Total**	**16 to 34**	**35 to 54**	**55+**	**Total**	**Total**
MEN	%	%	%	%	n	%	%	%	%	n
Indian	63	64	81	67	784	37	36	19	33	381
Pakistani	65	75	89	72	750	35	25	11	28	292
Bangladeshi	72	76	94	77	717	28	24	6	23	216
White	51	62	80	66	3,771	49	38	20	34	1,957
WOMEN										
Indian	77	77	94	80	1,027	23	23	6	20	256
Pakistani	84	85	93	85	974	16	15	7	15	169
Bangladeshi	86	93	98	89	916	14	7	2	11	116
White	72	72	88	78	5,582	28	28	12	22	1,568

Table 3.4 Mean number of total physical activity events in the last four weeks, lasting 30 minutes or more, by ethnic group, sex and age (n = 26,539)

	MEN				WOMEN			
	Total	**16 to 34**	**35 to 54**	**55+**	**Total**	**16 to 34**	**35 to 54**	**55+**
Indian	8.6	11.6	7.5	5.7	7.2	9.0	7.6	2.2
Pakistani	7.2	10.0	4.7	2.7	6.5	7.5	6.3	2.4
Bangladeshi	6.3	8.5	5.1	1.9	4.5	5.4	3.6	0.9
White	10.5	15.2	10.7	6.9	8.8	11.0	10.5	5.8

3.3.1 Contributions of physical activity domains to total physical activity

Figures 3.1 to 3.5 illustrate the different contributions of each physical activity domain to total physical activity, for each ethnic group. When men and women are combined (Figure 3.1), South Asian groups appear to do more housework than the White British group and Indians and Pakistanis do less walking than the Bangladeshi and White British group. Figure 3.2 illustrates the importance of analysing ethnic groups by sex (including the White British). The contribution of housework to total physical activity is much higher in women than men, in all ethnic groups, although differences between the ethnic groups are still apparent for both sexes. Within women, South Asian groups appear to have a higher proportion of housework and a lower proportion of DIY contributing to physical activity as compared to the White British group. In men, the ethnic group with walking as the highest proportion of total activity was the Bangladeshi ethnic group.

Table 3.5 Proportion of physical activity types contributing to total physical activity (n = 26,539)

	MEN				WOMEN				TOTAL			
	Housework	Manual	Walking	Sport	Housework	Manual	Walking	Sport	Housework	Manual	Walking	Sport
TOTAL												
Indian	30.1	13.2	18.6	38.2	56.3	3.2	14.8	25.6	43.7	8.0	16.6	31.6
Pakistani	23.7	10.9	18.5	46.8	68.0	3.6	12.3	16.2	47.3	7.0	15.2	30.5
Bangladeshi	24.0	5.3	25.7	45.1	64.9	2.5	15.5	17.2	44.9	3.8	20.4	30.8
White	24.0	21.0	22.1	33.0	46.5	6.0	19.1	28.4	36.3	12.8	20.4	30.5
16 to 34												
Indian	23.1	8.2	19.2	49.5	45.6	2.1	19.0	33.4	34.9	5.0	19.1	41.0
Pakistani	18.8	7.6	16.9	56.7	62.3	2.9	15.1	19.7	41.7	5.1	16.0	37.2
Bangladeshi	16.1	3.5	24.5	55.9	61.1	1.7	17.2	20.0	40.3	2.6	20.6	36.6
White	15.5	11.6	24.1	48.9	36.5	3.6	20.0	39.8	26.6	7.4	22.0	44.1
35 to 54												
Indian	32.6	16.4	17.4	33.6	63.8	3.9	11.7	20.7	49.5	9.6	14.3	26.6
Pakistani	31.9	14.9	20.3	32.8	77.0	4.7	7.0	11.4	57.0	9.2	12.9	20.9
Bangladeshi	38.0	8.3	29.6	24.1	76.9	4.6	10.9	7.6	56.5	6.5	20.7	16.2
White	23.3	21.9	22.8	32.1	47.3	6.6	19.6	26.5	36.9	13.2	20.9	29.0
55+												
Indian	46.5	20.6	20.3	12.7	75.7	6.2	8.6	9.4	58.5	14.7	15.5	11.3
Pakistani	38.1	27.0	27.0	7.9	85.5	4.3	9.0	1.2	60.4	16.3	18.5	4.7
Bangladeshi	51.7	11.5	24.3	12.6	76.4	6.3	3.1	14.3	59.5	9.8	17.5	13.1
White	33.9	29.8	19.1	17.2	55.4	7.6	17.5	19.5	45.5	17.8	18.2	18.5

Figure 3.1 Proportion of physical activity domains contributing to total physical activity, by ethnic group, Health Survey for England 1999 & 2004 (n = 26,539)

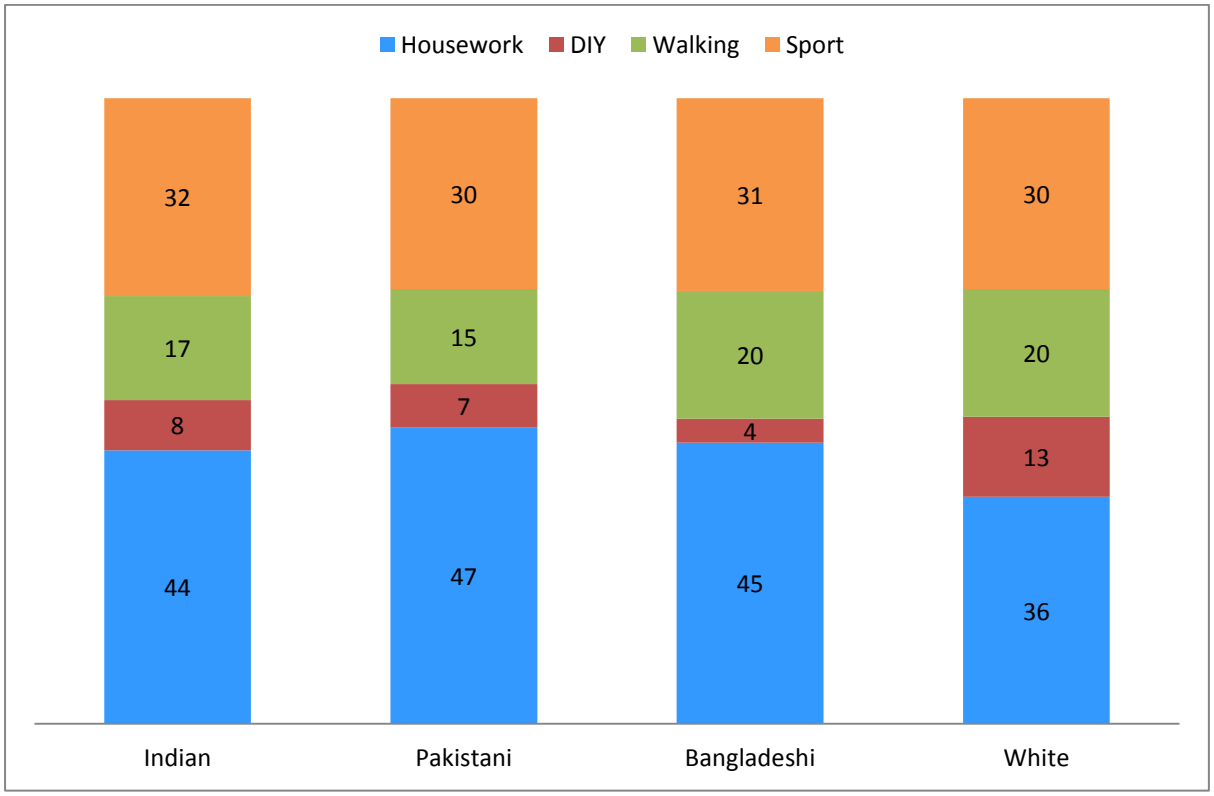
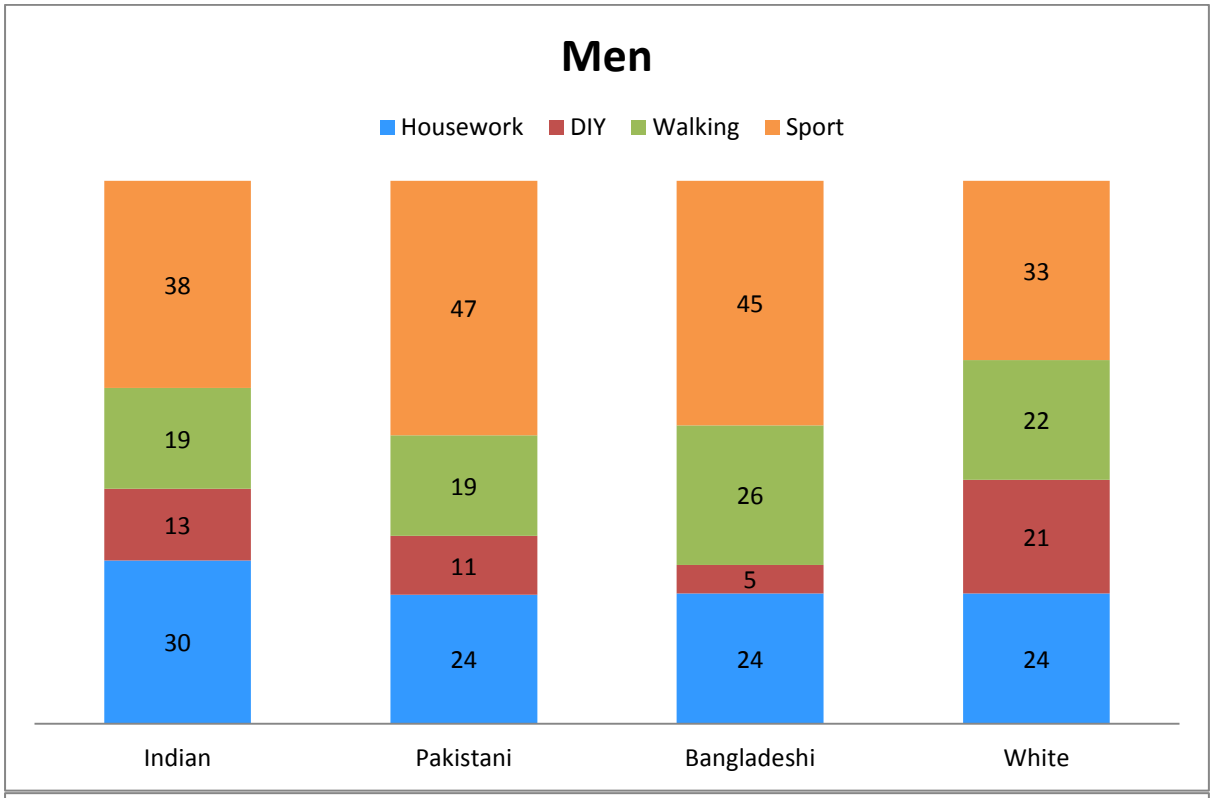
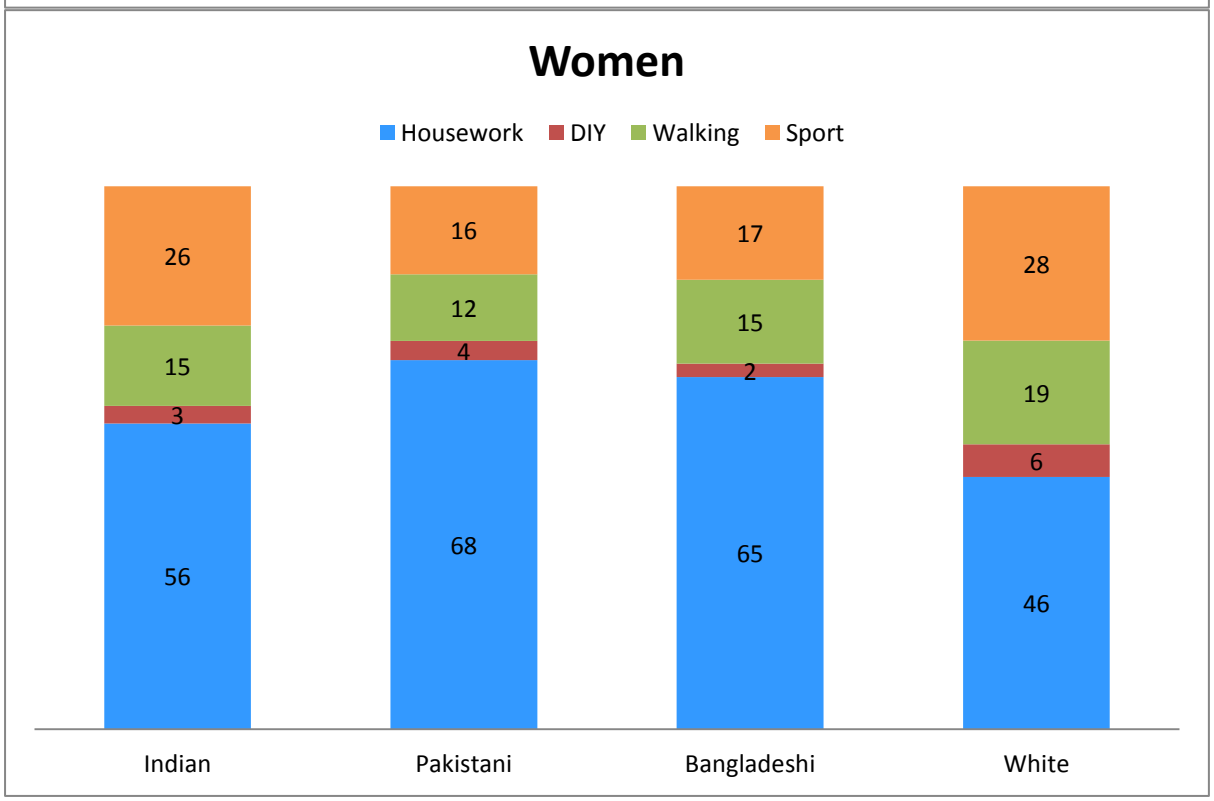


Figure 3.2 Proportion of physical activity domains contributing to total physical activity, by ethnic group and sex, Health Survey for England 1999 & 2004 (n = 26,539)





Figures 3.3 and 3.4 illustrate how each domain contributes to total activity for each ethnic group by age. Differences between ethnic groups are apparent within all three age-groups. The proportion of total activity coming from sports declined with age for all ethnic groups and the proportion of activity coming from housework increased with age.

In those aged 16 to 34 South Asian men appear to have sport as a higher proportion of their total activity as compared to the White British. In South Asian women however, sport is a much lower proportion as compared to the White British women, with over 60% of total activity coming from housework in Pakistani and Bangladeshi women aged 16 to 34.

In the 35 to 54 age-group, the differences between male ethnic groups appear much narrower, particularly for sport. Out of all the ethnic groups in the age-group, Bangladeshi males have the highest proportion of total activity from walking. For women in the 35 to 54 age-group, 77% of total activity came from housework for the Pakistani and Bangladeshi women, compared to 47% in the White British group. The proportion of activity coming from walking and sports was highest in the White British women aged 35 to 54. The proportion of activity coming from sports in the Indian women of this age group was more than double that of the Pakistani and Bangladeshi women.

In those aged over 55, the proportion of activity coming from sports was the lowest in all South Asian ethnic groups for both sexes, but it was particularly low for Bangladeshi women. South Asian men had a higher proportion of total activity coming from walking and housework than White British men, however the White British had sports and DIY as a higher proportion of total activity. For women aged over 55, housework accounted for the majority of South Asian women's activity and in a much higher proportion as compared to the White British women in this age-group. The proportion of total activity coming from

walking was 18% for White British women aged over 55, but was half this for Indian and Pakistani women, and only 3% for Bangladeshi women.

Figure 3.3 Proportion of physical activity domains contributing to total physical activity, by ethnic group and age, Health Survey for England 1999 & 2004 (n = 26,539)

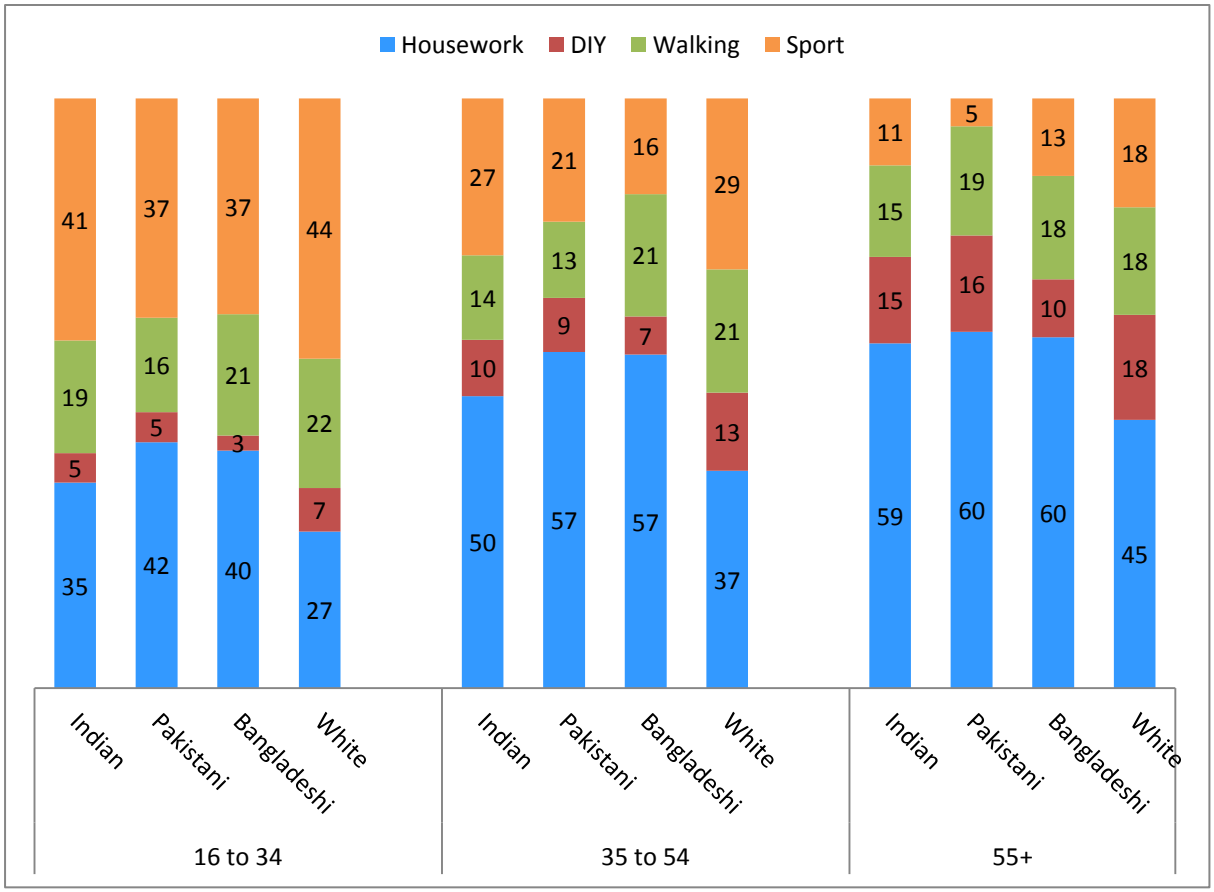
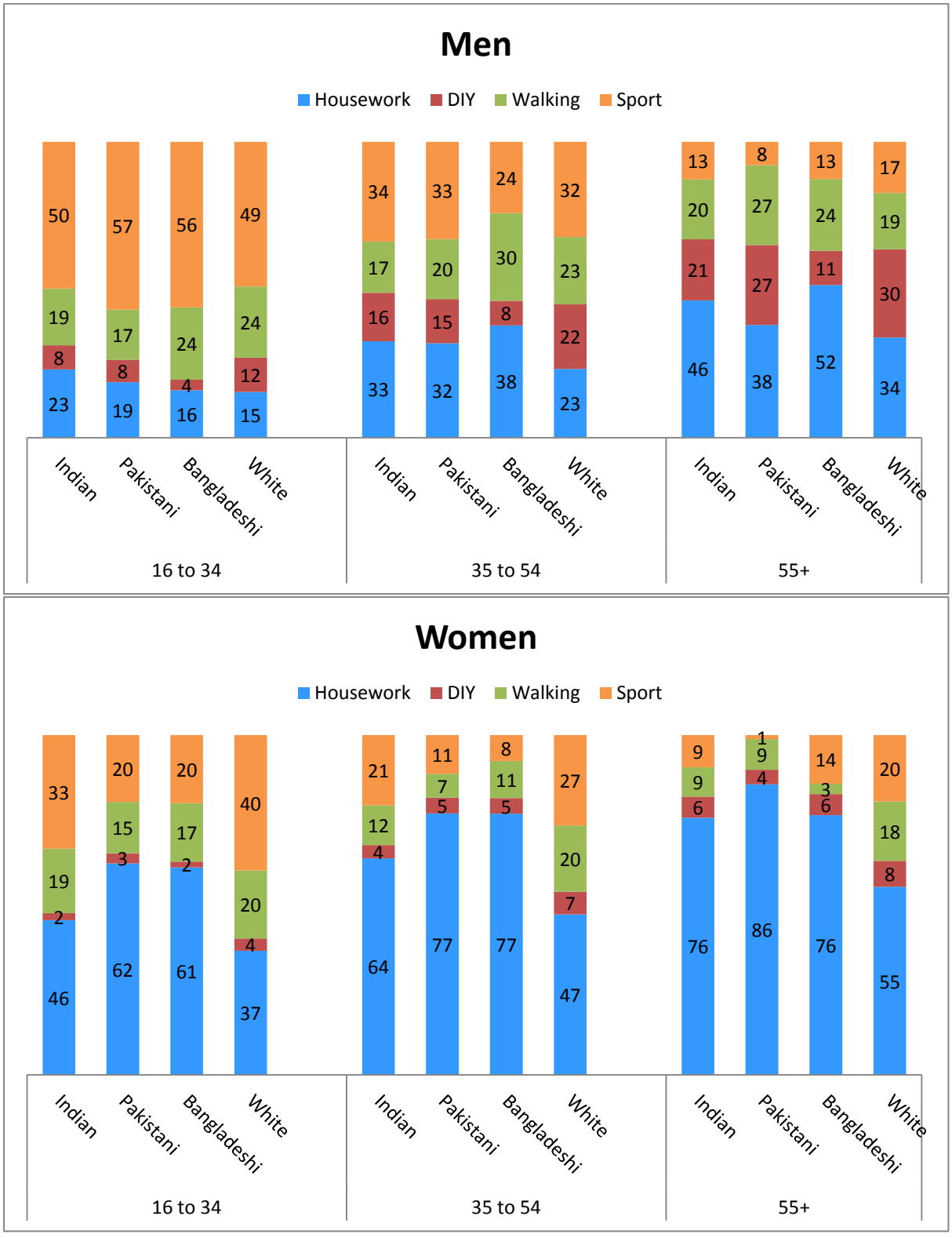


Figure 3.4 Proportion of physical activity domains contributing to total physical activity, by ethnic group and age, in men and women separately, Health Survey for England 1999 & 2004 (n = 26,539)



3.3.2 Tests for statistical differences

3.3.2.1 Between ethnic groups

I conducted one-way ANOVAs to test whether there was a statistical difference between all ethnic groups in the mean numbers of events and the proportion of each activity making up total activity (Table 3.6). There was a significant difference between all ethnic groups in the total number of physical activity events, for both men and women. When tested in each age group and sex, differences between ethnic groups remained, with a few exceptions. There was little evidence of a statistical difference between ethnic groups in the proportion of total activity that comes from walking in men aged above 55. There was also some evidence that for women aged 16 to 34, the contribution of walking to total physical activity did not differ between ethnic groups (p=0.06). In those aged over 55, there was also no evidence of difference between ethnic groups for the proportion of total activity comprising sports in men, or DIY and heavy gardening in women.

Bonferroni tests

I used bonferroni tests to assess the ways in which each ethnic group differed from the others in physical activity (see Appendix II for tables II.8 to II.17). These showed that the proportion of total activity coming from housework was significantly higher in the South Asian groups overall as compared to the White British group overall, but there was no evidence of a statistical difference between the South Asian groups.

For the proportion of activity from walking, there were no significant differences between the White British group and the South Asian groups for men, but in women both the Indian and Pakistani ethnic groups had a contribution of walking significantly different to total activity from the White British group. Both Indian men and women in the 16 to 34 age group

showed no evidence of being significantly different to the White British group for the proportion of total activity from walking.

For sports, almost all the South Asian ethnic groups in men and women significantly differed from the White British in the amount that sports contributed to overall physical activity. Indian women were the exception to this, who showed no evidence of being different to the White British women. However, when analysed by age, Indian women aged 16 to 54 showed evidence of being significantly different to the White British group for the proportion of total activity that comes from sports.

Table 3.6 Results of ANOVAs to test for differences between all ethnic groups in their contribution of physical activity domains to total physical activity, by sex and age (n = 26,539)

ALL ETHNIC GROUPS	All ages		16 to 34		35 to 54		55+	
	Anova F	Anova P-value	Anova F	Anova P-value	Anova F	Anova P-value	Anova F	Anova P-value
Total physical activity events								
All ethnic groups	82.53	<0.00	68.59	<0.00	62.46	<0.00	25.74	<0.00
Men	37.36	<0.00	31.90	<0.00	32.54	<0.00	12.60	<0.00
Women	49.55	<0.00	37.59	<0.00	31.20	<0.00	17.14	<0.00
Housework events								
All ethnic groups	15.45	<0.00	5.78	<0.00	5.83	<0.00	10.62	<0.00
Men	17.25	<0.00	7.72	<0.00	5.05	<0.00	5.36	<0.00
Women	9.77	<0.00	4.96	<0.00	3.98	<0.00	6.68	<0.00
Proportion of total activity from housework								
All ethnic groups	31.88	<0.00	35.46	<0.00	37.94	<0.00	7.03	<0.00
Men	5.74	<0.00	4.61	<0.00	9.71	<0.00	4.34	<0.00
Women	58.84	<0.00	50.29	<0.00	42.94	<0.00	8.24	<0.00
Walking events								
All ethnic groups	30.79	<0.00	21.28	<0.00	27.51	<0.00	5.74	<0.00
Men	9.16	<0.00	11.01	<0.00	7.71	<0.00	2.22	0.06
Women	25.89	<0.00	11.56	<0.00	23.09	<0.00	6.40	<0.00
Proportion of total activity from walking								

All ethnic groups	10.61	<0.00	5.58	<0.00	10.17	<0.00	0.38	0.82
Men	4.59	<0.00	4.57	<0.00	3.70	0.01	0.78	0.54
Women	10.60	<0.00	2.26	0.06	13.88	<0.00	2.41	0.05
Sports events								
All ethnic groups	27.54	<0.00	43.44	<0.00	35.26	<0.00	15.09	<0.00
Men	5.77	<0.00	10.69	<0.00	15.32	<0.00	6.66	<0.00
Women	35.10	<0.00	41.04	<0.00	23.47	<0.00	9.62	<0.00
Proportion of total activity from sports								
All ethnic groups	4.14	<0.00	10.24	<0.00	9.51	<0.00	4.71	<0.00
Men	24.87	<0.00	4.57	<0.00	3.42	0.01	1.28	0.27
Women	24.47	<0.00	36.02	<0.00	15.33	<0.00	3.67	0.01
DIY events								
All ethnic groups	71.80	<0.00	25.62	<0.00	26.93	<0.00	12.62	<0.00
Men	61.39	<0.00	20.57	<0.00	25.08	<0.00	11.91	<0.00
Women	17.22	<0.00	5.04	<0.00	6.13	<0.00	4.67	<0.00
Proportion of total activity from DIY								
All ethnic groups	56.39	<0.00	12.87	<0.00	14.60	<0.00	3.39	0.01
Men	49.22	<0.00	10.18	<0.00	12.18	<0.00	4.78	<0.00
Women	13.36	<0.00	3.21	0.01	4.24	<0.00	0.70	0.59

Effect of socioeconomic status

I also conducted ANOVAs to examine the effect of both socioeconomic status and ethnicity on the contributions of physical activity categories to total physical activity, for both sexes and age-groups (Table 3.7). In women, once ethnicity was accounted for, socioeconomic status was associated with the proportion of all total activity coming from all domains, except for the proportion coming from DIY in women aged 16 to 54; for women in this age-group, ethnic background is more relevant than socioeconomic status. Appendix II contains information on the contribution of physical activity domains by social class, within each ethnic group. This shows that while there are trends for housework, walking and sports to decrease or increase with social class, this was not the case for DIY. For differences in the proportion of total activity coming from walking in women, once socioeconomic status was accounted for, ethnicity was only relevant for the 35 to 54 age group. This means that for women aged 16 to 34 and above 55, socioeconomic status is more likely to be an explanation for differences in the proportion of walking, rather than ethnic group. After accounting for socioeconomic status, ethnicity remained significantly associated with the proportion of total activity coming from almost all domains. Exceptions to this were for walking and DIY in women aged over 55 and walking in women aged 16 to 34 and over 55; for both of these socioeconomic status is more likely than ethnicity to be an explanation for differences between the proportions of physical activity domains making up total activity.

In men, the only domains where socioeconomic status was not significant after ethnicity was accounted for was for the proportion of total activity coming from walking in men aged 35 to 54 and the proportion of total activity coming from DIY and gardening in men aged over 55. After accounting for socioeconomic status, the only domains where ethnicity was no longer associated with the contribution to total physical activity domains were walking in

those aged above 55 and DIY and gardening in women aged over 55. For men aged over 55, neither ethnicity or socioeconomic status were associated with the proportion of total activity coming from sports, however the p-value for socioeconomic status was 0.06, which is weak evidence for an association.

Table 3.7 Association of socioeconomic status and ethnicity to contribution of physical activity categories to total physical activity, by sex and age (n = 26,539)

ALL ETHNIC GROUPS	MEN						WOMEN					
	16 to 34		35 to 54		55+		16 to 34		35 to 54		55+	
Total events	**F value**	**P-value**	**F value**	**P-value**	**F value**	**P-value**	**F value**	**P-value**	**F value**	**P-value**	**F value**	**P-value**
Ethnicity	35.24	<0.00	27.46	<0.00	8.82	<0.00	18.21	<0.00	8.97	<0.00	7.10	<0.00
Social class	6.85	<0.00	3.57	<0.00	6.08	<0.00	3.33	<0.00	4.50	<0.00	4.81	<0.00
Housework events												
Ethnicity	6.78	<0.00	6.00	<0.00	4.94	<0.00	4.74	<0.00	3.14	0.01	3.75	<0.00
Social class	5.01	<0.00	0.72	0.69	1.46	0.17	7.23	<0.00	4.68	<0.00	1.32	0.23
Housework proportions												
Ethnicity	8.39	<0.00	7.92	<0.00	4.29	<0.00	25.31	<0.00	15.81	<0.00	5.11	<0.00
Social class	9.35	<0.00	4.05	<0.00	2.61	0.01	24.83	<0.00	21.69	<0.00	6.23	<0.00
Walking events												
Ethnicity	15.64	<0.00	7.09	<0.00	1.17	0.32	5.75	<0.00	10.54	<0.00	2.21	0.06
Social class	7.94	<0.00	1.26	0.25	4.33	<0.00	2.29	0.01	2.71	0.01	2.82	<0.00
Walking proportions												
Ethnicity	6.74	<0.00	4.95	<0.00	0.88	0.48	1.06	0.38	8.83	<0.00	1.99	0.09
Social class	5.03	<0.00	0.69	0.72	2.94	<0.00	2.94	<0.00	3.93	<0.00	2.92	<0.00
Sports events												
Ethnicity	16.58	<0.00	14.41	<0.00	4.36	<0.00	20.31	<0.00	4.22	<0.00	3.48	0.01
Social class	11.49	<0.00	8.00	<0.00	4.18	<0.00	9.00	<0.00	12.75	<0.00	3.75	<0.00
Sports proportions												

Ethnicity	3.54	0.01	5.64	0.02	1.12	0.35	18.47	<0.00	3.26	0.01	2.47	0.04
Social class	7.13	<0.00	7.25	<0.00	1.91	0.06	16.70	<0.00	15.69	<0.00	1.35	0.22
DIY events												
Ethnicity	15.74	<0.00	24.12	<0.00	11.06	<0.00	2.00	0.09	2.85	0.02	4.58	<0.00
Social class	7.30	<0.00	3.25	<0.00	2.84	0.00	2.06	0.03	1.38	0.20	3.47	<0.00
DIY proportions												
Ethnicity	7.89	<0.00	8.84	<0.00	4.93	<0.00	3.06	<0.00	2.63	0.01	0.47	0.86
Social class	9.18	<0.00	5.34	<0.00	1.81	0.07	1.43	0.17	1.65	0.11	2.77	0.01

Within each ethnic group, I conducted ANOVAs to explore whether socioeconomic status, age group or generation were significantly associated with the total number of physical activity events for each domain, and the proportion of total activity coming from each domain. While it is possible that there are interactions between age group, socioeconomic status and generation, there are too few numbers in the sample to stratify by all three of these factors, which would be necessary if an interaction was present.

3.3.2.2 Indian ethnic group

There was no evidence that age group was significantly associated with the proportion that walking contributes to total activity in the male Indian population (p-value = 0.68), but age-group was associated with the total number of walking events. For Indian women, there was much stronger evidence for an association between age-group and the proportion of activity comprised by walking (p-value = <0.00). For housework, age-group was not associated with the total number or proportion of events in men, but in women, age-group did show evidence of being associated with the proportion of total activity from housework. When considered in conjunction with Figure 3.4, we can see that the contribution of housework to total activity increases with age-group. For sports, age-group was relevant for Indian men and women both in the total number of sporting events, and in the proportion of total activity comprised of sport. Figure 3.4 illustrates that the contribution of sport to total activity declines with age for Indian men and women.

When I assessed the contribution of generational status, there was evidence that for Indian women, generation was not associated with the contribution of DIY to total activity. Age-group was associated with this, indicating that differences in this domain for Indian women may be more likely due to age differences, rather than generational differences. It is likely

that these two variables interact with each other, however due to the low numbers within each age and generation of ethnic group, it is not possible to produce ANOVAs stratified by age and generation.

Socioeconomic status was not associated with the proportion of total activity made up by walking in Indian men or women, although the evidence that socioeconomic status is not associated was much stronger in Indian men than women (male p-value = 0.51; female p-value = 0.07). For the contributions of housework, DIY and sports, socioeconomic status was significantly associated.

3.3.2.3 Pakistani ethnic group

Age-group was associated with the contribution of housework and sports in Pakistani men and women. Figure 3.4 shows clearly that housework increases with age and sports decreases with age. There was no evidence that age-group was associated with the proportion of total activity that came from walking in men, however in women there was evidence of an association (p-value = <0.00). Figure 3.4 shows that overall the contribution of walking to total activity decreases with age for women. In Pakistani women, age-group was also not associated with the proportion of total activity that came from DIY.

The associations of generation with the contributions of physical activity domains showed very similar results to the associations with age-group. Unfortunately, this analysis cannot determine whether age only, generation only or both together are associated with the outcome.

Socioeconomic status was significantly associated with the proportions of total activity coming from housework, walking and sports in Pakistani women; in men it was only significantly associated with housework and sports.

3.3.2.4 Bangladeshi ethnic group

In Bangladeshi men and women, the proportion of activity coming from housework and sports was significantly associated with age-group. As with the Indian and Pakistani groups, the contribution of housework to total activity increases with age and the contribution of sports decreases. There was very little evidence that age-group affected the contribution of walking to total activity in both Bangladeshi men and women.

As with the Pakistani group, the significant associations of generation showed results very similar to associations of age-group. The only exception was for DIY, where there was little evidence of an association for generation ($p=0.69$), but stronger evidence for an association with age-group ($p=0.02$). This indicates that generation is not likely to be relevant for the contribution of DIY to total activity.

In men, socioeconomic status was significantly associated with the proportion of activity coming from housework, DIY and sports, but not walking. In women socioeconomic status was associated with the proportion of total activity events made up of housework, walking and sports, but not DIY.

3.3.2.5 White British ethnic group

Age-group was significantly associated with the proportion of total activity comprised by housework, DIY and sports in women, and all activities in men. Figure 3.4 shows that the contribution of walking to total physical activity changed very little with age-group. Socioeconomic status was significantly associated with the proportion of total activity coming from all domains in men, and all but DIY in women.

Table 3.8 Associations of age-group and socioeconomic status to contribution of physical activity categories to total physical activity, for each ethnic group separately, by sex (n = 26,539)

	White				Indian				Pakistani				Bangladeshi			
	Men		Women		Men		Women		Men		Women		Men		Women	
	Anova F	Anova P-value	Anova F	Anova P-value	Anova F	Anova P-value	Anova F	Anova P-value	Anova F	Anova P-value	Anova F	Anova P-value	Anova F	Anova P-value	Anova F	Anova P-value
Contribution by socioeconomic status																
total PA events	4.18	<0.00	10.49	<0.00	5.52	<0.00	4.12	<0.00	11.24	<0.00	4.55	<0.00	9.96	<0.00	5.80	<0.00
Housework	1.40	0.18	2.88	<0.00	0.85	0.56	1.57	0.13	1.57	0.13	1.32	0.24	1.62	0.12	0.68	0.71
Walking	5.70	<0.00	5.33	<0.00	2.00	0.04	2.97	0.00	4.64	<0.00	4.43	<0.00	3.65	<0.00	6.86	<0.00
DIY	5.66	<0.00	2.96	<0.00	2.36	0.02	0.98	0.45	1.30	0.24	0.84	0.55	1.08	0.37	0.37	0.93
Sports	10.89	<0.00	15.51	<0.00	12.64	<0.00	6.91	<0.00	11.82	<0.00	8.88	<0.00	11.79	<0.00	8.56	<0.00
Proportions																
Housework	4.74	<0.00	23.12	<0.00	4.09	<0.00	11.49	<0.00	3.11	<0.00	12.89	<0.00	4.64	<0.00	9.10	<0.00
Walking	4.55	<0.00	5.15	<0.00	0.91	0.51	1.87	0.07	0.55	0.82	3.47	<0.00	0.93	0.49	2.34	0.02
DIY	10.06	<0.00	1.50	0.14	3.75	<0.00	2.45	0.02	1.71	0.09	1.81	0.08	7.70	<0.00	0.39	0.93
Sports	8.42	<0.00	11.26	<0.00	6.44	<0.00	8.49	<0.00	3.10	<0.00	11.15	<0.00	4.97	<0.00	11.12	<0.00
Contribution by age																
total PA events	199.50	<0.00	157.44	<0.00	21.94	<0.00	34.67	<0.00	37.41	<0.00	12.86	<0.00	26.27	<0.00	15.09	<0.00
Housework	1.53	0.22	45.80	<0.00	0.86	0.42	14.27	<0.00	0.77	0.46	6.53	<0.00	2.63	0.07	7.22	<0.00
Walking	59.78	<0.00	40.70	<0.00	2.32	0.10	12.44	<0.00	5.81	<0.00	6.71	<0.00	4.40	0.01	7.52	<0.00
DIY	3.32	0.04	6.36	<0.00	0.99	0.37	2.51	0.08	0.06	0.94	2.60	0.07	0.73	0.48	0.75	0.47
Sports	345.39	<0.00	185.42	<0.00	60.80	<0.00	25.44	<0.00	53.30	<0.00	11.53	<0.00	41.75	<0.00	8.80	<0.00
Proportions																
Housework	93.96	<0.00	81.73	<0.00	15.00	<0.00	24.76	<0.00	10.22	<0.00	12.27	<0.00	22.15	<0.00	5.50	<0.00
Walking	7.88	<0.00	2.69	0.07	0.39	0.68	7.11	<0.00	1.76	0.17	6.12	<0.00	0.65	0.52	2.40	0.09
DIY	103.95	<0.00	20.05	<0.00	10.42	<0.00	3.18	0.04	10.86	<0.00	0.98	0.37	3.79	0.02	2.55	0.08
Sports	240.62	<0.00	120.56	<0.00	34.94	<0.00	17.48	<0.00	35.65	<0.00	8.21	<0.00	30.90	<0.00	4.97	0.01

3.4 Discussion

3.4.1 Summary of results

3.4.1.1 Differences between ethnic groups

Figures 3.1 to 3.5 and tables 3.5 and 3.6 clearly demonstrate that the types of physical activities that people in England do vary according to their ethnic group, sex and age-group. Socioeconomic status, rather than ethnic background appears to account for differences in the proportions of walking in women in the 16 to 34 and above 55 age-groups; the same was true for men in the 35 to 54 age-group. This analysis also highlights some similarities between ethnic groups. For example, in the younger Indian groups (of whom 60% are UK-born in this dataset) walking contributes a similar proportion to physical activity as in the majority White British group.

After accounting for the role of ethnicity, socioeconomic status was still associated with the contribution of most physical activity domains, with some exceptions within each sex and age-group. Once social class was taken into account, the ethnic background of women was no longer associated with walking as a proportion of total activity. This indicates that for women, cultural preferences for walking are not responsible for differences between ethnic groups, but the differences are more likely related to occupation, income, education, or possibly the local area.

3.4.1.2 Role of age-group within ethnic groups

Age-group was associated with the contribution of housework and sports within all ethnic groups, with housework generally increasing and sports decreasing. It was not associated

with walking for men in any of the South Asian groups, and was also not relevant for Bangladeshi women and the contribution of walking.

3.4.1.3 Role of socioeconomic status within ethnic groups

Individual social class was significantly associated with the proportion of total activity coming from housework and sports in all ethnic groups. Socioeconomic status was not associated with the contribution of walking to total activity for men in any of the ethnic groups, and additionally for Indian women. With the exception of Indian women, socioeconomic status was not associated with the contribution of DIY in women in all ethnic groups.

Individual social class clearly has a role in most ethnic groups in that it is associated with the contribution of most physical activity domains. It is possible that occupation, education and income all affect sports participation, although it is interesting to note that these factors do not appear to be relevant for walking in South Asian men or Indian women.

3.4.2 Results in the context of other studies

While I could find no studies based in the UK that had looked at all the reported types of physical activities performed by ethnic minorities, there are some studies published in the United States of America. Hispanics are a major ethnic group in America and therefore the majority of published studies include this group, which are not a major ethnic minority in the UK. A paper based in the United States showed that socioeconomic status explained a lot of the difference in the amount of leisure-time physical activity between Hispanics and non-white Hispanics, indicating that cultural differences are not always responsible differences in physical activity behaviour between ethnic groups[123].

Kandula & Lauderdale (2005) found that immigrant Asian Americans were less likely to participate in leisure-time physical activity when compared with the American-born non-Asians; 'Asian American' in their study refers to Chinese and South Asian groups[124]. While the comparator groups are different for both physical activity domain and ethnic group, it is possible to make some comparison. My study does also appear to show that South Asian groups spend less time participating in sports than the majority White British group, particularly in women and in older age-groups. Walking may also be classed as being a leisure-time pursuit (although in the HSE 1999 and 2004 it is impossible to know whether walking is for leisure or active transport). The proportion of walking in older South Asian women (the majority of whom were born abroad) was lower than the White British, but much higher in older South Asian men as compared to the older White British. As mentioned, it is not possible to know whether the walking reported here was due to leisure-time or active transport therefore it is possible that the walking reported by the different ethnic groups is actually comprised of varying proportions of leisure-time walking and active transport walking.

There are no UK studies investigating ethnic differences in the types of physical activities. However, Bélanger et al (2011) examined age-related differences in physical activity types using the Health Survey for England 2008. They showed that the proportion of activity that comes from sports and exercise and fitness declines with age, and is particularly low in those above age 45[47]. This pattern was also apparent for each ethnic group in my analysis, with the proportion of activity from sports consistently lower in those aged over 55. Bélanger et al also found that occupational physical activity is a large contributor to total activity in men aged below 65. As occupational activity was excluded from the analysis in my study, it is possible that differences between men and women of different ethnic groups are

partially accounted for by occupational physical activity. The inclusion of individual social class goes some way towards accounting for occupational physical activity, but it is not possible to get an accurate idea of this from my study.

Unfortunately, I was not able to further investigate the types of sports done by different ethnic groups, but the Active People Survey indicates that there are cultural preferences for certain types of leisure-time physical activities in ethnic minority groups in England. The Active People Survey is a conducted through a telephone interview; respondents are asked to choose their ethnicity from a pre-defined list, and are asked a series of questions on the sports they have done over the last four weeks. South Asian people are more likely to have participated in cricket and the gym, and weight-training and basketball are all popular among ethnic minority communities in the UK[125]. South Asian women aged 16 to 34 all do less sport as a proportion of total activity as compared to White British women of the same age; it is possible that South Asian women have less access to the sports they may prefer than women of the White British majority population. As ethnic groups tend to cluster in geographical areas[126], it is also possible that local facilities influence the types or amounts of sports that ethnic minorities in England do.

3.4.3 Strengths and limitations

To my knowledge, this is the first study to assess at a population level the different types of physical activities that ethnic minority groups in the UK do. By combining two large nationally representative datasets, I have been able to analyse ethnic groups separately by sex and age. Many studies group ethnic minorities together for analysis in order to boost the sample size and so the power of the results, but this limits the interpretive value of the results. Indian, Pakistani and Bangladeshi groups are often grouped as ‘South Asian’, but in

the UK the socioeconomic profiles of these ethnic minorities are quite different, as are their main religions. Both socioeconomic profile and religion have a high potential to affect health behaviours such as physical activity, so by analysing these groups separately, we can gain more useful interpretation from the analyses. The inclusion of socioeconomic status in the regression analyses is also a strength of this study; socioeconomic status was notable by its absence in my review of the literature on generational differences in physical activity in South Asian groups in chapter two.

The main limitations of this study are rooted in the nature of the HSE 1999 and 2004 surveys. The data come from studies that were published in 1999 and 2004 and the physical activity profiles of ethnic groups could have changed over the past decade. The HSE is a cross-sectional survey and so it is only possible to observe associations between ethnicity and physical activity. I have postulated that the different proportions of physical activities result from differences between the ethnic groups, but it is not possible to be definite about this when results are from a cross-sectional study.

Secondly, the physical activity questions included in the 1999 and 2004 HSE surveys were limited in their scope, as only a self-reported measure for physical activity was available. Self-report measures of physical activity are subject to recall bias, where respondents inaccurately recall their physical activity, often over reporting it. This may affect the interpretation of my results if different ethnic minorities are prone to self-reporting physical activity differently, but it is difficult to obtain population-level information about this.

The nature of the question 'how many days in the last four have you done [*insert activity name here*] for 30 minutes or more?' also presents a limitation. The nature of the question does not allow for an accurate calculation of the number of minutes of moderate to

vigorous physical activity (MVPA), which the more recent physical activity surveys do allow. It is also possible that this type of self-report question is open to misclassification bias, where the question does not measure the activity type accurately. While respondents are shown cards with examples of the activities, it is plausible that participants will say they have done 'heavy housework', when if measured objectively, for example through an accelerometer or heart rate monitor, their housework would not have been classified as 'heavy'.

Studies done in other populations[47,48] were able to use more domains of physical activity, but in this study only the four broad domains of housework, DIY, walking and sports could be included for analysis. Ideally 'sports' could have been broken down into types of sport, such as in the paper by Bélanger et al (2011), and 'walking' could have been broken down into 'walking for leisure' and 'active transport'. Occupational physical activity was not included in this study, which could affect the proportions of physical activity types contributing to total physical activity. However, the inclusion of occupational social class in the regression analyses should go some way towards assessing the contribution of manual work towards total physical activity.

3.4.4 Conclusions and implications

This analysis has shown that while South Asian ethnic minority groups in England are active in different ways to the White British population, and to each other, there are also some similarities. For example, there appears to be little difference in the contribution of walking to total activity between the younger Indian people and younger White British people.

It is important for public health and health promotion to understand the different ways in which ethnic groups are active, as this allows physical activity interventions to be tailored

appropriately. Or, in the cases where activity patterns are similar to the majority population, to know that perhaps tailored interventions are not necessary. Activity patterns change with age, as has been shown in the general population, indicating that age-appropriate interventions are necessary for all ethnic groups. It also possible that some of these age-differences are due to generational status, with UK-born ethnic groups having very different childhood experiences to ethnic groups who were born in other countries. This analysis however cannot provide information on why age-differences in physical activity patterns exist. It is likely to be due to factors that change throughout the life-course, such as health, income and leisure-time, but it may also be due to differences in early childhood experiences, which stay with people throughout life.

Understanding the role of individual class in physical activity patterns is also important, especially as some ethnic groups are mainly in the lower social classes. Social class had some impact on physical activity patterns, however it is difficult to know whether these differences are due to occupation, income or education levels. As some South Asian ethnic groups live in deprived areas, and people in lower social classes also live in deprived areas, it is possible that it may actually be the local facilities and resources that are responsible for differences in physical activity profiles between ethnic groups, rather than individual social class.

3.4.4.1 Messages for the qualitative study

This analysis demonstrated that there are differences in physical activity patterns by age and generation within UK South Asians, including among Indian women, on which my qualitative study will focus. There were differences in generation for the mean number of total physical activity events and in the proportions that contribute to total activity, with the

exception of DIY. This epidemiological data provides some evidence towards the theory that physical activity differs within ethnic groups, not only in the amount that they are active, but also in the ways in which they are active.

The epidemiological analysis was restricted by the available data, and so there is very limited information about why these differences within ethnic groups might exist. I postulate that local neighbourhood environment may affect physical activity, but there was no information available on this for this analysis. As well as the physical characteristics of a person's environment, there is a dearth of information on the social characteristics of the environment, such as the media and friends, and how these might affect the amount and types of physical activity that Indian women do. Lastly, we also lack information on whether the attitudes towards physical activity have changed between generations of Indian women (or other ethnic groups). Information on the motivations and barriers to physical activity in ethnic groups, both individual and environmental, are vital if health promotion for physical activity is to remain relevant and cost-effective.

The next four chapters of this thesis concentrate on the methods and findings of my qualitative study in Indian women, where I aim to fill in some of the gaps on why physical activity differences within the Indian ethnic group may exist.

4. Qualitative methods

4.1 Introduction

The literature review and epidemiological analysis of patterns of physical activity in South Asian ethnic groups showed that there is some evidence of different physical activity behaviour between first and second-generation South Asians and between age-groups. However, neither the literature review nor the epidemiological analysis was able to provide detailed insight into why these differences between the first and second-generation might be present. I therefore aimed to use qualitative methods to understand why these differences might exist. The next four chapters report on the methods and findings of my qualitative work.

The majority of South Asian groups in the UK are now second-generation. Culturally tailored interventions are costly, and while they may be necessary for migrant groups, there is very little information available on whether culturally tailored interventions are also necessary for the second-generation. My qualitative project therefore aimed to answer research questions three and four (Figure 4.1), which essentially aim to understand why there may be differences in physical activity between the first and second-generation of a particular ethnic group. As I am a British Indian female, I felt it would be appropriate for me to interview the Indian ethnic group, as I anticipated that women from this ethnic group would feel comfortable talking to me about issues concerning cultural background, family, social and work life. Although these aspects of my identity would have influenced how participants viewed me, the most important issue was that the women trusted me as a researcher and that the women felt it was an important research area[127]. The study was based in Manchester as there is an Indian population there and having grown up in Greater

Manchester, I have some familiarity with the city. Practically, it also meant that I would have somewhere to stay when I travelled to do interviews.

Figure 4.1 Thesis research questions 3 and 4

3. What aspects of ethnicity influence physical activity choices in the second-generation of Indian women?

a. How do other aspects of their identity affect their physical activity choices?

b. What aspects, not related to their identity, influence their physical activity choices?

4. How do they think their physical activity influences compare to the physical activity influences of their parents?

4.2 Overall study design

4.2.1 Theoretical background to the study

The qualitative element of this thesis aimed to explore the contribution of ethnicity to physical activity for second-generation Indian women, in the context of other factors that can influence physical activity. I aimed to use a modified grounded theory approach to the study, as detailed by Kathy Charmaz[128]. The design of the study ensured that the multiple exposures and influences on physical activity were discussed, as well as the contribution of ethnicity (Figure 4.2). In the model by Foster et al (2005)[15] (Figure 1.4), ethnicity was placed at the individual level and did not indicate how ethnicity is multifaceted and affects behaviour in the context of other aspects of social identity. In the model shown in Figure 4.2, I aim to show how ethnicity is one aspect of identity and that all other aspects of identity, along with the structural context will influence physical activity.

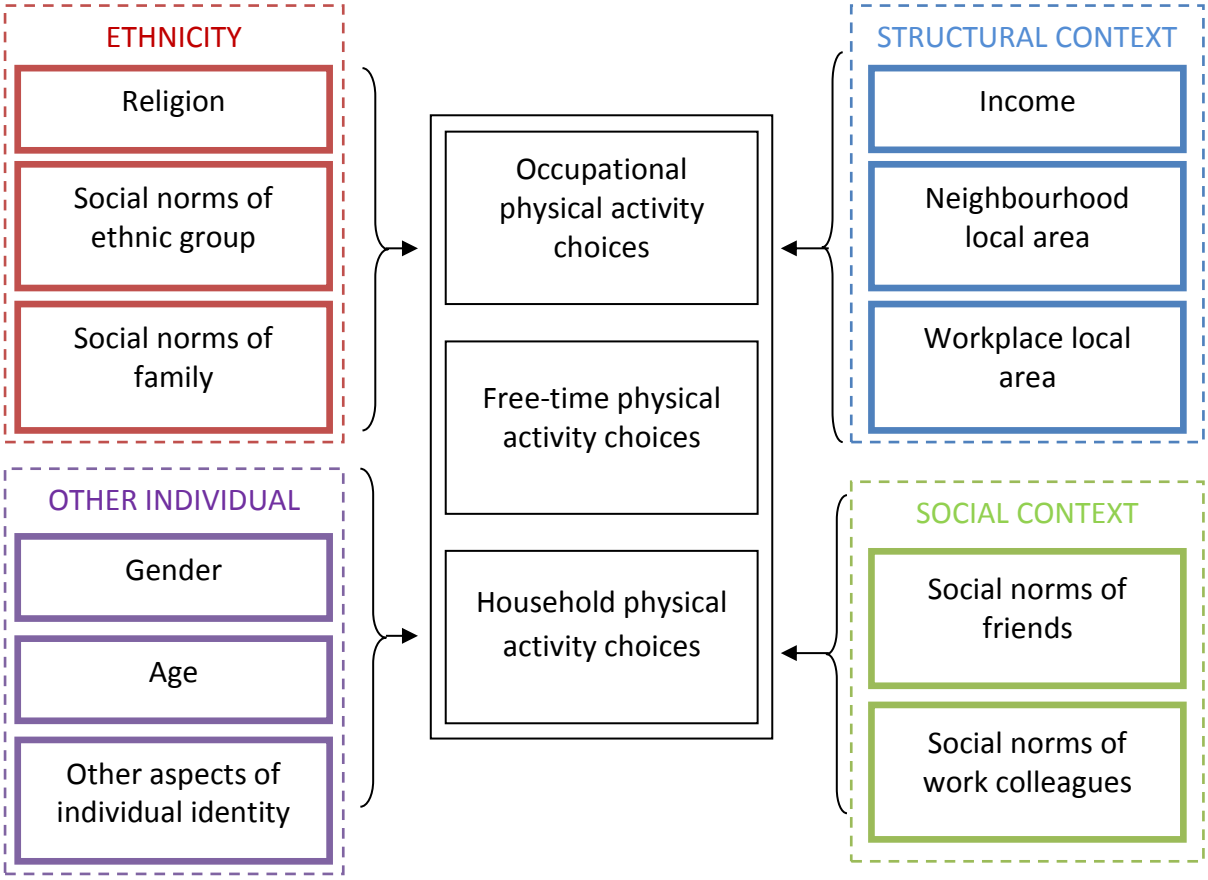
4.2.1.1 Physical activity and ethnicity

I did not recruit participants based on physical activity level, although the concept of physical activity was central to this study. When discussing physical activity, I asked participants to provide their own definition of physical activity and asked them to describe what they thought of the physical activity diary that I asked them to complete. While the diary gave me a crude measure of each woman's physical activity level, I also asked the women to tell me how active they thought they were.

While I aimed to recruit Indian women, as defined by the 2011 census and national surveys, I allowed the women to provide their own definition of their ethnic background and then decided whether to interview them. I aimed to include women who had some ancestral linkage to India, either through previous generations, or themselves. I asked all the women who seemed eligible for inclusion in the study to fill out a brief form, providing personal demographic details about themselves. The section on ethnicity simply had the word 'Ethnic group' next to a box that they could write in. Many women included in the study wrote 'Indian', however some women wrote 'Asian' and a few wrote down their religion, such as 'Hindu'. This in itself gave an interesting insight into variation within a small group of women in how they define their own ethnicity and how, when given the option, women emphasise one particular element of ethnicity, namely their religion. While giving the women the option to write in their own ethnic identity, as opposed than choosing from a list, gave them more freedom to show whether they identified as Indian, this method of assessing ethnicity is still limited, as a multifaceted concept is still reduced to one or two words which do not fully reflect the complex and dynamic nature of ethnicity. When filling in the form, the women chose what they wanted to put as their ethnic identity, but it may be that if they were asked in a different context that they would have written an alternative.

If it was unclear from the form whether the person had any ancestral linkage to India, I clarified with the person whether they had ever had any family links to India, or whether they would consider themselves as being of Indian origin.

Figure 4.2 Conceptual diagram of qualitative study

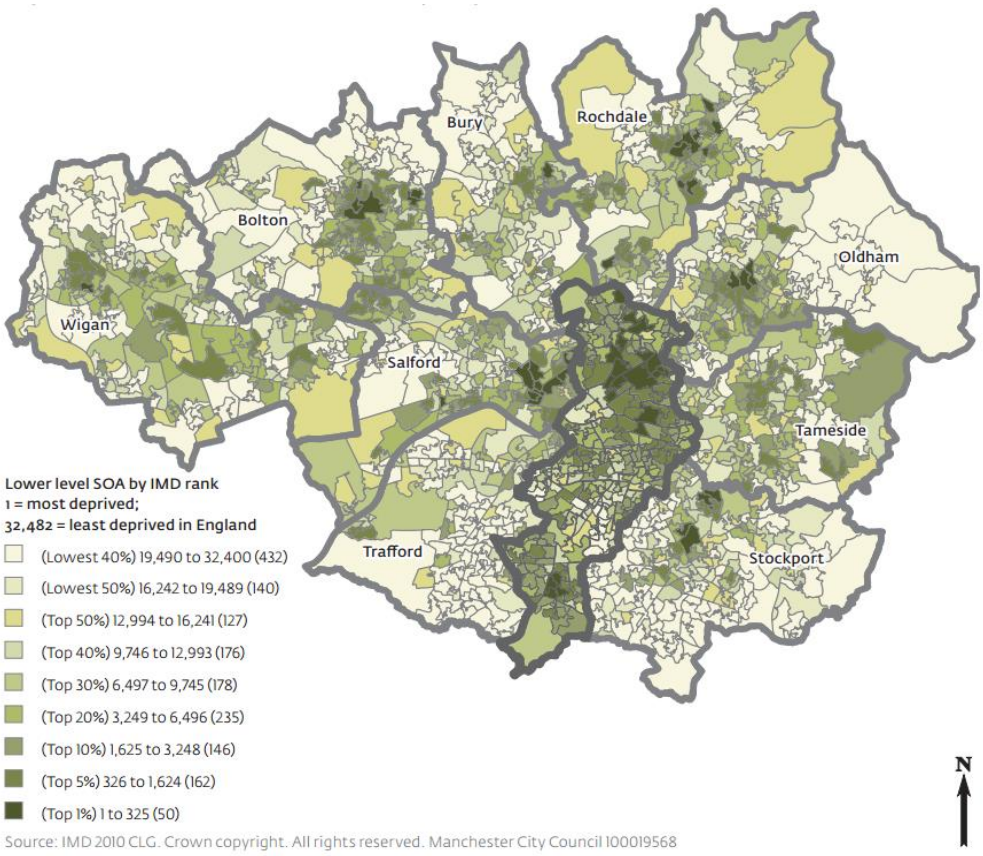


4.2.2 Setting of the study

This study was based in Greater Manchester, however two of the women lived in London, as they were recruited as the mother or daughter of a participant. Just over 7% of people in Manchester are Asian or British Asian and 2% are of Indian origin, equating to around 53,000 people[129]. Around 55% of the Indian group in the UK are aged under 35. I carried out interviews in eight local authorities of Manchester altogether, and these varied in their deprivation level (as measured by the Index of Multiple Deprivation). Figure 4.3 illustrates

the variation in deprivation levels throughout Greater Manchester. I interviewed participants in Bolton, Bury, Tameside, Stockport, Manchester, Trafford and Salford, which varied from some of the most deprived areas in Greater Manchester to some of the least deprived. Physical activity levels in the areas I conducted interviews in are similar to the national average, except in Salford and Tameside, where they are much lower than the national average[130].

Figure 4.3 Map of Greater Manchester showing the 2010 Index of Multiple Deprivation



4.2.3 Data collection

I purposively sampled to recruit participants at different stages in their life and with different occupations. As discussed, I used a modified grounded theory approach, which provides guidance on when it is appropriate to stop gathering data. The aim of grounded theory is to generate a theory from your findings, therefore when interviews are no longer providing new theoretical insights, or adding to themes, the categories are said to be saturated – commonly phrased as 'data saturation'[128]. My aim was to recruit people until I felt I had reached data saturation, where the last few interviews seem to provide similar findings to the previous interviews. However, the idea of data saturation can be problematic. Different researchers may find a different number of themes in the same dataset, or other themes may be missed if analysis is completed too soon[131] – it is impossible to know whether the next interview will reveal a new theme or theoretical concept. As the concept of data saturation has some difficulties, I also aimed to recruit 30 participants altogether. I recruited 31, although three of these later dropped out bringing the total number of people interviewed to 28. One interviewee had her daughter translating for her and although the daughter did not want to participate fully or separately in the study, she was willing to answer some questions during the interview with her mother; therefore one participant only provided partial information.

The study was conducted in two phases, with the initial study being phase one, and the adjusted study design being phase two. The overall structure of the study, which did not change, consisted of:

1. Recruited participant filled in a 7-day exercise diary.
2. I reviewed the diary and carried out a semi-structured, audio-recorded interview.

a. During the interview, I ask interviewees to draw on a map where they consider their neighbourhood to be, and where they go walking, cycling or running in their local area.

4.2.4 Physical activity diaries

Participants were asked to fill in an exercise diary for 7 days. They were asked to record activity outside of work that was done in periods of 5 minutes of more. The diary was ideally completed in the seven days immediately prior to the interview, but some participants completed it more than seven days in advance of the interview and two participants did not complete the diary in advance, with one of these filling it in at the beginning of the interview after I had arrived.

Physical activity diaries (see appendix III) were designed using categories from the Compendium of Physical Activities[132] and covered walking, domestic activities and sports/leisure time.

4.2.4.1 Semi-structured interviews

I conducted semi-structured interviews and used an interview guide (see appendix III). All but one of the interviews were conducted face-to-face, with one done over the phone. I developed the interview guide using a socio-economic model to make sure it included questions around more than just the influence of ethnicity on physical activity. The interview guide had questions on cultural background, the physical environment, the media and social groups. During the interview I also asked interviewees to draw on a map of the local area surrounding their home. I asked interviewees to do two things using this map. Firstly when discussing their local area, I asked the participants to draw where they walked, ran or cycled on the map. This helped the participants to elaborate on what they were

saying and sometimes helped to generate richer discussions. The second task I asked participants to do was to draw where they imagine their neighbourhood area to be. The aim of this task was to compare the participants' drawings to the standard 1km buffer often used by researchers and local authorities, to explore how Indian women's perception of their neighbourhood compares to the standard buffers used for planning and development[133]. For the one interview conducted over the phone, it was not possible to do the map exercise.

4.2.5 Phase One

The initial study design was to interview UK-born Indian women in Manchester in order to learn about how this population made decisions about exercise. This was later extended to include women who were born abroad but moved to the UK before the age of 11.

4.2.6 Phase two

After carrying out ten interviews with second-generation Indian women and asking them questions about their parents' attitudes towards physical activity, it became clear that it would also be useful to interview Indian women of the first (migrant) generation to get more insight into the generational differences in attitudes to physical activity. Therefore in phase two, in addition to second-generation Indian women, I also aimed to recruit migrant Indian women. I aimed to recruit Indian mother-daughter pairs, where the mother was born abroad and the daughter was born in the UK or moved here before age 11, as well as just first-generation women. To recruit mother-daughter pairs, I contacted all the second-generation women I had recruited to date and also asked all future recruits if their mother or (adult) daughter would also like to participate.

4.2.7 Ethics approval

I applied for ethics approval from the University of Oxford and modified my application twice because I had extended the eligibility criteria. I used the CUREC 1 form and received approval for both the initial study and the modifications. For details of this, please see Appendix III.

4.3 Pilot study

I piloted phase one using the first five participants recruited; I piloted my recruitment methods and interview schedule. The pilot helped me to refine my recruitment strategies and I added a question about comparing childhood activity and present day activity, which helped elucidate how the different stages of people's lives affect their exercise and attitudes towards it. All pilot participants were all in their twenties, unmarried and without children. During phase two, I began to interview people who were married and had children, therefore I also added in a question about how their marriage and children had affected their exercise.

4.4 Recruitment strategies

Recruitment took eight months in total and I used a variety of strategies, devised after reading published articles on recruiting ethnic minority groups into health research. While a large amount of literature has been published on recruiting the migrant generation of ethnic minorities into research, relatively little has been published on recruiting the UK-born members of an ethnic minority. One paper that has been published on recruiting UK-born women into research reports that strategies designed to recruit migrants are not necessarily

appropriate for the UK-born generation[134]. Twamley et al (2009) used health-care professionals to recruit UK-born ethnic minority women into a study on maternity care. Recruitment through maternity units was the most successful method, although not necessarily for Pakistani women. Community and religious groups resulted in only one participant being recruited, primarily because the majority of their members were first rather than second-generation. Recruitment through the media could not be effectively evaluated due to problems beyond the researcher's control. The evaluated media campaign consisted only of adverts in two newspapers; these resulted in six people contacting the research team, but only one interview. It is possible that with a more comprehensive media campaign this would have been a more successful method. Snowballing was a very effective recruitment technique, although this method does yield participants of a similar demographic, therefore may not be the best option if a range of education and ages is needed.

Given the experiences of the researchers in the Twamley et al (2009) study, I decided to employ general strategies to recruit people into the study, through advertising in public spaces, email lists, approaching local community organisations, and through primary schools and nurseries. I also aimed to use snowballing techniques once participants had been recruited.

4.4.1 Emails, posters and personal contacts

Initially I emailed contacts in Manchester to ask them to circulate details about my study through their email lists, hoping people would contact me about the study. This yielded no interviews and no potential interested people. I therefore arranged to meet up with a staff

member at the British Heart Foundation who worked on ethnicity and heart disease. This staff member agreed to send out emails on my behalf to their existing contacts to help encourage people to participate. However, this strategy was also unsuccessful resulting in no responses. I emailed student societies at Manchester University and Manchester Metropolitan University, some of which responded saying they would send an email out to their lists, while others gave no response at all. Two of these student societies proved to be very helpful, with one allowing me to present my project at an evening careers talk they were holding and the other allowing me to talk at the end of a religious Hindu event. Speaking in person to people was much more successful. I recruited four people directly through this method and another one through snowballing. Four participants were also recruited through speaking to my own and my family's personal contacts.

I also put up posters around the universities and libraries around Manchester, but no one contacted me from these. My mother also agreed to hand out leaflets about the study at a Diwali Mela, which unfortunately I was unable to attend; this strategy was also unsuccessful with no participants contacting me.

4.4.2 Schools and nurseries

In order to make sure I had a reasonably diverse sample of women, I was also keen to ensure mothers were included. The government publishes ethnicity percentages by school and I used these lists to identify which schools to contact in the greater Manchester area. I started by contacting schools with 30% or more pupils who were of Indian origin, later also contacting schools with 10% or more pupils who were of Indian origin. Altogether I contacted 16 schools, four of which agreed to help me.

Two schools allowed me to attend their parents' evenings, where I could approach parents before and after their talk with the teachers. I got the details of ten potential participants from one parents' evening, however only one person decided to join in the study from this school, with this person also recommending one other person. At the other parents evening, I obtained three names and details, but all three people recruited from this school ended up dropping out from the study; one person emailed in advance, one person was not in when I went to interview them and did not respond afterwards, and the third person did not confirm their interview and never responded to me when I asked to rearrange. Two schools sent out the details of the study to all parents at the school; for one school this did not yield any participants, but at the second school I recruited one participant using this method.

The second school also allowed me to attend 'toddler gyms' held at the school as part of their extended services scheme and to speak to parents directly during these sessions. Using this method I recruited one person, who also gave me details of an extra participant (her sister). I also attempted to contact nurseries in the greater Manchester area, to see if they would allow me to attend their sessions during the day and speak to parents as they were picking up or dropping off their children. One of these nurseries agreed to help me, but later they became unresponsive and I was never able to attend any sessions at the nursery. Many of the nurseries said they did not have many Indian women attending, so this may explain why I was unsuccessful in recruiting at nurseries.

4.4.3 Attending events

I attended events at cultural organisations in the Greater Manchester area, the Hindu Society at Manchester University, as well as a ladies only swimming session at a leisure

centre and a yoga class at a community centre. During the beginning of recruitment, when I was only recruiting second-generation Indian women, recruiting at cultural events and organisation was only partially successful. I attended two cultural events during this phase and despite speaking to over 100 people, I recruited only one participant. However, during phase two when I was recruiting all Indian women, I attended a cultural event that had around 30 eligible women and recruited two people, with one then giving me the details of her daughter who later participated. I recruited no participants at the ladies only swimming session as all women I spoke to were of Pakistani or Bangladeshi origin. The yoga class was the most successful in terms of recruitment, with five of the eight people agreeing to participate.

Table 4.1 Recruitment activities and participants

Recruitment activity	Number recruited	Of which were snowballs	Dropped out
PHASE 1			
Emails	0	0	
Posters	0	0	
Personal contacts	1	0	
Schools and nurseries	0	0	
Attending events	7	2	
PHASE 2			
Personal contacts	4	2	
Schools and nurseries	8	2	3
Attending events	11	4	
TOTAL RECRUITED	31	10	
TOTAL AFTER DROP-OUTS	**28**	**10**	

4.5 Recruitment challenges

My initial recruitment activities consisted of emails and posters, however people were not responsive to emails, posters or sometimes word of mouth. I found that I needed to be

present and explain the study in person to have the best success rate. I also found that recruiting UK-born Indian women was particularly difficult. This section of the population was not present in high numbers at cultural organisations and almost all those recruited through schools were first-generation Indians. The second-generation Indian women appeared reasonably integrated into mainstream society in that they were not easily identifiable at organisations and events designed for Indian women. Comparatively to the second-generation, the first-generation was easier to identify in the population as they did attend the cultural organisations and events, but this group of people presented other challenges. I could not interview some participants as they only spoke Gujarati, which I do not speak or understand; this meant that I could not interview everyone whose contact details I was given and I had no budget to pay for a translator.

Recruiting mother-daughter pairs was particularly challenging. I relied on the existing participants to tell the mother or daughter about the study if they did not provide contact details. When I was able to contact their mother or daughter myself, recruitment was more successful. Only three official mother-daughter pairs are included in the study; additionally there was one pair where the daughter only contributed during her mother's interview. During this interview the daughter translated for her mother and also answered some questions. Although she did not want to participate fully in the study, she was happy to answer questions this way and gave some insights into generational differences in exercise in Indian women between her mother's generation and her own.

4.6 Analysis of interviews

A range of theoretical approaches and analysis techniques are available to qualitative researchers. I aimed to use modified grounded theory. Grounded theory's primary aim is to

use the data to generate a theory, which can then be used to inform practice or provide a framework for further research. It states that the researcher should not have any pre-conceived ideas of what the analysis may result in, and that all theories should come from what the data present, rather than looking to see whether your data supports your theory. This method was developed by sociologists Glaser and Strauss in 1967 and states that meaning is created and understood through interactions with other people in social processes within an environment[135]. Glaser and Strauss later disagreed on the extent to which it is possible to come to a research project without preconceived ideas, which led to a split within the grounded theory literature, now distinguished as the Glaserian and Straussian traditions.

A third approach has also been developed by Charmaz in 2006 which takes a more constructivist approach and now the Straussian and Charmaz methods are the most commonly used approaches to grounded theory. They involve systematically developing a theory that explains the process, action or interaction on a topic, for example, the process of choosing what food to buy or eat. Interview data are analysed as collected, and the findings from the first analyses inform how the next set of interviews will be done. Strauss & Corbin emphasise the systematic nature of the grounded theory approach, which was criticised by Glaser as being too prescriptive in its approach.

The approach to grounded theory developed by Charmaz is referred to as the constructivist approach. Charmaz aims to move away from the positivist influences that grounded theory originally developed in, bringing in a social constructivist perspective that embraces the idea of multiple realities and gives importance to the context of the research. While the process of using the data to generate theories is the same, Charmaz places more emphasis on the

values, beliefs and assumptions of the individuals being studied, as well as those of the researcher conducting the study. I intend to analyse my qualitative data with Charmaz' constructivist approach, as the individuals' values and the environment they live and are interviewed in are likely to affect their responses to questions around ethnicity and physical activity. Using this approach will also help me to discuss how my own background may influence the analysis.

Throughout the data collection process I kept a field diary to note down my immediate thoughts and impressions after interviews and any general thoughts about the interviews I had done so far. I used these entries to gauge whether I was reaching data saturation and whether I needed to modify my interview schedule. I also wrote memos during the coding process, to record any initial thoughts I had about a code, concept or topic.

Once transcribed, I used NVivo 10 to collate and analyse all the interviews. I initially coded the interviews using words or short phrases to summarise sentences and paragraphs. I employed constant comparative methods to compare coding between interviews to understand the similarities and differences between interviews and aimed to use codes closely connected to the data. Due to structuring my interview guide around the socioecological model, I already had some expectations that codes based on topics in the interview guide would emerge from the data. However I aimed to allow all codes to closely relate to the data, and noted when a person talked about a factor related to the socioecological model.

I then moved on to focused coding to synthesize and explain larger segments of data. I identified codes that were common in the interviews and sorted them according to whether the codes were relating to a barrier, an influence, a particular stage of life, or talking about

certain groups of people, such as parents or friends. During this stage I went back over the transcripts to check whether the initial codes I had used were appropriate and to check if I had missed any implicit or vaguely-stated concepts.

Once I was happy with my initial and focused coding, I started to use more theoretical coding to start looking for relationships between codes and groups of codes. While grounded theory states that a theory should emerge from the data, I had already pre-chosen an existing theory on the influences of physical activity, therefore I chose to view the data through the lens of the socio-ecological model. As well as exploring how the data fit into the already published socio-ecological model, I also aimed to explore theories in the data that provided more detailed insight into certain aspects of the socio-ecological model. I was aware throughout my analysis that my conversations with participants had been directed by me, and therefore the women were sometimes talking about topics they had not thought much about, or sometimes, talked about attitudes that were not their own. Throughout this process, I used memos to record my insights and used these, along with the codes, to develop theories around the influences on physical activity in Indian women in Manchester.

I analysed the second-generation and first-generation interviews separately, only later drawing a direct comparison between the two generations. This allowed me to gain a thorough understanding of the motivations, barriers and attitudes towards physical activity in the two generations of Indian women.

4.6.1 Validity of findings

Validity in qualitative research has undergone much discussion. Generally, the criteria used to establish validity involve describing the data collection in detail, so that readers can

assess the transferability of the findings for themselves, and being transparent about the sampling techniques used in the study.

During the interviews, I felt that at times the women were relaying views that were not their own, but were stereotypical attitudes circulating in the Indian community, as if they felt they needed to answer my question but were unsure how to, or sometimes seemed to disagree entirely with the premise of the question. During the interviews, I assessed the women's tone and body language to gauge whether I thought they were comfortable with what they were saying; when I sensed an uneasiness, I tried to explore further whether this was their actual view. Within the year after my data collection finished, I sent a lay-summary of the qualitative findings to all the women who had been interviewed and told them that they were welcome to give me comments. While this does not counteract the issues within the interview process, the process of feeding back the findings allowed the women to comment on any findings they found a particular objection to or resonance with.

I am a UK-born woman of Indian origin, which is likely to have influenced my data collection and analysis in some ways. I grew up in Manchester, therefore I was able to use some personal and family contacts to help me with recruitment. While none of the participants were my friends or family, there were some participants with whom I had links. For example I attended the same school in the same year as one participant, and another was a colleague of my mother's, and therefore knew of me through my mother prior to the interview and recruitment. While this prior relationship was acknowledged during the interviews, it did not appear to hinder or encourage the participants from expressing their views.

Being of a similar ethnic background to the participants and also being from Manchester did help some participants open up to me. Some people discussed the attitudes of White people or 'Goras' (the Hindi term for White people). I do not feel they would have been as open about discussing the attitudes of White people in comparison to themselves if I was not obviously from an ethnic minority myself. Being a woman may also have helped women open up to me more, as there were discussions around clothing issues, expectations of women in the home and gender stereotyping of women.

While coding the interviews and deciding which themes to focus on, it was important for me to acknowledge any ideas I had about attitudes to physical activity in the Indian community, which had come through my own personal experiences. While I had some idea of which themes might emerge from reading the literature, through the notes in my interview journal, and through my personal experiences, I feel I did allow the themes to emerge from the interviews. When deciding on which themes to draw out in chapters five and six, I had to be careful not to put the most emphasis on the themes with which I personally identified with. Therefore, I constantly checked the transcripts to make sure that the themes I have drawn out are fair representations of the discussions I had with the women.

4.7 Strengths and limitations of the qualitative study

The main strength of the qualitative study was the number of second-generation participants who agreed to participate in the study. The literature review in chapter two demonstrated that there is scant qualitative literature on the physical activity of second-generation ethnic minority groups in the UK. The second-generation makes up the majority of South Asian and Black Caribbean groups in the UK, however very little is known about their attitudes to health behaviours, separately from the first-generation.

This is also the first qualitative study in UK to investigate role of culture in physical activity in the context of the physical environment for the Indian ethnic group. Culture and socioeconomic status are often cited as explanations for differences in health behaviours for ethnic minority groups, but ethnic minority people reside in a physical environment, just as everyone else does, so it is important to understand how any cultural factors may be affected by where people live.

Anthropological literature defines ethnicity as an 'emic' category, or one that is self-defined by the person. Epidemiological literature on the definitions of ethnicity acknowledge this, but in epidemiological research the majority of participants are asked to choose their ethnicity from a pre-defined list. In my study, participants self-identified as Indian or South Asian, rather than choosing from a pre-defined list, indicating that we can have a little more confidence that the participants in my study did identify as Indian for the purposes of this study. However, as mentioned, the process of identifying to an ethnic group is a dynamic and contextual one, and it is possible that asked the question in a different way, or different context, that the women may have given different answers.

The main limitation of the qualitative study was the number of first-generation women who participated in the study. Time-constraints meant that I was unable to recruit more first-generation women. As I had no budget for a translator and I do not speak Gujurati or Punjabi, I was only able to interview first-generation women who had some level of English. Ideally, all first-generation participants would have been mothers of the second-generation participants, however it proved challenging to recruit both mothers and daughters into the study, with often only one agreeing to participate. Nonetheless I was able to make some

general generational comparisons from the first-generation study participants by contrasting findings from the second-generation.

Another limitation of the study is that a number of the women were recruited through snowballing techniques, meaning that the women recruited this way were more likely to have similar attitudes to the original participant. I tried to overcome this through using different methods of recruitment and purposively sampling to get a wide range of women.

5. Findings from the qualitative exploration of physical activity and ethnicity: the second-generation story

5.1 Introduction

This chapter describes the findings from interviewing second-generation Indian women living in Manchester at the time of recruitment. I have described my findings according to the research questions I aimed to answer, but have also presented them in the context of the socio-ecological model in order to help situate ethnicity in the wider contexts of influences on physical activity. By presenting the findings this way I hope to elucidate how cultural factors related to 'being Indian' influence physical activity, when other relevant factors are also taken into account. I first present the main themes from the interviews, and then go on to discuss the main issues at the end of the chapter. Figure 5.1 is a reminder of the research question this chapter is aimed at answering:

Figure 5.1 Research question (3)

(3) What aspects of ethnicity influence physical activity choices in the second-generation of Indian women?

a. How do other aspects of their identity affect their physical activity choices?

b. What aspects, not related to their identity, influence their physical activity choices?

I interviewed 28 women altogether: nineteen of the participants were second-generation and nine were first-generation. In this chapter, I report the findings from the second-generation participants. In chapter six, I go on to report the findings from the first-generation and in chapter seven I compare the two generations against each other.

The majority of participants were Gujarati Indians, although the sample also included Sikhs (Punjabis), Jains and Muslims. Based on the information from the self-report diary, some of

the participants had reasonably high activity levels, although there were some who were not particularly active. Eighteen of the second-generation participants filled in the physical activity diary before the interview, as one person did not wish to fill in the exercise diary or participate separately in the study, but was happy to answer some questions when translating an interview for her mother.

Table 5.1 describes the characteristics of second-generation participants. The majority were under 40 years old. There was somewhat of a split between people living in the most and the least deprived areas; however this may actually be due to the fact that quite a few second-generation participants were students and so were living in inner-city areas near the Manchester Universities. The occupations of the participants included students, bank clerks, dentists, customer assistants and teaching assistants. Activity levels were spread across the spectrum, with some describing themselves as active and others as less active or inactive.

The interviews took place in a variety of locations, such as cafes, libraries and people's homes, although I did one interview over the phone. I conducted most of the interviews on a one-to-one basis; the only exceptions were when the participant had young children or in one case where the daughter was translating for the mother. The interviews where children were present were frequently interrupted, as would be expected. This occasionally caused a train of thought to be lost, or in one case caused the interview to be rushed so she could go back to looking after the children. Where the daughter was translating into Gujurati for her mother (who did not have a high level of English), I was unable to tell if the daughter was translating faithfully as I do not speak or understand Gujurati; however the answers of the mother (which were all in English) did appear to reflect my questions. The findings reported here are from these 19 women who all talked frankly about the various influences on their physical activity choices.

Table 5.1 Characteristics of the second-generation participants

		N = 19	
Age group	**20 to 29**	9	47%
	30 to 39	6	32%
	40 to 49	3	16%
	50 to 59	1	5%
	60 to 69	0	0%
Religion	**Hindu**	14	74%
	Sikh	3	16%
	Jain	1	5%
	Muslim	2	11%
Local authority	**Cheshire East**	0	0%
	Bolton	2	11%
	Bury	1	5%
	Manchester	5	26%
	Salford	1	5%
	Stockport	3	16%
	Tameside	5	26%
	Trafford	1	5%
	London	1	5%
Index of Multiple	**1 (most deprived)**	6	32%
Deprivation quintile	**2**	6	32%
	3	2	11%
	4	1	5%
	5 (least deprived)	4	21%
Occupations as	**Account manager, advertising**	1	5%
Described by	**Bank Clerk**	1	5%
participants	**Bank Portfolio Manager**	1	5%
	Clerical Officer	1	5%
	Customer Services	1	5%
	Dentist	1	5%
	Doctor	1	5%
	Student	7	37%
	Teaching Assistant	2	11%
	Trainee Solicitor	1	5%
	Volunteer	1	5%

	Works in family business	1	5%

5.2 Role of ethnicity in influencing physical activity

There were particular attitudes around Indian women and exercise that the second-generation women discussed. These attitudes and activities described here have been observed and sometimes experienced by the second-generation women, but often they spoke about them in a remote sense, giving the impression that they did not feel these attitudes were relevant to them. Second-generation Indian women did not generally consider their being Indian and their religion as particularly relevant for motivating them to do physical activity. Participants described Indian cultural attitudes as influencing them when they were children, but felt that as adults their Indian cultural background was much less relevant to them in influencing their overall physical activity.

5.2.1 In childhood

5.2.1.1 Types of activities

Women described their parents as being either encouraging of or neutral to their children being physically active. Many of the women reported having been taken to classes by their parents, such as Indian dance classes, swimming, and badminton. While swimming and badminton were clearly regarded as sports, or physical exercise, some people thought of Indian dancing as an art form, rather than exercise, and had been encouraged by their parents in this capacity, rather than in a physical activity capacity.

PB: So what got you into dancing?

I've another thing I did from probably when I was about 6 or7, so again my background was quite good. So I did Indian classical dance from a really young age, so my parents actually, they did really encourage sport. I just forgot (laughs). They probably didn't see it as a sport, but it's an art really, so I think dancing was thought of as an art at that time so I did that from a really young age and it's something I really enjoyed. I didn't necessarily see it as an exercise but saw it as my passion, so, yeah.

Participant 6, second-generation, age 35, Dentist

One woman also described how dancing in general is something that is valued in the Indian culture.

I've always liked dancing. There are so many different forms and think it's harder sort of, being at uni it's a lot harder to keep maintaining sort of, because I used to go dancing, it was very specific dancing - you don't always find that up here, but like I found different forms of dancing. Like I go pole dancing which I recently took up. I do really enjoy it. My arms are like killing from Tuesday's lesson. So in a way yeah but it does influence a lot of it. I think my culture is quite a vibrant one, so whenever you go to like family functions like a wedding, you always like get up and dance at some point.

Participant 2, second-generation, age 22, Medical student

Some second-generation participants were unable to swim, despite having lessons, although swimming as an activity was often mentioned by the second-generation participants. It is possible that swimming is a popular activity amongst the people of Indian origin, as making the effort to have lessons indicates a particular motivation for this activity. The women themselves did not mention swimming as a particularly popular activity among the Indian ethnic group in particular, but a 2009 systematic review on sport in ethnic minority

communities reported that the proportion of Indian women participating in swimming was close to that of the national average, indicating that it is a popular activity[125].

> *Like, they encouraged me to do it, and I had swimming lessons and they'd take me swimming and encourage me to do netball and things like that…*
>
> Participant 4, second-generation, age 20, Medical student.

Badminton was also regularly mentioned by participants and was often an activity they had done or seen in childhood. My personal experience of being a second-generation Indian woman leads me to believe that badminton is a popular activity in the Indian ethnic group, however it was not possible to directly ascertain this from the interviews I did.

5.2.1.2 Gender and the role of parents

Gender seemed to relate to how their parents had influenced them in their physical activity. For many participants, their fathers were particularly active, especially if they had grown up in East Africa. Mothers were sometimes reported to encourage activity, although this was rarely through directly encouraging activity, rather it was by encouraging activities that happened to be physical, such as Indian dancing or housework. Parents who had grown up in East Africa were reported to be more active than parents who came from India.

In some families, the fathers had been particularly active and this had encouraged the daughters to also take up physical activity.

> *My dad really got me into biking and running and stuff quite a lot, cos he bikes quite a lot and he does London to Brighton every year, so he got me into that as well.*
>
> Participant 3, second-generation, age 20, Advertising student.

While mothers were reported as having an influence, this was often less as compared to the fathers, and some participants reported that there was a pressure to be thin from their mother, which caused them to exercise.

The impact of gender on physical activity was a general issue in childhood. Many of the women discussed how most boys socialise through sport, for example, football, but most girls socialise in other, less-physical ways, which meant that the fact of being a girl meant that they were less active than their male peers during adolescence and adulthood. Nearly all participants who talked about this described this gender difference in how men and women socialise as being general and not specific to Indian people.

> *Yeah, it's not just exercise, it's stuff like, you know, playing football cos there's so many similar guys who have got similar ages in Manchester so that's how they socialise, they just play football in the park. Whereas with girls it's not like there's an easy way to play a sport together.*
>
> Participant 1, second-generation, age 24, Trainee solicitor.

5.2.2 As adults

5.2.2.1 Types of activities

For leisure-time physical activity, participants described participating in a number of physical activities. While the second-generation participants did partake in some sports such as badminton, there was discussion around how Indian women do not tend to participate in team sports and are not seen as active. Many people described their Indian friends and 'not being sporty', but when they were active they did activities such as running and going to the gym. While Indian culture did not seem to influence whether people participated in leisure-

time physical activity, there were some types of activities that appeared to be chosen due to an influence of being Indian.

Walking, going to the gym, dancing and running were the most commonly described activities. Housework, yoga, swimming, exercise classes, and cycling were also mentioned by a number of participants.

Walking was the most popular type of physical activity, with almost all participants walking during the seven days of filling in the physical activity diary; this activity did not appear to be related to ethnic background. Walking as a commute to work or university was popular, as well as a means of travelling locally to go on errands or see friends.

> *Yeah, a lot of the walking is sort of walking from the bus stop to the like, the house, or like to the corner shop and stuff…or walking to meet up with someone.*
>
> Participant 2, second-generation, age 22, Medical student

The gym was regularly mentioned by the second-generation participants, with weights, the running machine and the cross trainer being used. One participant described feeling self-conscious when using the weights area with her friend as she felt she was being stared at by men while using the weights and felt pressured to go and use different equipment in the gym.

> *When I used to go to the gym quite a lot last year we used to go to like the weights because obviously not a lot of women do, but it's actually the quickest way to lose weight in fact, so we used to go and we just used to get stared at…it just wasn't a nice experience, so like you always had to go somewhere else and maybe not do weights when other people are there.*

Participant 2, second-generation, age 22, Medical student

Some participants in their 20s also talked about running as a regular activity, and again, this did not come up in discussions in relation to being Indian. One participant who was very physically active talked about how she felt running without a goal to be pointless, so she had signed up to a half marathon, and another talked about running as a reliever from boredom when her housemates were away. Some people had signed up to organised runs, although others just ran as part of their regular routine.

Many of the second-generation participants had done Indian dancing when they were children and still enjoyed dancing now. Participants tended to describe Indian dancing as an art, or a cultural activity rather than a sport or specific leisure-time physical activity. Zumba, salsa and pole dancing classes were also mentioned by participants, as well as social dancing with friends when on a night out.

I think when I first started, I started from a very young age, so like 5 or 6, yeah I hated it. My mum was like, you're going to go, you're going to do this. But then I started like making friends through it, so that was really nice, then in the end, by the time I sort of like left my dance school, I was dancing with my friends. I mean, at university I wouldn't say I dance like loads. Obviously when you go out you have a dance with your friends, so that's more of a social thing. I mean I pole dance and it is much easier to go pole dancing because my like housemate does it as well, so it's really nice that we can talk about it, and be like I don't how to do this move, and it's quite nice. So yeah, I suppose in a way like, I do dance quite a lot with friends and I think it's quite a social sort of, not event, but it's quite a social activity, cos you don't really dance by yourself, you dance in a team.

Participant 2, second-generation, age 22, Medical student

It was difficult to tell from this study whether not playing team-sports is an issue related to being Indian. Restrictions on active play as a child or a reduction in activity during adolescence may have influenced the types of activities some women participated in as adults, however it was not possible to discern this from the interviews.

5.2.2.2 Religion and physical activity

Questions about whether their religion influenced their decisions around exercise were generally met by negative responses from Hindus, Sikhs and Jains, although there were some exceptions.

Hindu women who said their religion does influence their exercise cited yoga and 'mental exercises', although they were often unclear about the precise role of yoga in Hinduism. Some people also discussed the role of religious clubs, rather than the religion itself:

> *PB: Do you think anything about Hinduism has ever influenced your activity - either with yourself of your family?*
>
> *Actually, yes. That's how we came to play badminton every week [as children]. So when we – we were part of a Hindu group – it was a Hindu group called Shaka and then, so from the age of when I was about 10 or so, this group actually encouraged us to actually participate in sport, so we did marathons and things like that, you know, fun runs? So we were quite lucky. So that group and it still exists, so amongst Hindus and Hindus you know, it is a group that encouraged sport. Definitely for guys – it was great for boys because they had basketball and allsorts, we had the – sorry, we had the more, we had the less challenging sports such as badminton and just, you know, talking (Laughs).*
>
> *PB: (laughs). So what were the less challenging sports?*
>
> *Yeah, it was that and you know, and the walks, so it was walking, brisk walking and badminton, and actually, some of the Indian games. So you know, and that gives you*

quite a lot of physical activity to be honest, so there were some like running games which were Hindu.

PB: What were those games?

I think one was 'Kho' there was, it was another one was 7 stones, which was 'Bitu' in Hindi and any – there's one called 'Namaste Behenji', so those were a few – that's off the top of my head. But again you know, you're running around, It's fun, so it did encourage us to go every week, so yeah, so quite lucky in that respect.

Participant 6, second-generation, age 35, Dentist

Muslim women cited the Koran, saying that its health messages were similar to the ones they had heard, although they did not specify where they had heard similar health messages. Islam also influences the way in which women exercised, namely through prescribing modesty and non-mixing with men.

PB: Does Islam have any influence on whether you exercise or not?

It does actually. Like in Islam we have to pray Salat Namaz – I don't know if you've heard of it? [PB: I have, yes], so that is actually a form of exercise. They say if you pray 5 times a day, we have to pray 5 times a day, it's very basic, it's very easy but the positions what we have to do in that Namaz is actually very beneficial for us. It kind of uses most of the parts of the body you see. Islam does say if one prays 5 times a day – that Namaz – it's like a form of exercise.

PB: Oh ok. Is it because you're kneeling?

Yeah, you're bending, you're kneeling, getting up again, using your collar bones, everything you see? So, yeah, and generally Islam does say, you shouldn't eat too much, you should eat – how it says in the exercise book, I have noticed when you compare it, I mean, sometimes you know in an exercise book it will say you know, you should eat, often every now and then, but you shouldn't just eat one big meal, so Islam states that

as well. You shouldn't just have one big meal, you should have it every now and then, you know a few meals, so yeah, some things are very similar.

PB: Does it ever influence the way that you might go and exercise?

Well – it does say you should exercise but in a modest way. Like Islam would be against, like you can go swimming, but then it would tell you, you can't just go out in a bikini or a swimming costume, so you can go swimming, but modestly you know? Cover yourself, because we have Islamic swimming costumes, where can cover you from top to toe and yeah, if like going to the gym – Islam would say go to a ladies' gym. You can go to the gym, there's no harm in it, but go to the ladies' gym. Islam doesn't like it when you mix with other men – do you get it?

Participant 19, second-generation, age 33, Teaching assistant

5.2.2.3 Weight and health

As adults, concern over maintaining looks and weight were important for many of the women when it came to motivations for being physically active. These are again, motivations more related to being a woman than to being an Indian woman, although there were some special cases. For the older second-generation women (usually over age 25), health was also a factor – especially if parents or other family members were suffering from ill-health.

I think we're in a different generation, so we're kind of motivated like by a, like society and things, you know, about being health conscious and I think as we get – as I've got older I've realised that I'm 30 now, it's – I need to start taking care of my health before these major things, so I think that's what motivated me to do exercise and seeing I think the health problems that my parents, well my dad's had, I don't want to become like that, so it's encouraged me.

Participant 20, second-generation, age 30, Works in family business

Some participants openly said that although they were aware physical activity was good for their general health, this did not factor into their reasons for exercising.

> *…I kind of do exercise for the wrong reasons, like I don't do it to be healthy, I do it to look good, which I know sounds a bit like, vain, but I'm more minded to go to the gym if I can't get into a dress, then someone says you might get a heart attack in 20 years' time, so I know it's stupid but it's just the way it is.*
>
> Participant 2, second-generation, age 22, Medical student

Some people described a general lack of valuing exercise for health in Indian culture, emphasising a relationship between food, weight and exercise, although there was some indication that not all second-generation Indian women held this attitude. While attributing this attitude to Indian culture, they sometimes simultaneously implied that they did not have this attitude themselves by saying they thought it should change. The women were not specific about who they thought did have this attitude. The woman quoted below felt that housework, but not exercise was part of Indian culture.

> *[Referring to husband's family]*
>
> *I think part of it is related to being Indian. Because I don't think they realise the importance of it. I think now they've started t, but I think before– before everyone is doing it all the time, as much as they should be, then it's going to be a long time for that I think.*
>
> *PB: Before what, sorry?*
>
> *Before it properly changes and everyone realises that they should be doing it, I don't think that's going to happen tomorrow.*
>
> *PB: So you think – for Indian people it's not really in the culture to exercise or*
>
> *No I don't think it is. I think housework is Indian.*

PB: The stuff in the house?

But not exercise, no.

Participant 13, second-generation, age 29, Teaching assistant

Despite admitting that they did not always exercise for their health, the second-generation of women seemed to have an understanding that physical activity and exercise was beneficial for health and tried to fit physical activity into their life. Their descriptions of how this Indian attitude affected physical activity involved women not being active outside of the home, but this was not in practice the case for the second-generation women in my study.

Some participants talked about how Indian people had more short-term goals when it came to exercise, for example only exercising to lose weight or to look good for an upcoming social event. This was contrasted in the discussion with the motivations of White British people who were seen to incorporate exercise into their regular routine and exercise for general health as well as for looks.

As in, I think sometimes in my family, or just with my friends, they're like, my mum says, oh you know there's a wedding coming up and you know, if you're wearing a sari then just watch what you're eating for a couple of weeks. So I think sometimes you have shorter-term goals of weight loss, whereas like other people who I'm working with, they sustain their exercising, their dieting; I think they do it for the long-term whereas we exercise for the short-term.

Participant 1, second-generation, age 24, Trainee solicitor

The fact that people are encouraged to lose weight only to increase their chances of getting married was also discussed, describing a specific pressure around needing to lose weight to

find a husband. Arranged marriages are more practiced among South Asian than White British people, with arranged marriages not considered the norm for the White British population in the UK. While not all second-generation Indian women will necessarily have an arranged marriage, it seems that pressure to be thin (and therefore to exercise) is definitely related to an Indian cultural value when arranged marriages are practiced.

> *I think in Indian people, only like, especially when it's I think, girls are overweight when you're younger because they have this whole thing, oh, you won't get married, and there's an encouragement to lose weight. But I think they don't encourage I think to do sport, I think kids just play and that's what – and that there wasn't an encouragement to kind of oh it's good to do, or like, they're consciously thinking you need to do exercise.*
>
> Participant 20, second-generation, age 30, Works in family business

One participant also talked about the pressure on unmarried women whose marriages are being arranged to look slim because they feel they need to look good while people are looking for husbands for them.

> *Yeah, one of my cousins have got married but 2 or 3 years ago. She lost weight for her wedding but she wasn't naturally slim and now she's put the weight on again. But I think she felt the pressure as well, like I have to look my best when I'm you know, having an arranged, looking for someone to get married to, so she felt a lot of pressure.*
>
> Participant 1, second-generation, age 24, Trainee solicitor

Maintenance of looks or weight-loss seemed to be issues related to more strongly to gender, rather than ethnicity,, however, the intersectionality approach may argue that it is not possible to isolate gender from ethnicity. It is perhaps a combination of being and Indian and a woman that meant the women in my study were concerned about their looks and

weight. This is particularly true when the women were discussing arranged marriages, where being an *Indian* woman meant that the issue of being slim and looking the right way while people were looking for a partner was particularly pertinent for them.

5.2.2.4 Role of women in the Indian community

Second-generation participants reported their observations of how men and women behaved in social situations, with women tending to do the cooking and cleaning exclusively. Indian men are not expected to cook and were reported to contribute only minimally to housework.

> *Yeah I think, I wouldn't say so much in my house, it is sometimes a bit of a problem when you go to a community function, like they always expect the women, like you never see a man in the kitchen. So but it wasn't so much in our house, I was quite lucky like that. But I think yeah, cleaning of all – yeah I don't think I've ever seen my dad clean (laughs), so yeah, a bit of gender imbalance.*
>
> Participant 2, second-generation, age 22, Medical student

Indian women were traditionally seen as being active in the home, through domestic activities such as Indian cooking and general cleaning, although one of the younger second-generation women described this as being an 'old idea', in the context of it being out of date. While this traditional role was described by the second-generation, a very active participant described it as if it was irrelevant to herself, and this was typical of many of the participants. It is particularly noticeable in this example, where she describes 'Indian women' as not being active, despite being of Indian origin herself (i.e. other people might describe her as an 'Indian woman') and being a very active person.

> *I haven't ever thought of Indian women as being active. I don't know, if it's more – I know that a lot of Indian men are but I never really thought of it as Indian women kind of thing. Probably like housework and stuff, and like cooking and that kind of thing, but I've never really thought of like extreme sports.*
>
> Participant 3, second-generation, age 20, Advertising student

Whether these gender expectations of domestic duties in Indian women and men affected the participants themselves was not clear from the interviews, possibly because many of the participants were still young, or not living with a husband or partner, so had not experienced these pressures directly yet. Those with partners or husbands did not explicitly talk about the split in domestic responsibilities between themselves.

There appears to be a strong relationship between gender and Indian cultural attitudes. While these attitudes may have influenced the women as children, the influence on them as an adult appears to be limited.

5.3 Role of social and structural factors in influencing physical activity

It is likely that ethnicity did not appear relevant for adult for second-generation women because other wider societal and structural factors had a strong influence on their motivations for physical activity, both in childhood and adulthood.

5.3.1 In childhood

In childhood, school had a large influence on the participants' attitudes towards physical activity. It instilled a sense of importance about exercise and health, provided physical education classes and also offered opportunities to try out new sports and activities.

PB: What made you decide to get into kayaking?

I think I did it on a school trip and I really enjoyed it from there, so I looked into a club nearby where I live and joined them…

Participant 4, second-generation, age 20, Medical student.

Often the importance of school was more apparent when participants directly compared its influence to their parents' knowledge about exercise and health:

PB: Do you think your parents think exercise is important?

I think my dad does and my mum doesn't.

PB: can you tell me a bit more about why you think your mum doesn't?

I think like, we've like learnt from school recently, like everyone was pushed to exercise and like the Olympics and everything – the health benefits, but I don't know if she thinks it's that important. I think we've learnt through school and stuff – we've been told how important exercise is and to have an active lifestyle is good for your health, but I don't know if she's had – I don't think she realises that it's probably good for her to do more exercise.

Participant 7, second-generation, age 23, Mathematics student

5.3.2 As adults

For women as adults, the media (television, films, magazines and the news) were reported as having a general message that activity is important, though this was usually about weight and looks, rather than physical activity for health. A few participants mentioned the recommended guidelines for levels of physical activity, but all except one of them underestimated that amount that is recommended by the UK government. Generally however, the media's role revolved around influencing how people want to look.

I'd say that they [the media] portray that you should be skinny and hence with that like you should be restricting what you eat and exercising to be thin, but not really like, I know the 30 minute thing, just because of like change for life and studying it in biology and things like that. I don't think they [the media] say anything about the amount you should be exercising, just that you should be thin.

Participant 4, second-generation, age 20, Medical student.

This message about physical activity, filtered through the need to maintain their physical appearance, seemed to help reinforce the message they had received at school, albeit with an emphasis on looks, rather than health.

The local built-environment also affected adult women's activity. Lack of car-parking, parking charges and good weather often acted as an encouragement to walk to a destination, rather than use a more sedentary means of transport, such as driving. One participant described how moving to a different area and car-ownership had reduced the amount she walked.

I think - we used to live in old Trafford I think we used to walk around a bit more there, but round here, because it's a main road, there's nothing really about – even the park you have to – it's too far to walk really.

PB: How far is the park?

Takes about, at least, half an hour, 45 minute walk. So there's either that one or there's one further down over there.

PB: So when did you move from old Trafford?

About 6 years ago, so quite a while.

PB: You find the area there made it easier to go around?

Yeah, everything there was local, so it was you know, it was easy to walk to. I suppose the other thing was, I didn't have my own car then so, I had to walk.

PB: It sounds like the main road can affect you a little bit in terms of, if you're happy to go out?

Yeah, because there's nowhere to really walk. If you just go up there you just go along to a dual carriage way, so, if you go down there I mean – I wouldn't really need to go that way to anything unless I just go for a walk. I used to walk sometimes to – because my husband's mum used to have a shop, so in the summer we'd just walk down, and then walk back, but as I say, now I've got a car, I don't really do it anymore.

Participant 13, second-generation, age 29, Teaching assistant

5.4 Barriers to physical activity

Ethnicity and religion had less relevance for barriers to physical activity in adulthood, and had most impact in childhood, with issues such as parental concerns over the safety of girls and emphasising studying over activities. In adulthood, more general factors around time, busy roads, cost and worrying about looks while exercising were reported most often.

5.4.1.1 In childhood

Some participants reported being restricted from going outside to play in childhood, mainly because they were girls and the parents were concerned about their safety or the appropriateness of them being outside. Interviewees were generally accepting of this and did not mind that they had been restricted to some extent from playing outside as a child.

Compared to my male cousins, when I was growing up – there are like one or two who are older than me – I think they were allowed to like, go on the road and ride the bike and stuff like that, but we weren't allowed to go and I knew that was because I was a girl so I think, but I didn't stop me from – I don't know how to describe it but I didn't feel

it was a bad thing that they were not letting us go cos I just thought like because they wanted me to be safe.

Participant 1, second-generation, age 24, Trainee solicitor

Another participant also talked about how her parents did not like her walking alone when she was younger:

Walking – I do more walking here [at university] cos when I was at home, and because you're younger, then it's – my parents would never really send me out to walk anywhere really. When I was in year 7, or year 6 age, I did Brownies and it's only – the place I did it was only like a 10 minute walk away, but they'd never feel comfortable sending me out by myself, so they'd drive me everywhere really.

Participant 3, second-generation, age 20, Medical student.

One woman from a Sikh family described not being allowed to go outside much as a child because she was a girl.

We just never really were encouraged to do exercise that much really. We were told to play out, but I used to – because I lived with so many girls, we used to just stay inside most of the time, that's why.

PB: You say it's because you used to live with a lot of girls

Yeah, they used to be more – I'd say stricter back then. It wasn't reall – it was – I did used to do a little bit, but they didn't really encourage it too much really.

PB: What were they strict about?

Going out.

PB: Just going out the house generally?

Yeah.

PB: Was it at all times of day, or was it just generally. Was it certain times you weren't allowed to go out?

No it was, it was nearer all the time. Obviously if you're going somewhere – you're allowed to go out but I think I used to be lazy as well, I didn't used to feel like it and they, obviously they didn't encourage it very much so, maybe they were just happy with it.

Participant 11, second-generation, age 25, Volunteer teaching assistant

In adolescence, education was often emphasised over other activities, meaning that physical exercise was side-lined for some participants when they were studying for GCSEs or A-levels. This was described by many as being a particularly Indian attitude. If participants were already seen to be doing well in school then physical activity was not discouraged, but some people reported that they thought they would have been discouraged from doing physical activities if they were not doing well at school.

..but I mean if we were, they would tell me, they'd be like 'you need to do something' not just to sit there, but I'd say when I got towards A-level, then they'd say it less, because they'd be like concentrate on your studies and less – like it's not really that important.

Participant 4, second-generation, age 20, Medical student

After discussing how her siblings' physical activity had increased, one participant went into more detail about why she thought education was seen to be more important than leisure-time physical activities:

I think, because I can't say for anybody else, but I think personally I think being Indian you're a bit more encouraged on the career side you know for sure education, is drilled

into you, books are drilled into you more than sports, so definitely, you know, compared to - you know I have a lot of non-Indian friends – and they would regularly go for their sports, so the generation has changed now, so fortunately the newer Indian generation are going to play sports a bit more, but it – I think there is a definite cultural element in it for me.

PB: You mentioned generation – do you think it's more for your parents than for you?

Yes. Yeah, definitely. You see, where their thinking has reflected on us, so that's why it's been a bit late for me to kind of you know –change, be quite regular at the gym, and I actually also go because it's great for the mental stress, but really, it's when we were growing up, obviously it's finances weren't so easy but education was you know, work – that's more important. You're going to get more in life by studying than going to the gym or playing sports, so (laughs). That's the way it was when I was growing up to be honest.

Participant 6, second-generation, age 35, Dentist

Overall, ethnicity had some impact on active transport, housework and outside play as a child, however it may be that gender expectations, both from the wider society and the Indian community have the largest impact on physical activity during childhood. During teenage years, having an Indian cultural background may have had more of an influence, as an emphasis on studying meant that some people stopped or reduced their leisure-time physical activities.

5.4.1.2 As adults

The most commonly reported reason for not exercising, or not exercising more was time. This was a general factor and was never described in relation to ethnic background. Many people said that they would do extra activities if they had more time.

PB: Do you think that affects how much exercise you do now? Walking or sports?

I think it's more of a time issue now, because I've got my daughter and my husband to look after and you know I've got priorities elsewhere now really. I would like to take an hour or something just to go somewhere and do something, but it's hard to find places that, when you're child's in school, when you're not busy or something like that.

Participant 11, second-generation, age 25, Volunteer teaching assistant

Younger participants, aged below 25, talked about being concerned about their appearance, or thought that other people were concerned about their appearance while exercising, which is an additional reason why they wanted someone with them when exercising. One particularly active participant reported that her friends were embarrassed to be seen exercising and for some activities, such as cycling, they were concerned about ruining their hair.

But I know a lot of people who said that they want, cos they've seen me they've kind of wanted to bike but they're always self-conscious of what they look like when they bike, about what people seeing them biking and that kind of thing, so they might be embarrassed of that, but yeah, it doesn't really affect me much cos I'm used to it.

PB: What are they concerned about looking like on the bike?

I don't know, just like, when people see them they're like, 'oh', people see them biking across wearing a helmet and that kind of thing. Maybe like their hair in the morning when they like…but yeah, I'm not too worried about it, as long as I can get around.

Participant 3, second-generation, age 20, Advertising student

Another participant talked about feeling self-conscious when she was running as she did not like bumping into people she knew when she was sweaty and wearing her running kit.

I think sometimes seeing people like, you don't expect to see at the gym. It sounds really stupid, or going to the gym or going for a run and you bump into people. It's not always like the nicest experience cos you're not – you don't look very nice do you? No make-up, you're sweating everywhere, baggy t-shirt, then you see people and then they're kind of like just, 'oh yeah, we saw you, you looked kind of a mess', or I don't know, I think it just puts you off in a way, like it throws you. It's not like it's a big deal, but just throws you a bit, that's all.

Participant 2, second-generation, age 22, Medical student

These two examples highlight how Western gender expectations of needing to look attractive at all times was important for younger second-generation Indian women. In essence it is the impact of being a woman in a Western society, rather than of belonging to Indian culture, which prevented women from or made them feel uncomfortable about doing some activities. Drawing on the intersectionality approach, it is also possible that the concern over appearance while exercising is part of a British Asian culture for women, which combines both Western gender expectations and aspects of Indian culture. It is also possible that other aspects of identity, such as social class, come into play here, but this did not come out in the discussions with the women.

The cost of exercising was also a barrier for some people, though this did not considerably differ between IMD quintiles or age-groups. Gym memberships were considered to be expensive for some people, as was the cost of attending some classes. On the whole, people were willing to pay a few pounds for a class, but not much more than this when travelling to the class was also factored in.

Yeah, like I really want to join boxing, but boxing classes are quite expensive, so at the moment, no, I haven't – I'd like to do it but I haven't done it because of the cost. Yeah

and then the cost of getting there, cos the classes are like 8 at night, 7 o'clock and then I wouldn't – they're up near Piccadilly, so I wouldn't walk there myself that late, so yeah.

Participant 4, second-generation, age 20, Medical student

Value for money was also important for most people, as even if they could afford the cost of activities, they had to feel it was worth it for them.

PB: Did you ever find that the cost of using the leisure centre or the gym, did that ever put you off doing anything?

Not initially no, but I think now, some of the gyms it is a lot of money to pay if you're not going to go there - like I wouldn't go in the evenings because it's too busy. I probably wouldn't use it so I can't justify spending £40-50 a month at the gym when I wouldn't really use it.

So if you thought you would go

Then I would pay, yeah.

Participant 14, second-generation, age 46, Bank clerk

Finally, the weather was also considered a barrier for some people. While some second-generation participants tended to say that bad weather would not stop them going out if they were going somewhere anyway, it did stop them from doing activities that were purely for exercise only, for example going for a run or walk. The majority of people who said weather would stop them from going out said this was when it was raining.

5.5 Described themes in the context of the socioeconomic model

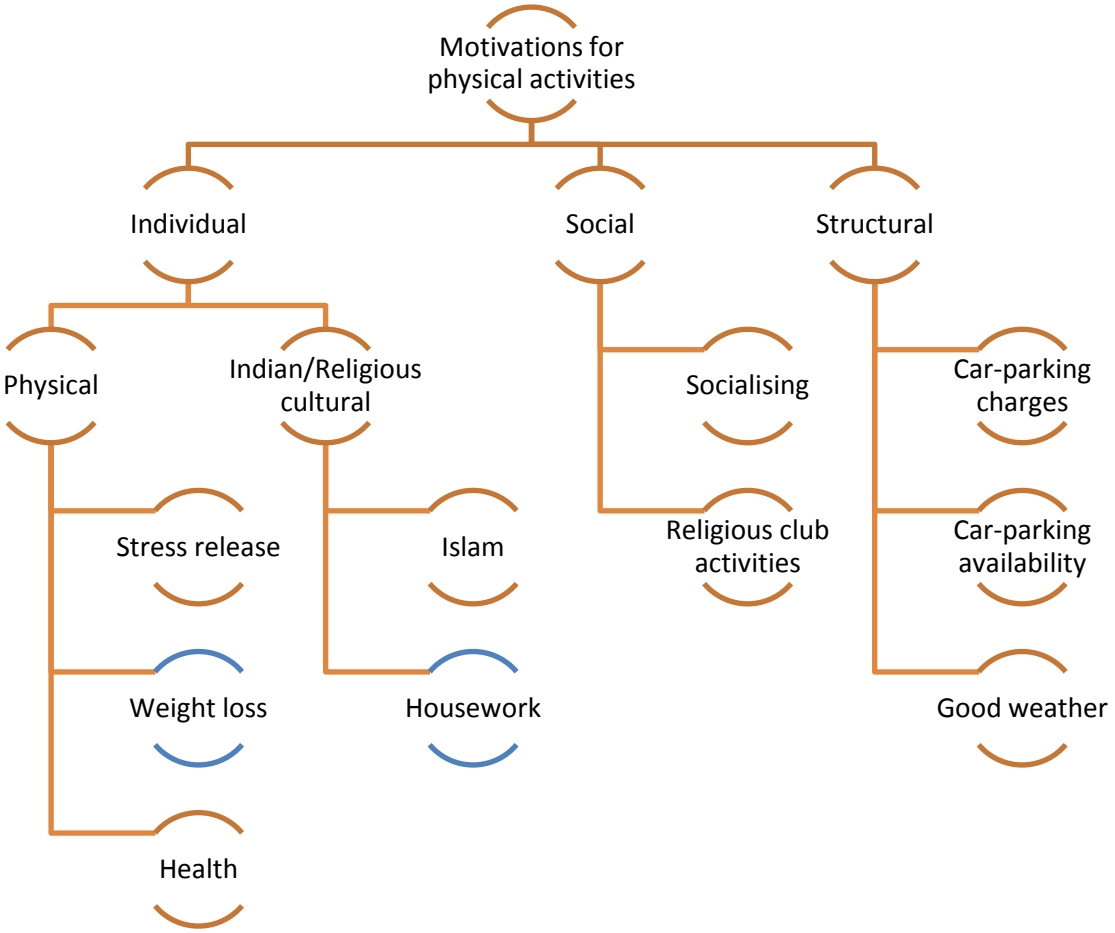
5.5.1 Influences

Figure 5.2 aggregates the various influences on physical activity, visualising the influences from the Indian or religious cultures in the context of other, wider factors. It shows that at the individual level, women exercised for physical reasons such as stress-release or health, as well as being influenced by some cultural values, such as Indian women traditionally doing the housework, or Islam encouraging physical activity. Maintaining or losing-weight was also a factor that appeared to be influenced by gender and the pressure on women to look good. For adult women, the necessity of doing the housework meant people were active. This was something that had been encouraged in childhood by parents, both as a general life-lesson, and as a cultural expectation that girls would do housework as adult women when they had their own homes.

Individual-level factors were not the only influences on second-generation Indian women, as would be expected. The desire to spend time with friends and family meant that the participants would join in organised activities or go for walks. The ease of walking in the local area, and/or the difficulty of parking also encouraged people to walk.

When placed in context, the role of Indian culture in influencing second-generation Indian women is shown to be minimal, and at least only part of the picture, particularly in adulthood. Religion in itself had little influence for Hindus, Sikhs and Jains, but some did describe the positive role of religious groups or clubs. Although there were only two Muslim women in my study, both mentioned the positive influence of Islam on physical activity.

Figure 5.2 Overview of motivations for physical activities described by second-generation Indian women, fitted in a socio-ecological model. Circles in blue indicate a factor which was related to gender



5.5.2 Barriers

Figure 5.3 describes the barriers to physical activity in second-generation Indian women. It shows how they span individual-level to environmental-level factors, as they did with motivations for physical activity.

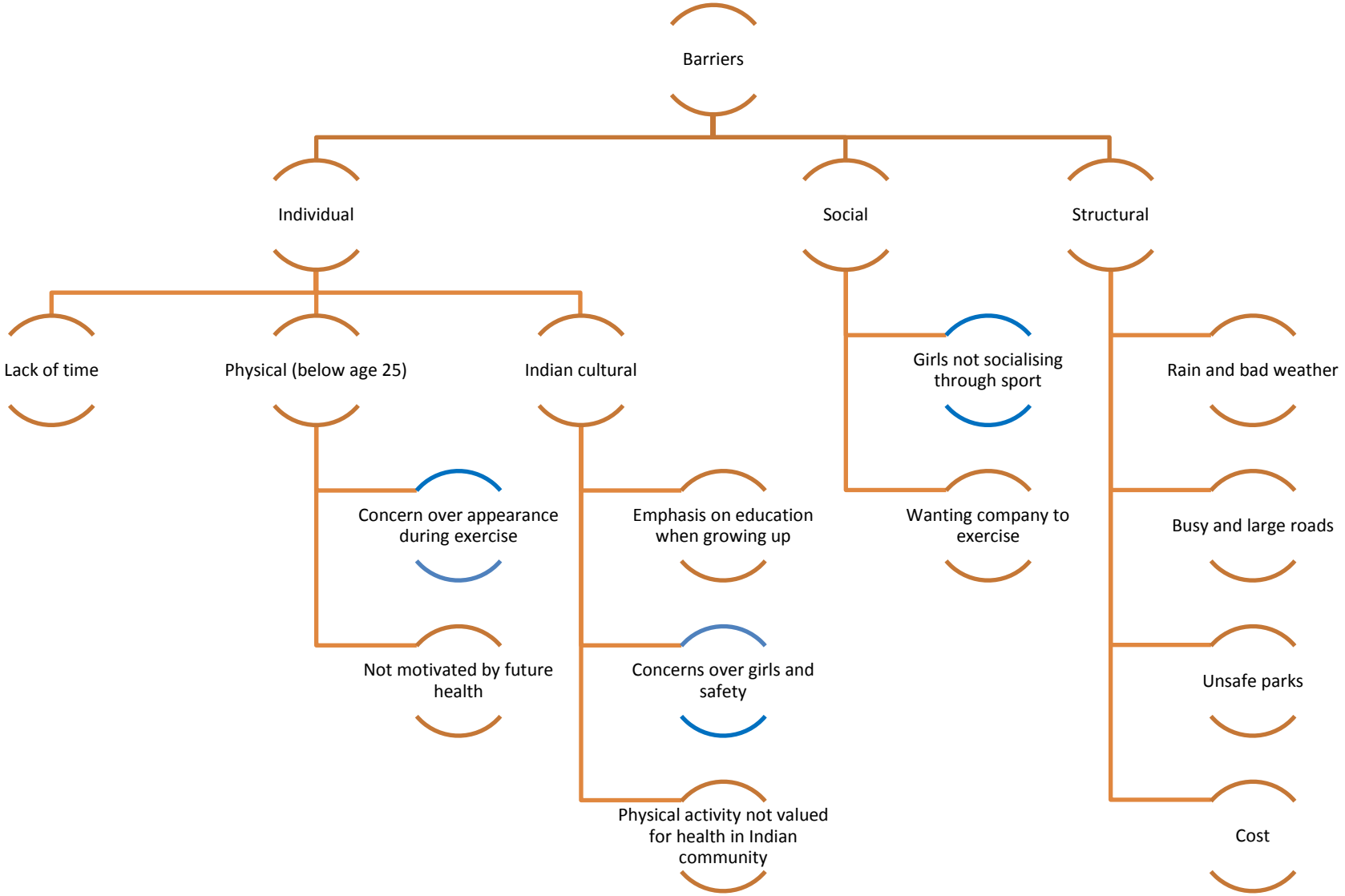
Cultural factors related to being Indian had really only prevented or reduced activity during childhood and adolescence. The general issue of physical activity not being valued for health was described as an issue in the Indian culture, but many of the women understood the

value of exercise for health, and tried to incorporate physical activity into their lives, so this cultural perception does not appear to have affected the activity of women themselves.

Gender as a barrier cut across the levels of the socioeconomic model, at both an individual level and a social level. Some women described a general lack of value given to playing sports as a social activity amongst women as a whole in England, not just among Indian women. By highlighting this, these women were pointing out that it was the fact that they were women and not the fact that they were Indian that had affected whether they socialise through sports.

Economic and environmental barriers were also an issue described by some participants. People described the cost of activities or gyms being too expensive, either as an absolute cost, or not being worth the money. Fear of unsafe parks and large, busy roads also discouraged some of the women from using their local neighbourhood to walk around in.

Figure 5.3 Overview of barriers for physical activities described by second-generation Indian women, fitted in a socio-ecological model. Circles in blue indicate a factor which was related to gender



5.6 Discussion of significant themes in relation to research question

Gender expectations from Western culture had some effect on most of the women's physical activity, influencing their enjoyment of sports and leisure activities, whether they cycled to university, and for some, in the amount of housework they did. Gender expectations within the Indian culture also sometimes affected their physical activity, through emphasising particular attitudes around the role of women in the family or home, such as encouraging them to do more housework, or restricting the ways girls played as children, out of concern for their safety. Due to this, the discussion around the role of ethnicity and other factors to do with the social identity of a person necessarily includes discussion around gender expectations in Western and Indian culture and the ways in which women are socialised to understand femininity.

5.6.1 Role of Indian culture in physical activity

My review of the literature in chapter two revealed that there has only been one UK qualitative study on physical activity which reported on second-generation ethnic groups. Brophy et al (2011) conducted focus groups with Welsh, Bangladeshi and Somali teenagers living in South Wales, to explore what teenagers would recommend to improve physical activity in ethnic minority children[97]. While the Bangladeshi group in this study may be quite different from the Indian women I interviewed, some findings are comparable, and where appropriate I discuss them here. There is literature discussing the role of ethnic background on behaviour in general, and this at times is relevant to the findings reported here.

5.6.1.1 Importance of education in childhood

The women in my study often mentioned that their families strongly valued the importance of education, especially while their daughters were in secondary school, with the result that extra-curricular activities, such as sports, were not encouraged as much. In the study by Brophy et al (2011), the Bangladeshi girls also discussed the conflict of exercising and school-work, discussing how their concentration at school could be affected by exercising. The issue of education was discussed differently by my participants, with the women talking about how an emphasis on education could mean that there was less time for physical activity, rather than physical activity itself affecting the quality of school-work.

It is possible that the emphasis on education in the Indian culture is related to the social class of the Indian ethnic group in the UK. People of Indian origin who migrated to the UK have been shown to have experienced downward migration, with high skill levels and education in their country of origin not impacting their social class in the UK. Platt describes the argument that the high levels of achievement in Indians and African Asians may be due to their migrant parents asserting their original background through their children, by encouraging education and emphasising its importance[26]. Abbas (2010) interviewed the parents and children of South Asians in Birmingham. He describes how parents' attitudes towards the role of the school and the importance of parental involvement varied with social class; those in higher social classes considered both the role of the school and the parents to be important in their child's education, but those of a lower social class emphasised the role of the teachers and school, rather than the parents[136]. In his conclusion, Abbas also discusses how differences in parents' social capital, knowledge and religion influence the education experiences of South Asians in Birmingham. All of the Hindu and Jain second-generation women in my study had been to university. Three of the four

Sikh and Muslim women were studying part-time for a qualification, while also caring for their children.

5.6.1.2 Safety concerns for girls in childhood

Some of the women in my study described being restricted from playing outside as a child, or concerns about travelling alone as a girl when they lived at home. Anwar (1998) describes the findings of surveys and interviews conducted between 1975 and 1994 in Birmingham, that looked at leisure and free-time among South Asians in Britain. Anwar discusses how South Asian parents' concern about their daughters having undesirable relationships with boys, means that they may be stricter with their daughters. Anwar describes how some of the younger South Asians (below 35) were accepting of the difference in freedom between themselves and White people of the same age. The women in my study who reported being restricted in their outdoor activities in childhood were also accepting of restrictions on their freedom, citing how their parents were looking out for them, or did it out of concern.

Nevertheless, the women also talked of their own children in ways that suggested that they would like to give more freedom to their own children, indicating that the restrictions faced by today's young South Asian women are less likely to be an issue for the next generation of South Asian women.

5.6.1.3 Women's role in the home in Indian culture

The women in my study often described how girls in Indian families were expected to do more housework than their male relatives and that they themselves had done more housework than their brothers as children, and had faced more restrictions on playing outside as a child.

A study in Canada has reported on the physical activity of Indian second-generation teenagers. Ramanathan & Crocker (2009) interviewed six girls aged 15 to 19 in Canada[137], all of whom were of Indian descent. Of these, four had spent their entire lives in Canada. While not all adults, this age-group is still old enough to articulate the different influences on their activity, and in theory are able to act somewhat autonomously. This paper focused on the role of family and culture and recruited exclusively from a spiritual centre; this recruitment strategy limits the transferability of the findings, as participants are already demonstrating a level of cultural and religious affinity by being at the centre. Despite this, the girls did describe experiences similar to those of the second-generation women in my study. The different ways in which boys and girls are active was mentioned, and the girls discussed how boys are more competitive than girls in general and were more interested in building muscle. They described their parents as being encouraging of physical activity, despite also reporting a distinction between how boys and girls are brought up in the home. The Canadian participants described how Indian girls are expected to be at home more than their brothers and are asked to do more housework, although the girls in the study also described rejecting and questioning these gender roles. The questioning of these gender expectations within Indian culture was also apparent in my study. In conjunction with the Canadian study, this suggests that the younger, second-generation of Indian women have experienced pressures from their Indian parents to behave in a certain way as a girl, but do not hold these Indian cultural values themselves.

5.6.1.4 Promotion of dance for women in Indian culture

Many of the second-generation women were interested in dance, or had done some form of dancing when they were children. One woman also explicitly stated that dancing was valued in the Indian culture, citing the example of dancing at weddings. Morcom (2013) has studied

the role of dance and dancers in Indian culture and gives an interesting insight how dance may fit into the culture of modern Indians and the diaspora community. Morcom outlines the complex history of courtesans and dance performances in Indian history, where public dance was traditionally associated with prostitution and was not appropriate for Indian women who were expected to marry[138]. She describes the role of non-resident Indians (NRIs) in promoting Bollywood dance, and the recent acceptability of dance and dance performances in middle class Indians. Bollywood dance in particular, which draws on but is distinct from classical Indian dance styles, has become popular in Indian weddings during the past 20 years, both in India and in Indians living abroad. Morcom's descriptions of how Bollywood dance has become popular in Indians living abroad corroborates with the accounts of the women in my study, although the women's interest in dance was not restricted to Indian styles, particularly in adulthood, pointing to a wider interest in dancing that may have stemmed from the popularity of dance in Indian culture.

5.6.1.5 Distinction between their own attitudes and that present in Indian culture

When talking about the attitudes and culture of Indian people in relation to physical activity, some of the second-generation women appeared uncomfortable. These women were often aware of stereotypical attitudes or values in Indian culture, or described 'typical' attitudes of their parents' generation, but on further questioning that it became apparent that they usually did not hold these views themselves. A minority of the women in my study also felt that there was no difference in motivations for or barriers to physical activity between second-generation Indian women and White British women. These women dismissed, as irrelevant, any Indian cultural values that may restrict their physical activity, stating that these are not values that influence their own activities or those of their generation. The

majority of described Indian cultural values that could restrict physical activity were related to the role of women in the Indian culture. It follows then that my informants' rejection of traditional Indian gender roles meant that Indian culture therefore had minimal impact on these women's physical activities as adults.

This distinction between acknowledging the existence of traditional Indian attitudes or values, yet not applying them to oneself indicates a complex identity which combines elements of a wider British culture and a traditional Indian culture. On the whole, the women rejected the traditional Indian cultural gender roles taught to them by their parents, such as the expectation of women to prioritise the home and family over themselves. The gender expectations of women prevalent in the wider British society however did appear to have affected them, with concerns over appearance and the conflicts between appearing feminine and doing physical activities. Dasgupta (1998) gave 46 Indian families in the United States questionnaires about their attitudes to women, along with two other questionnaires on other topics. Dasgupta found that second-generation women who had had their early years in the United States, as opposed to in India, had more liberal views about the role of women in society[139]. Both parents and their children believed in gender equality, but mothers were less liberal when their daughters were teenagers; the authors speculate that this may be because the mothers felt pressure to socialise their daughters according to traditional gender roles once their daughters were older. Both my findings and that of Dasgupta indicate that second-generation Indian women had adopted more Western ideas around the role of women in Western culture, although they were aware of the role of women in Indian culture. In Dasgupta's study, the parents also believed in gender equality, and appear to have taught this to their children, although the changing attitude of mothers as their daughters grow up may indicate the pressures and difficulties first-generation

women face in practically implementing their beliefs around gender equal roles for men and women.

5.6.2 Role of other individual factors

5.6.2.1 Western gender expectations for physical activity

The women in this study talked about the role of gender in physical activity separately from the influence of their ethnic background. The women discussed pressures to look 'good' during physical activity and how boys socialise through sports but women socialise in other ways.

A number of studies have been published examining the influence of gender expectations on the physical activity of young women and teenage girls[140–144]. Three of the studies cited here are based in the United Kingdom, one study is based in the United States and one is based in South Australia. All of the studies reported that women and teenage girls in Western cultures face a conflict between traditional expectations of what it is to be feminine and the expectations to do with sport. Cockburn & Clarke (2002)[142] describe how the Year nine girls in their study lived with a double identity . Those girls that were active were considered more masculine by their friends and had to 'temporarily loosen their ties to emphasised femininity'; inactive girls tended to participate in physical education (PE) classes in a way that allowed them to maintain their feminine identity, often resulting in their disengagement from the class. Choi (2000) has also discussed in detail how being into sports is in-line with a masculine identity, not a feminine one. As teenagers, girls are aware of this link and so this may contribute to explaining why girls do not socialise through sport. All of the studies also discussed 'male' and 'female' sports. Azzarito et al (2006) from the United States describe how the girls in their study theoretically reject the idea of gender-

stereotyped sports, but acknowledge that they do exist[141]. The conflict between being a woman and socialising through sports has been reported in previous studies.

All the papers reported the women as being concerned over sweating during exercising or generally being concerned about their appearance while exercising. These analyses of the role of gender identity in physical activity tie in with the discussions I had with the participants in my study. Some girls described feeling uncomfortable in the weights-area of the gym, as they felt it is a traditionally male area and they were being started at. They have also described people commenting on how they look while exercising and how their friends were put off trying cycling because of how they might look while doing it, or messing up their hair. These accounts all indicate that some women feel an expectation to prioritise looks over physical activity, with some succumbing to this and others being active regardless.

It is important to note that the pressure women felt to look attractive or feminine also motivated them to do exercise. The majority of second-generation women in my study discussed doing physical activity either to maintain their weight or to lose weight, which is line with literature exploring motivations for physical activity in the general population in the UK[57].

5.6.3 Role of non-individual factors

5.6.3.1 Impact of school on development of physical activity attitudes

Many of the second-generation women in my study discussed the positive impact of physical education lessons at school in teaching them about the importance of physical

activity. This was true even for the women who described themselves as 'not sporty' or in the school sports teams.

This attitude in line with Green et al (2005), who assessed the contribution of physical activity programmes in England and Wales to adult participation in sport and physical activity, using survey data and sociological analysis. The paper's premise is to challenge ideas in the literature that school-based physical education classes have not facilitated life-long participation in sport, as they originally aimed to do. Green et al discuss how the increased sports participation in the late 20th century may be, in part, due to the widening of the physical activity curriculum. These curriculum changes allowed for more choice of activities and encouraged activities outside of school time. In conjunction with the increase in sports and leisure provision in local areas from the 1970s onwards, these changes will have increased both the opportunity and aspiration to do physical activity[145]. Some of the women in my study described how, when their parents provided no opinion on physical activity, the education they received in schools served to provide a positive one; when participants had been encouraged to be active by their parents, school education reinforced these messages. It is likely that physical education classes, while perhaps promoting particular sports, particularly for girls[146], has had an overall positive impact on the attitudes towards physical activity in the second-generation Indian women in my study.

5.6.3.2 Impact of the media on attitudes to physical activity

The majority of the second-generation women in my study described physical activity messages from the media as promoting particular body images or weight-loss, rather than promoting physical activity in itself.

In 2012, Hilton et al published a study which had examined how obesity was reported on in mainstream UK newspapers between 1996 and 2010. They find that overall, individual drivers of obesity, such as diet and physical activity were the most frequently mentioned in the articles[147]. Interestingly, they find that in the more recent years, newspapers had started to report on the more societal drivers of obesity. In doing so however, more articles were likely to report on societal drivers related to diet, rather than physical activity, and the authors suggest that public health campaigns may need to focus on the importance of exercise to rebalance public perceptions around the importance of exercise[147]. This study lends support to the claims made by the women in my study that media messages about physical activity are more to do with weight, than physical activity itself. It is also interesting to note that when I asked the women about physical activity, some of them would talk about diet or food instead, indicating that for them there is a link between physical activity and diet. It is possible that the nature of obesity articles in newspapers has influenced some people to think about diet more than physical activity.

Many of the younger women in my study expressed an understanding that physical activity was important for health, but openly said that they exercise for their appearance or weight maintenance rather than their health. Pankratow et al (2013) assessed the effects of reading exercise-related magazine articles on first-year female university students in Canada and found that health messages may be influential to motivations for physical activity, as well as messages about appearance[148]. People who read articles about health messages rated health as a physical activity motivator more highly than appearance, but those reading articles about appearance did not necessarily rate appearance as a main motivator. While the second-generation Indian women were usually vague about the types of media they

were reading, it is possible that the types of articles they come across influence their motivations for wanting to exercise.

5.7 Conclusion

In summary, it appears that ethnicity is not particularly relevant in adulthood for physical activity, when placed into the context of other influences. While it did have some impact in childhood, most women said that they did not feel it was or would be relevant for their own children. This difference between childhood and adulthood in the second-generation could be due to the first-generation holding the Indian values they learnt in their own childhood and aiming to bring up their (second-generation) daughters with the same values that they had learnt. However the additional cultural values that the second-generation women have learnt through growing up in the UK may have superseded or added to the Indian values they learnt as a child.

To gain a further understanding of whether this low influence of ethnicity is specific to second-generation Indian women, I decided to interview first-generation Indian women as a comparison. I hoped to obtain more information on traditional Indian values around exercise by interviewing first-generation women, and to ascertain whether first-generation women themselves thought there was a difference between the generations.

The next chapter focuses on the influences and barriers to physical activity in the first-generation, and chapter seven describes the similarities and differences found between the two generations.

6. Influences on physical activity in the first-generation of Indian women

6.1 Introduction

This chapter first describes the findings from interviews with the first-generation participants, and compares my findings to the large existing literature on the motivations for and barriers to physical activity in South Asian women in the UK.

I present the findings in line with the research questions I aimed to answer and situate these within the framework of the socio-ecological model, in order to contextualise any Indian cultural influences on physical activity within a wider framework. As described in chapter four, I had originally intended to interview only second-generation women and as a result of time-constraints on data collection, I conducted fewer interviews with first-generation Indian women, compared to the second-generation. Interviewing the first-generation provided further insight into the influences on physical activity in this group, and in particular the potential influence of traditional Indian roles which, as discussed in chapter five, had a low influence on the physical activity of the second-generation in the context of other influences. The analyses presented here allows for a richer comparison between the generations, which is presented in the next chapter. Figure 6.1 provides a reminder of the research questions that my qualitative research was aiming to answer.

Figure 6.1 Research questions (3) and (4)

(3) What aspects of ethnicity influence physical activity choices in the second-generation of Indian women?
   a. How do other aspects of their identity affect their physical activity choices?
   b. What aspects, not related to their identity, influence their physical activity choices?

(4) How do they think their physical activity influences compare to the physical activity influences of their parents?

Table 6.1 describes the characteristics of the nine first-generation participants I interviewed. There were no Sikh or Muslim first-generation participants; the majority of the first-generation was above 50 years old. Two of the nine people did not fill in the physical activity diary; one filled it in at the beginning of the interview and one did not fill in the diary but wrote down her exercise on the back of an envelope. Most first-generation participants were living in relatively affluent areas.

Self-reported activity levels varied, with some reporting high levels of walking and household activity in the diary. The majority of first-generation participants described themselves or inactive or 'middle active', although there were a few exceptions to this.

The interviews mostly took place in people's homes, with only one taking place at work. All interviews were conducted in English, although one woman had her daughter translating some of my questions into Gujurati. Participants' level of English varied greatly, however all participants appeared to fully understand my questions and I was able to ask for clarifications from them if I was unsure of their meaning. As I did not interview any first-generation participants who could not speak English, the findings reported here are only transferable to English-speaking first-generation Indian women. Of the nine women in this part of the study, four had daughters who were also participating in the study as second-generation participants. It is therefore possible to look into specific particular mother-daughter generational comparisons for these people.

Table 6.1 Characteristics of first-generation participants

		N = 9	
Age group	**20 to 29**	0	0%
	30 to 39	1	11%
	40 to 49	0	0%
	50 to 59	6	67%
	60 to 69	2	22%
Religion	**Hindu**	7	78%
	Sikh	0	0%
	Jain	2	22%
	Muslim	0	0%
Local authority	**Cheshire East**	1	11%
	Bolton	0	0%
	Bury	1	11%
	Manchester	0	0%
	Salford	0	0%
	Stockport	1	11%
	Tameside	3	33%
	Trafford	2	22%
	London	1	11%
Index of Multiple	**1 (most deprived)**	1	11%
Deprivation quintile	**2**	2	22%
	3	1	11%
	4	0	0%
	5 (least deprived)	5	56%
Occupations as	**Administrator**	1	11%
Described by the	**Customer Services Advisor**	1	11%
women	**Doctor**	2	22%
	General assistant	1	11%
	Retired bakery worker	1	11%
	Software consultant	1	11%
	Systems developer	1	11%
	Teaching Assistant	1	11%

6.2 Role of ethnicity in influencing physical activity

For first-generation Indian women, the Indian culture and their religion had a fairly prominent role in influencing their physical activity. The influence of what they described as Indian attitudes was most prominent in childhood, but also strongly affected women's physical activity as adults.

6.2.1 In childhood

6.2.1.1 Type of activity

Indian cultural expectations of women had a strong influence on the domestic physical activity of first-generation Indian women. As children, the first-generation women described being encouraged by their parents to do the housework. This was specific to them as Indian women, as they would be expected to maintain the household when they got married.

> *So for Indian I know that even though I was studying in medicine and it was a very heavy study commitment, my mum was making sure that I have to get up at 5 o clock in the morning and help rolling chapatti for the day so that I don't forget, so that when I get married that I don't have problem, and also there were not electric gadgets. So I was helping quite a lot making poppadum from scratch and things like that. Those are the type of things change here because of the western, electric goods that are available as well as the, there's no sun to make poppadum here anyway (laughs).*
>
> Participant 24, first-generation, age 63, Semi-retired doctor

6.2.2 As adults

6.2.2.1 Type of activity

Many participants discussed how the 'housework' section of the exercise diary did not reflect the amount of housework Indian women do, and that it also needed to include cooking. The participants described Indian cooking as being quite strenuous, as they grind the spices from scratch, roll out the chapattis – an activity which they describe as being fairly hard work - and are on their feet for a long time.

> *PB: Ok, so did you find that the categories in here, did they tend to match your idea of exercise, of what you consider exercise?*
>
> *I think so, however with our generation women, we still do lot - spend a lot more time in the house, walking around trying to catch-up. For example, cooking, we still do everything in cooking ourselves rather than some ready-made thing – I don't eat ready-made meals, so which I know the young generation, at least I know a few of them they don't do that, but number of things we do ourselves, still with the roots from India. For example, grinding the chilli and other things, we will do it fresh while the young generation is buying a ready frozen one, so there are – so it means that there's a lot of walking in the house, exercise goes and we get less time for the planned treadmill. So that's not reflected – that's the only criticism I have got. A huge amount of work goes within the house.*
>
> Participant 24, first-generation, age 63, Semi-retired doctor

When talking about their mothers, or mother-in-laws, some second-generation women described how most of the activity of the first-generation came from housework.

My mum's a - I shouldn't be saying this, but my mum's a couch potato. Once she's done – she'll do the housework, she'll do the cooking and cleaning and whatnot, whatever needs to be doing in the house, but afterwards she'll need to have rest, you know she'll just sit on the sofa, watch her favourite soaps and that's her done. So, we've got to really nag her, we tell her you know, come on, come out for a walk, do this and do that, but she's not really into it.

PB: Is it that it doesn't occur to her or she doesn't want to do you think?

I think a bit of both. She just feels there's no need- she thinks she's healthy. Although she's having problem with her legs now, we tell her it's because you're not walking enough, you're not doing exercise enough and she does get aches and pains and she just takes it easy, she's just very laid back.

PB: Ok, so your mum is mostly doing housework

She thinks that's enough. [laughs]. I have enough to do at home and you know?

Participant 19, second-generation, age 33, Teaching assistant

6.2.2.2 Value of physical activity

When describing the attitudes in Indian culture, it was often reported that Indian culture does not value physical activity for health or encourage sports, particularly in women. Often the second-generation described this about the first-generation more succinctly:

I see my husband's family, so his sisters - none of them really do any type of – I don't think they do anything.

PB: They don't do anything?

No they don't do any exercise. His mum as well, she doesn't really do anything.

PB: Why do you think that is?

I think maybe they've not been used to do it. I don't think they've ever instilled it in them when they were younger, which is important probably. That's why.

Participant 13, second-generation, age 29, Teaching assistant

Another second-generation woman gave more detail on the lack of planned physical activity in her family in general, and postulates about the reasons why.

But there was none of this, oh you should exercise, or you need to – you're growing up, because I think that education wasn't there for our parents, you know, because they never went to school in this country or, they weren't exposed to healthy lifestyles. Do you know what I mean? Like we are here.

PB: So you think you got that information growing up here, at school and things?

Yeah yeah. And I think just watching television as well, watching all the different sports. Like I said, my brother loved watching Wimbledon, so we got into tennis then. I think as we grew up and got exposed to different things in this country, we just took an interest in things and that's how.

[talks about her brother playing snooker]

Exercise was just unheard of in all our relatives, you know, both sides of my mum and dad. Nobody exercised. None of my uncles, aunts. You know, even like my mum, she suffered many years with arthritis, but there was none of this education about eating healthy. Although we ate healthily, we never ate ready-meals or never had a takeaway in our life, everything was home-cooked.

[talks about healthy eating in her family]

But you know I think there wasn't that education of what foods to maybe not eat because you've got a certain illness, or to do certain exercises, like with arthritis, I don't know, it might have been better to do, I don't know, aqua aerobics to ease the pain. I think that sort of education was just never there, I think they just put up with whatever

illness they had and just carried on with the tablets that the doctors gave. But there wasn't any of that, oh we should exercise we should help ourselves by doing this or that, you know? I think that just wasn't there.

Participant 18, second-generation, age 46, Clerical officer

It is possible that the strong expectation of prioritising the family and the home, combined with a lack of value for physical exercise in general, combined to produce a situation where the first-generation women found it difficult to find time to exercise, and were not necessarily convinced it was that important. The expectation of prioritising the family may also explain why they "just put up with whatever illness they had".

While many people described a lack of value for physical activity, all the women in my study thought exercise was important. It is possible that this is due to a recruitment bias, where only women who had a prior interest in physical activity volunteered, or it is possible that this is also related to age.

The majority of the first-generation described seeing friends and family dying or having health scares, and this was cited as a major reason for exercising.

But now as I say get more free, bus comes quite regular via here, the we try to go more walking as well.

PB: Is that because it's free?

I think because becoming a bit more health conscious now at our age and we have started to see people our age people dying with heart attack, in India and here, so it just make – you get shaken up a little bit and start taking health a bit more seriously. It's not just because tram is free.

Participant 24, first-generation, age 63, Doctor

The process of getting older was also a prompt for some people, citing the need to keep joints supple or ward off diabetes as they get older.

I've always exercised except for the last eight years and I just feel that this is when I do need to do it more and I'm not doing it as much.

PB: Why do you feel you need to do it more now?

Because it – as you're growing up, you need to do exercise to keep your joints supple.

Participant 10, first-generation, age 58, Teaching assistant

However, despite some people talking about needing to look after their health as they got older, some of the first-generation women described how there is an expectation of acceptance of physical inactivity among older people in Indian culture. It is important to note though, that this was only described by people who did not agree with it, which is perhaps why they were able to articulate it. These participants discussed how once you reach the age of 60 or more, you are expected to slow down and let the younger generation take over the housework.

I think the idea of old has now changed isn't it? Before, and again, this is a 2-fold thing isn't it, because in the general, if you look at in generally in the UK, the idea's changed, the age – where you considered to be old. Before it was 60, now it's moved on and this thing, so it's changed. But whether that idea has changed in the Asian community I'm not too sure. In the Asian community, still that, if you're 60 that's it, you slow down, you should have slowed down by then stopped by now, so it's questionable which parameter you're using.

PB: You think the perceptions of age might differ in the Asian community?

Yeah I think they definitely do. Compared to the, you know, general UK population.

PB: So you said there you think there might be a perception that you should slow down maybe when you get to 60.

Yeah, it's like, and especially since like, and I've heard a lot of this being said to me as well, like when my son got married it was like, oh you've got a daughter in law now so that's fine, she'll be doing all the work so you can slow down and things. I don't see it that way, so perhaps I'm not the norm – the wrong person to speak to about this.

PB: No, not at all. So how do you think that idea of slowing down when you're older, 60 or older, do you think that's related to whether people exercise or not?

Shouldn't be, but what you generally hear is people coming up with various aches and pains and things. Obviously some illness is to come with age and this thing, or it may do, but then you just have to get on with it - but it's taken to be perhaps at times a laurel to rest on.

The same participant then went on to describe how this relates specifically to exercise in the Asian community:

I mean when I go to the gym, I'll see people you know, from the general population who will come in, will be with a walking stick or you know, some other disability or whatever, or even if just generally have difficulty in walking or other things, but they'll make the effort, they'll make the effort – they'll be there whatever they can do, whatever pace they can do it at, it'll be done, they'll do it no matter what. I think with the Asian community you'll find if they're like that, it's like oh I've got this 'ahh' very quickly, 'I'm dying' and the sympathy that's looked at very quickly and that effort is not put in. Ok, you know, I appreciate if you've got some sort of disability, is does take longer to go through your daily chores or you know, whatever, but I admire people who make the effort and you know, no matter what at least try and do what you can, whereas others are just sort of saying, just looking for other people to do your work for you, so yeah, I definitely think there's a difference in attitude. There definitely is that with age, in the

Asian population, it is definitely – you have kids, they grow up and then whether you have a son or a daughter or whatever living with you, then the cycle should change and they should look after you, but why?

Participant 28, first-generation, age 58, Customer services adviser

6.2.2.3 Religion

The question of whether religion influences physical activity was met with mixed responses by the first-generation. Many people said their religion did not influence their activity. However, there were no Muslim first-generation women in my study; it is possible that, from the responses of the second-generation, first-generation Muslim women may have been more likely to say Islam did have an influence.

Of those that said their religion did influence physical activity, it was always either through yoga for Hindus, or through activities arranged by religious organisations.

PB: Do you think Jainism has any influence on whether you exercise or not?

It does, I think it has got a huge influence because I know all the people who are going to the community centre regularly when they started to semi retire, retire, they all, including ourselves, registered with gym and paid with money for gym membership for year or 2, and nobody used it. As soon as everything got sorted out in the community hall people are using it regularly. Because as I said, culture it's the exercise is not just the going and doing exercise, it is culturally meeting people, talking with people and keeping social time, and so in my experience having the treadmill at home or going to the gym are much less for Asian community than if there is a community facility. People like to go more there.

PB: For the social aspect?

Social aspect and also, seeing that the other person is doing it so I will do it as well, and socialising.

PB: Makes it visible do you think?

Makes it visible, it make, gives more motivation, oh such and such person is coming every week so why can't I go? And then it is motivation as well as the social.

Participant 24, first-generation, age 63, Doctor

6.3 Role of wider societal and environmental factors in motivating people to do physical activity

6.3.1.1 Media

The media was thought to encourage exercise, however respondents said that the media provided little or no information on how much to do. Some participants described how the media adverts were not culturally sensitive enough, by not reflecting the ethnic make-up of the local population or promoting family activities.

Another thing which I have always noticed, when there are exercises, or sorry when they are advertising these types of classes, a number of things: the more or less the White faces and I'm not saying only White faces – they try to show that they are culturally sensitive, but it goes more Black and White, because, probably culturally they Blacks are a lot more into running and exercise, so probably that may be the reason, I don't know, but they are not sensitive to the– to see the community in their own area. In their own area if there are more Asian women, then their advertisement in the swimming pool or wherever showing those faces would make difference, and in another area where there are more Black community then put in those faces.

PB: You think it's not appropriate to the local population at the moment?

No and the third thing that they are not showing – they are showing, but very less, as a family thing. The Asian community is more family – if I go, if I go with my children as well, and see something for children happening and something for husband, or something happening for my mother-in-law, then we'll go together, so still going out is the – other than necessary things, it's a family thing.

Participant 24, first-generation, age 63, Doctor

6.3.1.2 Local facilities

All participants knew of their local leisure centres, but used them to varying degrees. Some used them to go to the gym or to learn to swim. Many of the first-generation Indian women used the ladies only facilities; some thought they were important for Asian women and others discovered the benefits after joining.

PB: So Curves [a brand of gym], is the whole gym ladies only or is it just the classes?

No, the whole gym ladies only. Whole gym for ladies only.

PB: So is it because it's ladies only, is that why you joined that one?

No, no, not like that. Just, now I think there's another point as well. Because it's a half an hour and they just, because it's only just concentrate ladies only, so they concentrate on the ladies part, like big, concentrate on bums and you know, these things, so they all the exercise related to the ladies fat. So, you know like, the abdominal bumps really, it's not like making muscle and going protein and you know, and there are, you don't feel like, in gym if you go, you know communal gym, you know all these hefty fellows with the tattoos on, and you know they are doing, you know. So, you know really if you go to gym, twice, it requires one and half hour of yours. Here you just go and, like in one, one and a half hour I'm home. Like I go, do it in one hour, because 10 minutes' drive from here. So, I can concentrate on this. There's nothing like go and wash, and take bath, nothing like that, you just go and do it and come back.

Participant 21, first-generation, age 56, Doctor

Parking charges or lack of parking facilities sometimes changed participants' behaviour to walking, rather than driving.

Sometime I'm shopping, there's no parking so I have to walk. You can go, like if I'm going or there's no parking, hardly like, you have pay the money, half an hour, you have to put it come back, but I'd rather go walking and do the shopping, it's better like.

PB: So only half an hour parking?

No, too much money like, you have to pay certain amount of money and come back in half an hour, it's too rush, so I left the car and just go walking and come back, it's better walking. It's a good exercise and saving the money like both ways. And you know, the parking is too expensive here.

PB: It is? So it makes you walk?

Yeah, they make you walk. Hardly find the parking and too expensive here. Walking is better for us sometime. I can go work walking, but everyday I'm doing shopping, so I don't like too much shopping carrying with me and walking.

Participant 12, first-generation, age 50, General assistant in a supermarket

6.3.1.3 Cost

The cost of using swimming pools and gyms was mentioned as an issue for some of the participants. For people living in the more affluent areas, they sometimes said that this was not a factor in their decision and that it had never made any difference to whether they exercised or not.

PB: Ok, so you mentioned that the tram is free now, so has cost ever put you off joining anything, or the gym?

Oh yes, gym has, I mean ok this year I got it free, but the gym, the local Altrincham swimming pool and the local gym is in a way, pay-as-you go, which is a lot more attractive to us that paying for a whole year and may or may not be able to use it, so yes, cost does put off, especially when we are not using that much, whereas the pay as you go it's more attractive so we started to go a little bit more for exercise there. Pay as you go, so, and longer opening hours.

Participant 24, first-generation, age 63, Doctor

6.4 Role of ethnicity in as a barrier to physical activity

6.4.1 As children

Some people also commented that there is a hesitation about letting children travel alone in Indian culture and Indian children are less independent than within British culture. This reluctance to let children travel meant that some people were particularly restricted in their ability to go out and pursue activities outside the home, particularly if they had grown up in India.

You know it's not like that. I'm telling you know I like [sports], it's not that – for some ladies, especially in India, they don't - change karo [change it] or I don't want. Not like that, but my childhood I could not.

PB: You said in school there wasn't much facilities and things?

No, actually, when I was, when my grandfather were alive and three sisters were there, so then we have to go to the nearby school. You know? Like you can't - one servant will go and all these things, it's too much, you know? So that's why I could not go to convent education. My brother who can, you know, cycle up to the – only he can spend it all. But my mother was quite educated. She was that kind, BA in English and all, so she actually only, with her effort we all three, my all, me and my 2 sisters, they became doctors.

Because she used to make us study and all, so that much she can do. Not much, that she can send me out to go to here and there and things, so only the one thing, she make us study, so that's the, I'm really thankful to study… [talks about other things]… so we live in a very small, you know, very old type of, like if you see in Delhi, Chandhi Chowk and all – you know?

PB: Yeah yeah?

So same type of thing was in Lucknow as well, so although that was also a bit of flavour, like everybody knows everybody and all these things, but and from there it was a one hour journey to convent school and big English school to be honest. So though I competed on studies and all, but other activity I couldn't do. I was not – daughters they could not go, and you know? All the grandfathers, they were protective…

Participant 21, first-generation, age 56, Doctor

6.4.2 As adults

All participants described how first-generation Indian women prioritise looking after the family above all else, including cooking Indian food from scratch, which meant that without making a big effort, they had neither the time, nor sometimes the energy to exercise. Many explicitly compared this to the perceived attitude of British people.

…you know, they, I think British people first of all they know to love themselves, they take care of themselves. Our, is always take care of you know, as being a woman, you have to take care of your family. That attitude is always there; take care of this, take care of, you know? Their individuality is not there. Here these British people they think themselves first. Plus point, minus point, whatever you say. I'm seeing my daughters and all, they think they are individual first, they firm and they have to look after first. I'm not telling that they are not caring, but that is the attitude, so they themselves care very far, you know, that's the way they are. We are not thinking that - oh, till our death, know what will we give them and we serve our children, but for them they say here 20 or 30s they don't want to live with their own, they want, you know - good also, they

look after themselves, they study, they work for the - these Asian here, we are all, till marriage and all, you know everything we are doing for them, because that is our attitude, that is we are because my mother-father did it. So they take care themselves, so that's why, so they look after themselves.

Participant 21, first-generation, age 56, Doctor

This prioritising of the family and housework above themselves and other activities is likely to have come from the experiences first-generation women had as children, where they were brought up to expect to look after the household, even when they were studying. If participants had ever lived with their in-laws, then the role of looking after the family was especially dominant and it was found to be almost impossible to exercise:

PB: So you mentioned you're in laws family were a bit

Very traditional, my in-laws were a very traditional family.

PB: So did you find that when you got married your activity changed?

Completely.

PB: Completely?

Absolutely completely.

PB: In what way?

It was like total just, revolve round the house and looking after other people, there was no me. So yeah, total change.

PB: That must have been quite a shock?

Yeah it was different, to put it mildly.

PB: So were you living with your in laws?

Yes. In laws, sister in laws, the whole shebang.

PB: And how about after you had children?

Yeah, still – they had this thing about living on top of each other.

PB: On top of each other?

To me it felt like that, it was, they had this thing of always wanting to be together.

PB: The whole family?

Yeah.

PB: How did you find that?

Claustrophobic.

PB: So you said then there was no' me', so if you had time to exercise, would you have been able to do you think?

No time. Absolutely my time was concentrated on cooking three/four meals a day for, and basically running a catering service for the house.

Participant 28, first-generation, age 58, Customer services adviser

6.5 Role of other individual factors acting as a barrier to physical activity

Time was discussed as the by far the most important factor in preventing first-generation women from doing physical activity. The responsibilities of looking after the family and working often meant that they struggled to find the time to exercise, either through walking, going to the gym or classes. All participants did some housework, although it is

difficult to know without observational measurement how vigorous or physical their housework really was.

> *PB: The men and the women – you say the men seem to be taking the sports and the walking more seriously?*
>
> *I think partly the way I have seen it that men are, our generation men, they have never done the housework, so the kitchen or the other things, so now with their retirement, they haven't got any other regular duties which they have to fulfil, and so they are getting more time, while for us, still, we have got those duties of housework and social commitments also fall on our shoulder, and with our generation, we look after our parents, as well as we try to so much look after our grandparents, sorry – the grandchildren, so both of they fall on us, and so we have less time. I have seen all my age women in our community many of them have now grandchildren and they are helping with that and also they are taking burden of looking after the parents. So the time is the major factor which I can say.*
>
> Participant 24, first-generation, age 63, Doctor

6.6 Role of wider societal and environmental factors as a barrier to physical activity

6.6.1.1 Asian television channels

The majority of first-generation participants watched the Asian channels on television almost exclusively, and described these channels as having no physical activity message, with the exception of yoga. The second-generation often described this when talking about their parents:

My dad watches Indian channels which is where I could see it, but as I say, those channels come from India and they don't really push health as much as we do here. It never really comes up, like the people on the screen will be thin but it's not pushed. Like if you pick up a magazine here it's like, lose this many pounds in a week.

Participant 4, second-generation, age 20, Medical student.

One participant described how in the incredibly popular Indian serials, the older generation characters are always fat, while in contrast Bollywood actresses are all slim. It is likely that these TV serials give the impression of 'normality', of representing South Asian people accurately and that this representation inadvertently discourages older people from exercising to lose weight.

PB: Do you watch many of the Indian channels? That you get on sky or virgin.

I watch them all the time! I do follow some programmes yeah.

PB: What about those channels, do they have the same sort of messages about exercise and dieting?

I think Bollywood does. I'm not too sure about those programmes, because in those programmes, I have seen a lot of older women, they are quite big, all the sarees on and the like proper proper makeup and all, they've like sarees and they're quite big and they're always having sweets, like these India sweets – mitai, and stuff like that – any happy occasion and they've always got the sweets out. But Bollywood – Bollywood girls, you know the Bollywood actresses, I think yeah, they're proper slim and proper toned and everything, so I think that would probably influence a lot in Indian girls.

PB: But the serials have got a different

The serials – maybe some of the younger girls inside it, yeah, but you know when you have your mums and the older relatives inside the serial, the extended family, I've seen

them, they're quite big. Especially one of the dramas I think, all the women are quite chubby.

Participant 19, second-generation, age 33, Teaching assistant

Some participants also thought that it would be useful for the first-generation to have Indian role models in the media, for example on the Asian channels that most first-generation Indian women watch.

6.6.1.2 Weather

Many people described the weather as a major obstacle for doing physical activity, citing cold temperatures and rain as weather conditions that would put them off.

I was born in a hot climate, I've been here so many years – perhaps I've been here more of my life than there, but I am still not a winter person. In fact, I keep telling _____ and _____, whenever the subject comes up and we discussing and they say you know, when you retire, what would you do? I say, I'll definitely spend winters in India. That is my ambition – to go to a hot climate in winter [laughs].

Participant 28, first-generation, age 58, Customer services adviser

6.7 Discussion of facilitators and barriers to physical activity in first-generation Indian women

There are a number of studies on motivators and barriers to physical activity in South Asians in general, i.e. regardless of generation. A 2012 review investigated physical activity in South Asian women across the world, bringing together both quantitative and qualitative literature [36]. In their synthesis of the qualitative data, they report that South Asian women

had knowledge of the benefits of physical activity, although there was confusion around how much and what type of physical activity to do. The participants in my study demonstrated having an understanding of the benefits of physical activity. Some women mentioned the recommended guidelines, however all mentioned the old guidelines and all underestimated how much the old guidelines had recommended, indicating that they were also unaware of how much activity they were supposed to do.

The review also described the reported barriers to physical activity in their included studies. These were mainly relevant to the first-generation in my study, with barriers such as feeling pressured to focus on the family above themselves (and therefore their physical activity) and having no time for activity because of these pressures. Difficulties in speaking English were reported in the review, but as all my participants spoke English this was not relevant to them; however, this is an issue that would only be relevant to first-generation migrants, as second-generation South Asian women who have grown up in the UK (or USA or Australia) would speak English fluently.

One participant in my study mentioned that her parents' generation, i.e. the first-generation tended to put up with their illnesses. Qureshi (2013) has written about the concept of 'sabar' in middle-aged migrant Pakistani women. Doing 'sabar' means being strong, suffering silently and being self-sacrificing[149]. Qureshi (2013) describes how the women in her study overtly reminded their friends of 'sabar' when they were in distress and how women who upheld 'sabar' were respected. While this concept was not discussed by any of the women in my study, it is possible that the concept of 'sabar' discourages South Asian women from exercising to alleviate or prevent ill-health, because they may be seen as not upholding their duties. It is also possible that when combined with a lack of understanding

about the amount of physical activity to do, and the pressure to look after the family, the concept of ‘sabar’ may have an effect on the amount of physical activity first-generation Indian women do. Interestingly, Qureshi notes that their daughters who have been brought up in the UK were critical of ‘sabar’, although it is possible that this is because they were not yet married or experiencing difficulties with husbands or extended families.

Other structural barriers mentioned in the review included a fear of personal safety and going out alone. While the women in my study did sometimes alter their routes of travel out of safety concerns, no one reported this being an actual barrier to them. It is possible that this was a barrier for women in the review because of their lack of English and the deprivation of the neighbourhoods they were living in, as some South Asian groups are more likely to live in deprived neighbourhoods[126]. Another barrier reported in the review was the weather; this was frequently mentioned in my interviews by both first and second-generation women, but discussions indicated that bad weather was more likely to prevent first-generation women from going out to exercise than second-generation women.

Only one of the reported facilitators of physical activity in the review was similar to the facilitators identified by my study participants. This was seeing physical activity as a way to prevent or alleviate ill health. In the review, women reported having exercise equipment in the house as helping to overcome barriers. However, in my study participants reported that they hardly used such equipment, even when they had it in their home. One first-generation woman described her running equipment as ‘decoration’. Another described how her daughter used the equipment more than she did herself, as she was too busy with housework. Some second-generation women did report using their exercise bike or treadmill at home, which indicates that these items may be a suitable exercise solution for

younger people or the second-generation. Another facilitator reported in the review was Islam, as physical activity was described as being central to the Muslim way of life. The number of Muslim participants in my study was too small to usefully compare to the literature, but one of the two Muslim woman did talk about how the messages from Islam and the physical activity messages she had heard seemed similar to each other. It is therefore possible that a sample with more Muslim women in would have revealed this as a facilitator.

Jepson et al (2012) conducted a study after the described 2012 review exploring the motivations and facilitators for physical activity in South Asians in Scotland[106]. They did not have any Hindu participants, and they interviewed both men and women; they mostly used focus groups to interview people, except when interviewing key informants. While their study did not distinguish between generations and involved mainly Sikhs and Muslims, many of their findings corroborate with the findings of my study, particularly for the first-generation. Motivations for physical activity included social interaction, and the physical benefits, both of which were mentioned as motivations by the Indian women in my study. However, there were also some differences, which are perhaps related to the fact that their study did not analyse the results according to generation. Participants in the Jepson et al (2012) study reported wanting community or celebrity role-models to help motivate them. In my study, none of the second-generation women reported wanting specific Indian role models, and some specifically answered in the negative when asked directly. Role models did seem relevant to some of the first-generation women in my study, with some of the second-generation proposing that it would be a useful thing for their parents' generation.

Sriskantharajah and Kai (2007) conducted interviews with South Asian women with diabetes, in order to explore their attitudes to physical activity and to improve secondary prevention[150]. Their participants ranged from 26 to 70 years old, although the majority was aged over 40. They reported some barriers that were related to the women's medical condition, but the more general barriers to being physically active were similar to those described in my study. The main benefits of exercise and physical activity were seen as weight-loss and improving physical appearance, which were the same reasons given by the younger participants in my study. Women over 60 in this study also described being motivated by maintaining mobility, which was also mentioned by the older women in my study. Their study also identified the barrier of being expected to prioritise domestic and family duties, and the older women also talked about how some older women thought that to do exercise for oneself, beyond daily work, was selfish. In my study, these attitudes were described by both the second-generation when talking about their mothers, or the first-generation when discussing themselves and their peers.

6.8 Conclusion

The findings from my interviews, in conjunction with the existing literature on facilitators and barriers to physical activity in South Asian women, illustrate the prominent role of Indian cultural values for physical activity in the first-generation of Indian women in England. The Indian culture had an effect on both the type of physical activity that the women did, as well as, at times, limiting the amount of non-domestic physical activity that they did.

In the next chapter I go on to compare the motivations and barriers towards physical activity in the first and second-generation Indian women.

7. Generational comparisons

7.1 Introduction

The previous two chapters have detailed the motivations for and barriers to physical activity in both second-generation and first-generation Indian women currently residing in Manchester. In this chapter, I aim to compare attitudes to, motivations for and barriers to physical activity between the two generations. Four of the nine first-generation women were mothers of a second-generation participant, and so where possible I have drawn out direct comparisons between the mother and the daughter. In addition to direct comparisons within the mother-daughter pairs, I have also made comparisons between the findings reported in the two chapters on the second and first-generations.

The four mother-daughter pairs in this study covered a wide spectrum in terms of their activity levels. In one pair both the mother and daughter were fairly inactive, in another pair the daughter was much more active than the mother, in a third pair both the mother and daughter described a middle-level amount of activity. In a fourth pair the mother was very active, but I had no information on the normal activity level of the daughter. In this fourth pair, as previously described, the daughter was only participating because she was translating for her mother, and while she was willing to answer questions about herself during the interview, she did not wish to participate separately in the full study.

7.2 Defining physical activity and exercise

The first and second-generations tended to define exercise in different ways, although the differences were more related to age, rather than generation. When asked, first-generation women tended to describe exercise as something that is done as part of daily life, through walking and housework, although extra activities like doing sports or going to the gym were

also described. Often the older participants used phrases like ‘physical movement’, ‘moving around’ and ‘moving muscles’. One woman succinctly described what she saw as a difference between herself, the Western world and her daughter.

> *That’s the other thing that the exercise here is, within the Western world definition is more going into the gym or the doing swimming or treadmill and again to bring it back that in my experience, what I saw with my roots in India was that grinding and the ____ and lots of lots of exercises were going which were in our experience or in our mind that those were the exercise or the walking rather than jumping in the car. I’m not saying that we are doing as much exercise as my mother in law or my mom would have been – or were doing it which I saw, but still there are a number of things which we do during the day which I think is exercise which is my definition. Just making your muscles work at a low pace or the fast pace yeah, making your muscles work. And just to give you an example, I don’t want to delay you in your interview but morning when my daughter would wake up, even having a baby just now – very young baby – first thing she’ll ask me, ‘mummy is it ok if I go on the treadmill?’. At the time when I would be doing my exercise when I say exercise – the work in the kitchen – getting the dough ready which my muscles are working making the dough while her priority is, every day I have to go on treadmill so, I think those definitions in our mind or between generation are completely different.*
>
> Participant 24, first-generation, age 63, Doctor

There were exceptions to this however, with some of the first-generation women acknowledging that their daily-life activities were not strenuous.

> *PB: So how do you define physical activity?*
>
> *Making your body work until your heart is sort of beating faster I think, you are breathless. Whereas cleaning and things like that doesn’t make you anything like that.*

Gardening, you're just pottering around in the garden, it doesn't sort of, make you breathless or you know, so I wouldn't have considered it as being exercise.

Participant 26, first-generation, age 57, Systems developer.

In the second-generation, most participants aged under 40 described physical activity and exercise as something that you 'go out and do' such as by going to the gym, a class or doing sports.

PB: So how would you define exercise or physical activity?

To me it would be actually going to the gym or going for a walk, cycling, like you know, yeah I wouldn't do as like my household chores but actually going to do something.

Participant 23, second-generation, age 27, Accounts manager

Some participants explicitly said that they did not consider walking as exercise, as that was just part of their daily life.

PB: OK, so how would you define exercise do you think?

I'd define it as, I think, more than your normal every day exercise, I'd generally consider it as dong sport or physical activity, or like, I wouldn't consider – I wouldn't think of going shopping or walking around town would be exercise. I think it would be something that I'd physically have to – right I need to go and do exercise.

Participant 22, second-generation, age 21, Dental student

Four of the second-generation participants were in their 40s or above. Three of these older second-generation women had a definition of exercise or physical activity that was more

similar to that of the first-generation. The following quote is from the oldest second-generation woman, who moved to the UK when she was ten.

> *It's the movement, isn't it? The more movement you do, any little movement you do is part of exercise, not just going to the gym, so anything what you say on here [points to the physical activity diary], you know gardening, this, doing housework, going shopping, carrying heavy weights, you know that is hard, all that is exercise, so every little thing that you do, is I think, that's part of my definition. Not just being able to go to a gym or a yoga class, is doing your hour and that's your exercise. Everyday movement is an exercise.*
>
> Participant 25, second-generation, age 53, Customer services adviser.

7.3 Influence of cultural gender expectations

7.3.1 Responsibility of looking after family

The expectations of the wife and mother in looking after the family were considerably different between the two generations. The first-generation women discussed how they prioritised looking after the family and cooking above all other activities, with only housework coming first. The second-generation often described their mothers as not having time to exercise because they were busy looking after the family and home.

> *PB: Do you think Hinduism influences exercise at all?*
>
> *Maybe not physical, but I do think it influences things like yoga and like mental exercise and health, you know? So I do think so, but then I think it's just some part of the Hindu culture with the stereotypes that women do this and men do that discourages women I think, from actually focusing on, like, themselves because they have to take care of, like they don't put themselves first, do they? Don't take care of their health so they don't do*

exercise, like, they think about oh they've got their in-laws and then their husband and then their kids, so they'll put all of their priorities first and put them[selves] last.

PB: Do you think that's the same with our generation and our parents' generation?

No, I think our generation – I think we still worry about it less, I think, I think for us because we don't really think about maybe the extended family, it's only just [us] and our husband and then our children. We don't have to take care of all the others, and then usually our husbands are quite independent as well, so I think we haven't got that burden on us that much, so we can focus on us.

Participant 20, second-generation, age 30, Works in family business

For the second-generation, family responsibility was less of a concern, especially for women in the 20 to 24 age group who did not yet have children. This difference became most apparent when first-generation women were talking about the attitude of their daughter's generation (the second-generation). One participant thought it was due to a general change in attitude that has happened over time.

But the mind-set was different then – the time – than it is now.

PB: Yeah. In what way was it different?

Because I think it's in a joint family system in my husband's family, the family was more towards – we didn't used to get loads of Indian food outside, so it was more towards cooking than doing exercises.

PB: So your priority was to look after the food?

It was, look after the food and family, then came yourself.

PB: So food and family, then you.

Then you, yeah.

PB: But you say that's changed?

That's changed because like in my daughter's life I can see that there's a lot of difference now because their priority is more to look after themselves first. Like, she will take time out to do her exercise, and the in-laws would do exercise – they would encourage it as well. So that's changed now.

Participant 10, first-generation, age 58, Teaching assistant

Participants 12 and 7 were mother and daughter. When asked about what she thought her daughter's married life would be like, the mother explicitly said she would be like the British.

I think British women married, the sharing the more like, the husband has to do this. Like in Indian women it's a different culture. Like they think oh I have to do it, not my husband has to do it (laughs). But British women, they are sharing like, half-half. Like I have to cook, my husband has to do the washing, that's what they share, for men and women. Indian women and the British women are like a different culture, that's what I think.

PB: When they get married?

Yeah.

[discussion about related issues]

PB: So if or when your children are married, do you think they'll be more like the Indian mothers or more like the British mothers?

British mother I can say (laughs). They're not Indian mother. 100% British mother that's what I can say.

Participant 12, first-generation, age 50, Customer assistant in a supermarket

7.1.1.1 Marriage

Getting married had a large impact on some first-generation participants, particularly if they had moved in with their in-laws. The traditional role of looking after the family was sometimes more strictly enforced which meant those who wished to take time out for themselves, to exercise or otherwise, were not able to. The second-generation women however, on the whole, did not feel that marriage would affect them, or had affected them.

> *If you think of it community-wise, then maybe if it's classically like mum's at home doing the housework, cleaning, doing all that then, maybe more men are out there exercising, you know, but I'm not really sure what to say about that one.*
>
> *PB: So what you were talking about then, were you talking about Indian people or more generally?*
>
> *I don't know – I think British culture has almost the same – it's maybe not as severe but I think it's still got that whole thing of men – the wife at home, the men are- yeah.*
>
> *PB: But you don't feel that affects our generation?*
>
> *No I don't think so.*
>
> Participant 22, second-generation, age 21, Dental student

Living with in-laws also meant that the participants had to dress more modestly, which sometimes precluded wearing clothing designed for exercise. A second-generation woman from a Sikh family who had lived with her in-laws for a while also described how exercising was difficult while living with her in-laws.

> *PB: Do you think the exercise you do now is quite different to what you did as a kid?*

Yeah I think it probably is. I used to ride my bike, like I said, roller skating and stuff like that. I used to be on a football team and things like that, whereas now, it's just through_____-or maybe a DVD.

PB: So when did all that stop?

I think when I got married really. So.

PB: Was it before you had the kids?

I was living with my in-laws for about three years so, that was – it was difficult to do exercise then as well.

PB: Why's that?

Because you've obviously got to be respectable as well, and stuff like that. I had to wear a scarf so, to take that off because my husband's dad would obviously live in the same house so it was difficult.

PB: Yeah, so you had to cover up?

Yeah.

PB: Do you think that's quite common when you get married, your

Yeah probably. There's a lot of people – so my husband had 4 brothers and sisters and obviously his mum and dad, so there was a lot of people that was in, so it was hard really.

PB: Do you think that's an Indian thing that when you get married

I think so. I think that when you get married things might be a bit easier, but you don't realise you've gone from a - to a different set of rules, of what works for that family.

PB: Do you think that's the same for your British friends and colleagues?

No, I don't think it really mattered or made a difference to them probably.

PB: Do you think it's because you moved to your in-laws – do you think if you hadn't moved into your in-laws it would have made a difference?

I think if I'd had had my own place, and if obviously no children and lots of time then I'd have probably done some, yeah. [laughs]. I did enjoy exercise, but I just don't have the time for it.

Participant 13, second-generation, age 29, Teaching assistant

Some second-generation participants described the struggles they themselves or their friends had experienced while living with in-laws. Tensions came from the different expectations of behaviour between the in-laws and the second-generation women, pointing to a difference in attitudes between the second-generation and some of the first-generation.

7.4 Cultural perceptions of physical activity

Some of the second-generation talked about how they felt there was no difference in the attitude to exercise between the White British population and the British Indian population now.

PB: Do you think there is any difference – or there was any difference between White British people and Indian people in terms of their attitude to exercise?

I'm not sure if I'm honest. I think we're all very similar now. English people go to the gym, we go to the gym. People are more aware of things out there – no I don't think so, I don't think there is a difference.

PB: Yeah. Do you think there ever was a difference?

No, I don't think so. Not now anyway.

Participant 14, second-generation, age 46, Bank clerk

Many people did however think there was still a difference between second-generation Indian women and White British women, but all women said that first-generation women did not do much physical activity outside of the home. They discussed how their parents' generation did not always fully understand the value of exercise and how their mothers had not had many opportunities to be active outside of the home. But because the second-generation had been to school and grown up in the UK, there was now less of a difference in attitude between White British women and the second-generation.

PB: Do you think your parents think exercise is important?

I think my dad does and my mum doesn't.

PB: Can you tell me a bit more about why you think your mum doesn't?

I think like, we've like from school recently, like everyone was pushed to exercise and like the Olympics and everything – they health benefits, but I don't know if she thinks it's that important. I think we've learnt through school and stuff – we've been told how important exercise is and to have an active lifestyle is good for your health, but I don't know if she's had – I don't think she realises that it's probably good for her to do more exercise

Participant 7, second-generation, age 23, Maths student

This participant's mother was also participating in my study. The mother said that while she did not want to join her husband in his sports and activities, even though she knows she could, she did feel that her daily life was more active than her daughter's, and this was related to both her own job and her own responsibilities in the house. This supports her daughter's opinion that the mother does not particularly want to do sports or activities. The daughter herself, (participant 7), did not do sports but did have an interest in yoga and did

attend exercise dance classes. These activities, coupled with her statements about school instilling a sense of the importance of exercise, indicates that this second-generation woman values physical activity, even though she does not do very of it much herself.

7.5 Personal motivations for being physically active

Despite some people saying that physical activity is not valued in the Indian culture, when asked directly, women of both generations thought that physical activity was important and considered it necessary for healthy living.

7.5.1 Socialising

Both generations described wanting company when going for walks, going to the gym or doing sports. Walking or some sports were also seen as a method of socialising with friends and family for both generations.

> *PB: So you think people want company? Is that just true of cycling or do you think that's true of other activities as well?*
>
> *Yeah I think that's true of everything, even going to the gym as well you want to go someone rather than on your own.*
>
> Participant 3, second-generation, advertising student, age 20

7.5.2 Motivations for physical activity

The reasons cited for doing exercise also differed between the two generations. The second-generation mostly talked about maintaining or losing weight and taking time out to do something for themselves.

PB: Have you been going there [yoga] for a while?

On and off. I used to go there a few years ago and then stopped for a while, and then started back again.

PB: What made you start back again?

I think it's more doing something for myself, having time for myself to do something. Because I don't really do anything out on a regular basis. Like my husband goes to the gym, my kids go to the gym but I don't do anything so that was just something for me.

PB: Do you think that's important to do something for yourself?

Yeah definitely. It gets me out with my friends as well, and I think we all enjoy it.

PB: Is there something social about it as well then?

Yeah I'd say so. Because we all go together, we all car-share, it's just fun.

Participant 14, second-generation, age 46, Bank clerk

The first-generation almost exclusively talked about the need to do exercise as you get older.

Some women talked about how, for Indian people, looks do not matter after you are married and about how the older generation is not motivated to exercise for weight loss or appearance, even though this latter observation was not in practice true of the first-generation women in my study. One first-generation women in her 30s described the Indian attitude of a woman's looks not mattering after her marriage as one that contrasts with the British cultural attitude she had observed.

I think ladies over here. I think English born-brought up, they are quite into it. British I mean, I'm talking about British – they are quite active, I'm talking about totally into exercising, but then their culture is totally different. Exercise means – everything is

exercise. Morning you go half an hour exercise, afternoon you go, one hour exercise. That's not Indian culture, you don't get time for those. Even they have so many other busy, they still go and do their exercise. They come back home and again go for a run – [exclaims] aii – we don't do all those things, we don't make that effort to maintain ourselves. I think they have activity in the culture because they want to look good in pubs and they have all this culture isn't it? Going for holidays to Spain, they have to look glamorous. We're not bothered, we don't bother about our looks – once we get married, I don't think so anybody is bothered about our looks. And they say that openly as well. Abhi kya karna abhi? [What do you need to do now?] So it's like – that is major point I think.

PB: Yeah?

After you get married, nobody is bothered about their looks. And therefore they don't go for any exercise or anything.

PB: So do you think up until that point of getting married, people might care?

Yeah yeah. We care about our self and we care, but once we get married, there are so many other things to look into. So you think this is not important, and anyway if I maintain myself there's no point. It's my husband who will be looking at me, so it's ok. [laughs]

Participant 9, first-generation, age 35, Software consultant

7.5.2.2 Health problems

While the majority of the younger second-generation participants were motivated to exercise for looks, some reported that they had also become motivated to exercise for health reasons after their parents developed health problems such as borderline diabetes and heart attacks. A parent developing a serious health problem seemed to bring into focus

the fact that they might be putting their own future health at risk through physical inactivity.

For the older, first-generation, the development of health problems either in themselves or in family members was regularly mentioned as a prompt to start exercising more, specifically, walking was most often taken up. The first-generation discussed the impact of seeing family members die of heart attacks or seeing family members with conditions such as diabetes. This had made them take on board the message that they needed to exercise to remain healthy. Appearance was not mentioned by the first-generation as a reason for losing weight.

> *…..my husband is very much into it.*
>
> *PB: Into?*
>
> *Into activity and all, so he pushed me that you know. It's not only for looking wise, you know you have to be active. Because he also had family history of you know, heart problems in young age, so all these collectively make me to go.*
>
> *PB: Yeah, your family history and all*
>
> *So I was often like, you dieting I always try to lose weight. I was never you know, never a thinny-winny kid like, if you see my [daughter's name], she's like me. My husband is like, thinny-winny. I was never, we are very fond of eating, you know my mother used to cook nice food, so we would always talk of food, food, food, food, so I was always a bit chubby. Even, so, but now I think it is a necessary, not to look good, only for your health and all, so this time I've become serious because my brother in law died, my husband elder brother he died hardly 60s and all, 3-4 years back, so since then, I am sort of.*
>
> Participant 21, first-generation, age 56, Doctor

The fact that in both generations it took the ill health of family members to kick-start physical activity demonstrates that the prospect of future ill-health is not something that motivates most people into doing exercise. It was only when noticing the ageing process in themselves or on observing people around them becoming ill that the prospect of 'future ill-health' became real.

7.6 Impact of school

7.6.1.1 Teaches importance and encourages activity through PE

All participants who had completed some part of their schooling in the UK (this included some first-generation participants who moved here between the ages of 12 and 18) described doing sports and PE lessons in school. The majority of comments were positive, with women saying that although they were not encouraged to exercise at home, this was sometimes because their parents believed that their daughter was getting exercise through PE lessons. School was sometimes the vessel through which people were exposed to new sports and the importance of physical activity. Some women carried on doing these sports as adults, but the majority described stopping doing sports when they left school.

First-generation participants that had been brought up in India often described a lack of facilities for PE lessons, which meant that their exposure to sports was limited in school. Almost all first-generation participants described walking to school, whether in East Africa or India, which combined with housework seemed to have made up the majority of their exercise. First-generation participants who had grown up in East Africa tended to describe better facilities in their schools and were generally more active as adults.

PB: Could you tell me what your parents thought about exercise when you were growing up?

They thought it was important, we were always encouraged to participate and to be mobile it helped a lot, being in a hot country. It was easy to be mobile and obviously with kids and stuff:

PB: That was in Kenya? So did your parents move to Kenya?

Yeah, from India to Kenya, and we were born there –we 2 kids were born there.

PB: So they encouraged you on the whole.

Yeah, definitely. I mean like when I was young I was in school swimming team, I was in - play netball, actively on the team, playing cricket, so and you know, we were always out because the weather was always conducive, we were always out. We were very encouraged to participate.

Participant 28, first-generation, age 58, Customer services adviser

Second-generation participants also described how they had received lessons on the importance of physical activity at school in the UK. No first-generation participant discussed their school directly addressing this issue, even if they had done sports at school.

7.6.1.2 Physical activity after leaving school

While all participants who attended school in the UK experienced team sports at school, very few people had carried on participating in team sports once they had left school. None of the university students interviewed reported participating in team sports as adults, but almost all of those aged 20 to 24 went to a gym, went running or took part in exercise classes. Of the second-generation participants in the older age groups, yoga and walking were the more dominant forms of physical activity outside of housework. From this, it

would seem that while participation in team sports did not carry through to adulthood, the message of exercise being important had been sustained.

Most people had received swimming lessons in school, but not everybody had successfully learnt to swim and therefore struggled with swimming in adulthood; this was sometimes despite taking their own children to use swimming pools. Swimming in some form was mentioned as an activity by many of the participants, over both generations, and was particularly an activity that people took their children to do.

> *PB: Do you think there's a difference between the exercise you do now and the exercise that you did as a child, or in your childhood?*
>
> *Yeah, definitely. When I was a child, it would be more, like we had a lot more like physical education classes, so we'd do a lot more like cross country and like, more sport activities. And like, because we used to be part of, it was easier to be part of a sport team, when you're at school, then at university, so when I was at school I was on the badminton team and the hockey team. But I mean a lot of it is I never really tried to get involved, but like I wasn't ever very good so I never – I just used to go more because a lot of my friends did it, 'oh I'll go and play hockey as well, it's not that bad'. I wasn't too bad at it, I wasn't great though. I think as a child, I feel as well, there was like, so much more time to do all those things, whereas now I feel like I have to plan my exercise ahead, as opposed to just, doing it. So yeah, I think there's a big difference.*
>
> Participant 2, second-generation, age 22, Medical student

The fact that many women did not carry on doing sports once they had left school indicates that the nature of physical education classes in school needs to be improved, or that participating in sports as an adult needs to be easier.

7.7 Influence of the media

The first and second-generation women described watching different media. The second-generation watched both UK channels and the Asian channels available through digital television, while the first-generation described only watching the Asian media. As previously discussed, the second-generation had heard positive messages about healthy eating and physical activity through the Western media. When asked about the Asian channels, some participants described television shows about yoga, but nobody described any other positive messages about physical activity on the Asian channels.

> *I think it's sometimes it's like you read like media as well. There's all these shows about eating healthy and looking good and you know, whereas I think they're more into their Indian TV shows where it's just the same thing over and over again.*
>
> Participant 20, second-generation, age 30, Works in family business

7.7.1.2 Influence of school and the media combined.

Both first and second-generation participants talked about how their experience at school and messages from the wider media or society had taught the second-generation about the importance of exercise for both health and looks. Receiving this message in childhood had had a positive effect on their attitudes as an adult.

The first-generation were either considered to have a neutral or a positive attitude towards physical activity, which meant that the influence of school in the second-generation either provided an opinion where there was none, or reinforced the message coming from home.

7.8 Physical activity in the local neighbourhood

Both generations were aware of local facilities in their area, such as parks and leisure centres. Some of the second-generation women described using local parks to socialise in (though not always through a physical activity), or run in. However, almost all of the first-generation women described parks as being for children, and would only go there with children. While some of the second-generation also described only going to parks with children, this attitude was not as universal. It is possible that a difference in perception the purpose of parks is due to the types of parks that were available to the first-generation when they were growing up abroad.

PB: Are there any parks or leisure centres around here?

Park yeah, around the corner. Just a little park.

PB: Do you ever go there?

I hardly go there – there is a park in the Hanger lane, a bit further like, in the Hanger lane yeah. But I haven't walked at the park.

PB: Why don't you go to the park?

When children were young that time I used to go play with children, they liked to go park, very young children, that time I used to go there. That place swinging and just running round with the park, everything, they like. When they were young children I used to go, but now I don't go park.

PB: So you'd never go without the kids?

No, no.

Participant 12, first-generation, age 50, General assistant in a supermarket

The cost of gyms, classes and travelling to classes was also an issue for some of the second-generation, but the first-generation did not find this a problem. This may have been because the second-generation were younger or students, and so were on a lower income. Some of the first-generation, were living in wealthy areas and so may have had more disposable income. For the few first-generation women who were living in more deprived areas, is possible that they did not consider cost an issue because they did not want to go to the more expensive classes or gyms in the first place.

7.9 Discussion

7.9.1 Changes in the influence of Indian culture

The differing priorities between the two generations and the impact of Western gender expectations on the second-generation indicate that second-generation women have a perspective on their role within society that differs from the first-generation's perspective. While changes in attitudes may not be universal for all second-generation Indian women, the factors described here were common to all the second-generation women in my study. The second-generation of Indian women prioritised physical activity and planned exercise more highly than did their mothers and the first-generation. The mothers often described their daughters as being more like the British, and expected their daughters to prioritise their physical activity when they had a family, something that the first-generation had not done overall, either through choice or because of their in-laws.

7.9.1.1 Collectivist versus an individualistic culture

The Indian cultural system has been described as a collectivist, family orientated one, whereas the British or Western cultural system as an individualistic one[151–153]. In my study, the first-generation women's descriptions of how they prioritise their family above themselves is in keeping with a collectivistic culture, where a person defines themselves in terms of their role within society, rather than as a person separate from society[151]. The first-generation women, who had grown up either in India or East Africa, described putting their children and family first and being taught household skills as a child, in order to prepare them for when they were married. In her book on the culture of India, Henderson (2002) describes the 'world view' of Indian culture, describing the shared system of values and ideas that contribute to India's sense of being a distinct nation, while acknowledging the variety of social classes, religions and ethnic groups within India[153]. Henderson begins by stating that the most important factor in the 'world view' of Indian people is the family and its role as the primary social institution in Indian society[153]. Specifically, for women, they are taught their responsibilities from a young age, and that they will have duties in their husband's home when they are married. All the first-generation women in my study described this and seemed consciously aware of their view that the family is more important than their own physical activity. Some of the women had done planned physical exercise for most of their adult lives, fitting it in around their family responsibilities, and others actively tried to be physically active, indicating that they were all aware of the importance of physical activity, or enjoyed physical activity.

The second-generation women also describe being taught, during childhood, some of these Indian cultural values around the role of women. As adults however, the unmarried women did not feel that they would prioritise their families over themselves in the way they

described their mothers doing, and the married women all saw their own health or appearance as important enough to make time for physical activity. This is perhaps related to the concept of 'sabar' that I discussed in chapter six, where self-sacrifice and not complaining about suffering are seen as good qualities in a woman[149]. In the author's study the adult daughters who are raised in the UK are critical of 'sabar', which is in line with the second-generation women's statements that they would prioritise themselves over their family. The attitudes they expressed during their interviews indicated a more individualistic attitude, which is more in keeping with Western culture. It is possible that having White British friends (which all the second-generation described as having) in school and later on in life, in conjunction with being surrounded by Western media, instilled a more individualistic culture in the women where their sense of themselves is not related to the thoughts or actions of others, but is more internally driven[151]. This difference in how they view themselves may have meant that they were more willing to prioritise their physical activity for their own sake, when compared to the first-generation, who mostly prioritised their family over their own, planned physical activity.

The concepts of individualistic and collectivist culture are useful, however there is a danger of stereotyping people within these concepts. Carsten (2004) discusses how the notion of 'traditional' societies having a collectivist culture may be misleading, because people in these societies can have individualistic identities also. The same is true of Western societies, commonly termed as individualistic, where people can have strong relational identities, such as being a parent[154]. While the first-generation women in my study described prioritising the family over themselves in terms of physical activity, they also described how they thought physical activity was important and some individuals clearly expressed how they disagree with some aspects they describe as belonging to Indian culture. This indicates that while

collectivist and individualistic concepts may apply to some, there are likely to always be exceptions.

It was interesting to note that the first-generation did not see this difference between themselves and their daughters as negative, mostly just describing it as factual. Chadda (2013) describes how in India, the nature of joint families has undergone radical change in the last decade, with there being more nuclear families and with it, a change in the role of women[152]. Huynen et al (2005) have outlined the impact of globalisation on health, and describe how global trade, economic development and social interactions are all changing the lifestyles of populations[155], including those in India. It is possible that this change in India, along with the norm of a nuclear family in the UK has had an impact on the attitudes of the first-generation Indian women currently living in the UK.

7.9.1.2 Drawing on different cultural gender expectations

In the previous two chapters, I discussed how the first and second-generation women in my study ascribed to gender expectations from either the Indian or Western culture, certainly with respect to physical activity, or perhaps a combination of both.

It is likely that the second-generation's adoption of Western gender expectations is related to their adoption of an individualistic sense of self, as the role of the woman in the Indian family is also connected to the collectivistic nature of the Indian culture. This cultural difference between the two generations is likely to be due to exposure to Western media, school and friends during childhood, when a person's sense of identity and gender is being formed. It also useful to consider the concept of intersectionality here. The second-generation Indian women in my study are likely to have Western gender expectations that

are specific to some British Asians, both due to having a childhood in the UK and because they have been taught Indian culture by their parents. Durham (1999) explored how peer group activity and social context affected adolescent girls' interaction with mass media in the United States. She finds that gender identity in the girls was consolidated through peer-groups referencing the portrayals of traditional femininity in the media, though this differed according to class and race[156]. The ethnic minority groups in Durham's study were Latino and African American. Durham describes how the Latino girls did their make-up and hair in a particular way, and that opinions on abortion differed between the ethnic groups, though on religious grounds for some. Durham's findings appear to point to intersectionality, where the way girls interacted with the media and formed gender identities was ties up with their ethnicity and social class. While there were no girls of Asian background in her study, it seems plausible that these findings could apply to teenage Asian girls in the United States. Gillespie (1995) has written about the relationship between television, ethnicity and cultural change in Punjabis aged 14 to 18 living in Southall, London. In her conclusion, she describes how exposure to culturally diverse media encourages British South Asians to compare and contrast cultural norms presented by their parents, by other people in their daily lives and by what they see on the television screen[157]. This exposure to gender ideals in the Western media, perhaps consolidated by their peers at school, may explain why the second-generation of women in my study all appeared to have adopted more Western gender ideals over the traditional Indian gender ideal.

The first-generation all lived with the in-laws after getting married and described a change in lifestyle for themselves. Some women faced major lifestyle changes, with their individual freedoms being severely restricted, whereas others simply became busier. Some of the second-generation women had also found their physical activity to be restricted if they

moved in with their in-laws, but after moving out made efforts to increase their physical activity. One woman also described the tensions her friends had when moving in with in-laws. These descriptions the women gave of conflicts between in-laws and their peers indicate the difference in attitude in the second-generation women from the first-generation women.

Both gender and collectivist or individualistic attitudes help shape attitudes towards the family responsibilities of women. The role of the woman in the home is a large aspect of Indian culture. Attitudes towards prioritising yourself as an individual and looking after the family played an important role in shaping physical activity in the first and second-generation women in my study.

7.9.2 Changes in the definition of physical activity

Older people all saw physical activity as part of daily-life, but younger generation usually defined it as a formal activity. The second-generation all did daily physical activity, but did not mentally count this as contributing to their physical activity.

Rather than being specific to Indian women, it is possible that this actually reflects the age-difference between the first and second-generation women in my study, and feeds into a wider change in attitudes to physical activity in the UK. The older generation view physical activity as coming from daily-life, possibly because daily life was less sedentary when they were younger. Housework was more strenuous and sedentary office-jobs were not commonplace in the first half of the 20th century. The generation that were born in the 1980s or late 1970s (the majority of the second-generation women in my study) have experienced a world where being sedentary during the day is commonplace, and physical

activity must be sought out. Formal physical activity guidelines in the UK did not exist before the 1990s, and since then the UK population has been encouraged to 'fit in' physical activity during their daily-life, implying that our daily lives are not currently active.

It is also possible that because many of the first-generation women perceive their housework to be reasonably exerting, and they spend a lot of their time doing housework, they feel that their daily life is active, which feeds into their definitions.

7.9.3 Ageing and physical activity

The women aged over 25 were motivated to be physically active by health and health scares of those around them, but younger women were motivated almost exclusively by maintaining appearance. Although some of the second-generation women also reported being motivated by seeing their parents having near misses with heart disease and diabetes. They were aware that these conditions are widely prevalent in the South Asian ethnic groups and observing these affect their parents highlighted the importance of being physically active for their health.

A review by Allender et al (2006) aimed to synthesise the literature on motivations for doing physical activity. The authors conclude that younger women were primarily concerned about their body shape and weight-management, but the older adults talked more about the health benefits of physical activity[57]. These issues were almost identical to the ones brought up by the women in my study, suggesting that influences of ageing on physical activity in Western culture are similar to the influences of ageing in Indian culture.

7.10 Conclusion

Indian cultural attitudes only appeared to be a significant barrier for first-generation Indian women, and mostly related to family responsibilities. The effects of school and the media appeared to have a larger impact on second-generation participants, with notions of individuality and their role in the family being different from those of the first-generation. Indian cultural attitudes played some role in influencing the physical activity of second-generation participants when they were children, but a general desire to exercise and knowledge of the importance of physical activity was retained into adulthood. Where first-generation participants had grown up in East Africa, they often described having had facilities to exercise in school, experiencing favourable weather and having no means of transport other than walking. This gives some further insight into the importance of school facilities for physical activity and having opportunities for exercise in childhood.

Some participants pointed to the fact that there has been a general increase in awareness about the importance of physical activity. They commented on the influence of westernisation in India and the increase in the number of gyms there. As with any country or society, attitudes, facilities and the media have changed in India and East Africa since the participants in my study left these places 20 to 40 years ago. Cultures in all societies change over time, and the attitudes to physical activity, both in India and the UK, have changed with time. It is possible that the restrictions and attitudes described by the first-generation women in my study are more pertinent to the time –period they left India; but some were also in touch with the changes in attitude happening in India and so it is possible that their own views have changed over time, as views in India and the UK have changed. Some women also discussed the cultural ideal in which being overweight is valued because it

signifies wealth as being an old idea. The association of fatness with power is not unique to the Indian culture and has also been described in other cultures, for example the Tuareg in North Africa[158]. There was also considered to be an increase in awareness in the UK, with many second-generation participants discussing how their parents had recently become more aware of exercise and health, either through their children being educated or through hearing it through the media. It is possible that the general increase in awareness about physical activity over time has consolidated the childhood experiences of the second-generation, as well as contributing to the physical activity of the first-generation.

The influence of the Indian culture was notably reduced in the second-generation Indian women in my study, as compared to the first-generation. The impact of growing up in the UK was clear, through descriptions on the influence of school and the media on attitudes towards physical activity. The switch in cultures for gender expectations is interesting, and again points to the influence of a childhood in the UK. The implications for this are that public health measures aimed at combating negative gender influences on physical activity are also likely to impact on the second-generation of Indian women.

8. Summary, implications and conclusions

8.1 Summary

8.1.1 Review of research questions

This thesis aimed to answer three main research questions.

1. What are the patterns of physical activity among ethnic groups in the UK?
    a. How does this differ by sex?
    b. How does this differ by age?

2. What aspects of ethnicity influence physical activity choices in the second-generation of Indian women?
    a. How do other aspects of their identity affect their physical activity choices?
    b. What aspects, not related to their identity, influence their physical activity choices?

3. How do they think their physical activity influences compare to the physical activity influences of their parents?

I answered the first question through an analysis of a national dataset, which contains a boosted ethnic minority sample and questions on physical activity. I aimed to answer the

last two questions of the thesis through a qualitative inquiry, conducting and analysing semi-structured interviews.

8.1.2 Summary of central findings

The literature review in chapter two revealed that there is reported variation in physical activity levels within UK South Asians. The second-generation of South-Asian women in the UK seem to be more active than their first-generation counterparts, however despite this, it may be that they are still less active than the general population. Once I had established that there are generational and age group differences in physical activity levels, I went on to explore how and why these differences occur in South Asians in the UK.

8.1.2.1 Generational differences in how South Asians in the UK are physically active

My analysis of the 1999 and 2004 HSE data showed that there are differences in the types of activities that UK South Asians and the White British population do. When looked at as a whole (i.e. not separated by age), Indian women did more housework and less sports as compared to White British women. However, when compared by age group, the levels of sports participation was only slightly lower in Indian women as compared to White British women. In the older age-group, Indian women spent more time doing housework and less time doing walking and sports. This was the same for White British women, although overall they were doing more walking and less housework.

8.1.2.2 Influences and attitudes towards physical activity in two generations of Indian women in Manchester

The semi-structured interviews with Indian women in Manchester revealed that second-generation Indian women are motivated to be physically active by much the same factors that are reported for women in the general population; the same was also true with barriers to physical activity. Lessons on physical activity in school and messages from the media either reinforced positive attitudes towards physical activity, or provided an opinion when women had not received one from their family or parents. The local built environment and the cost of activities also impacted the physical activity of some women.

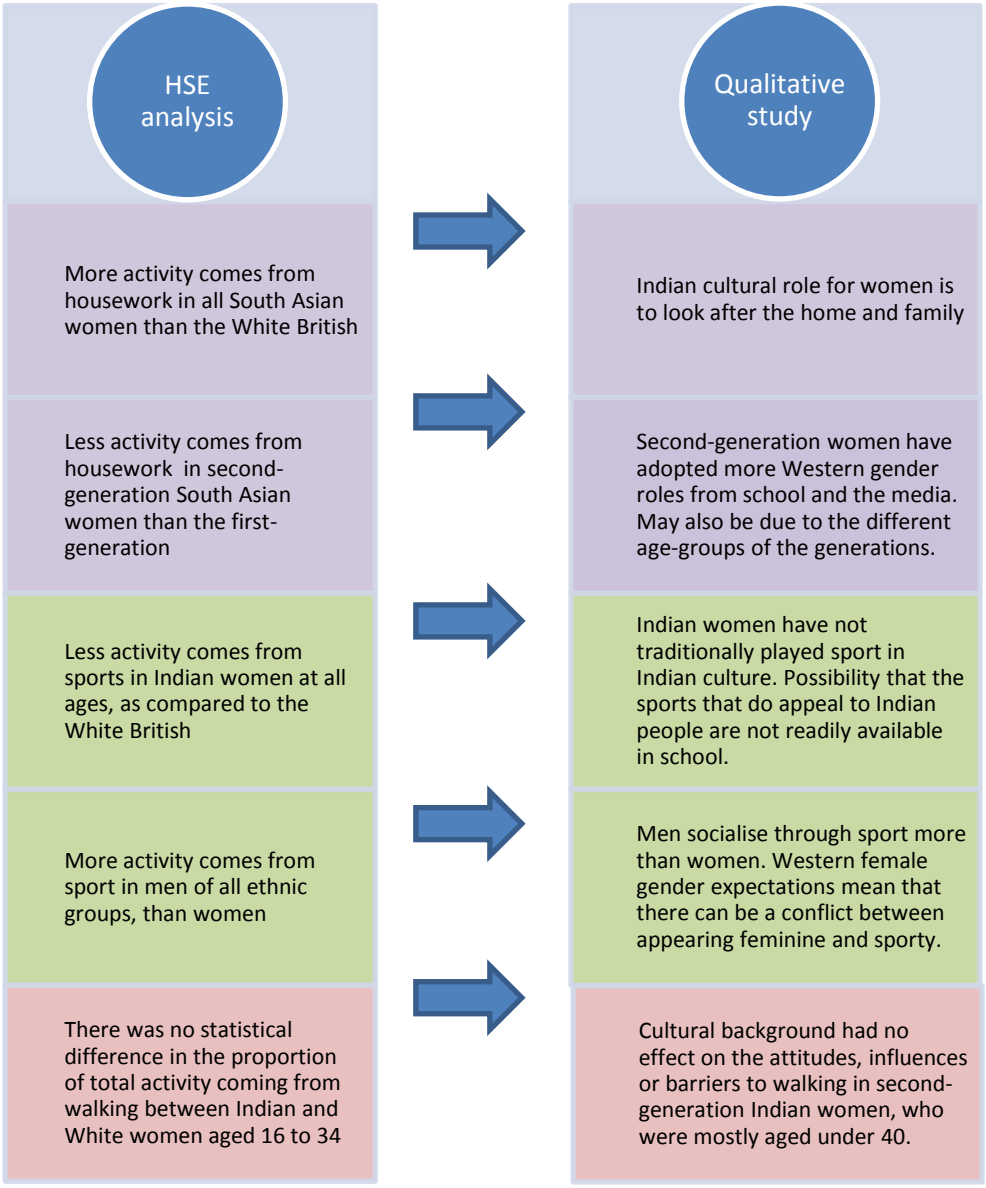
It is possible that there are some differences in the types of leisure-time physical activities that Indian women enjoy, but population level data are needed in order to confirm this. Indian cultural values had an effect on the physical activity of first-generation Indian women, primarily through Indian gender expectations and the role of women after marriage. First-generation Indian women were either neutral to physical activity or actively encouraged physical activity in their second-generation children.

8.2 What do the quantitative and qualitative findings together tell us?

Figure 8.1 summarises the main links between the results of my quantitative analysis and the findings of my qualitative study. The purple boxes relate to housework, the green boxes refer to sports and the pink box denotes walking. My analysis of the combined 1999 and 2004 HSE data indicated that there are differences between age groups and generations in the amount of housework and sports that UK South Asians do, including the Indian ethnic group. This came out quite clearly in the interviews, with many of the second-generation

women describing participation in gym activities and running, which would be included under sports in the Health Survey for England. Many of the first-generation Indian women also described doing a lot of housework, and considered it more strenuous than the housework done by White British people, mainly due to the intensive nature of Indian cooking. While the second-generation did describe doing housework (as measured in the HSE), they usually considered leisure-time physical activity more important than the first-generation did. The HSE analysis also indicated that walking was more related to individual social class than ethnic background. While my qualitative study was only done in one ethnic group, all participants described doing some amount of walking, regardless of occupation or the IMD score of their local area.

Figure 8.1 The links between the quantitative results and the qualitative findings



8.2.1 Strengths and limitations of the overall thesis

In this thesis I have brought quantitative and qualitative methods together in order to get a fuller understanding of generational differences in physical activity in South Asian ethnic groups. Using a mixed methods approach has allowed me to understand not only what the

differences in physical activity are between generations, but also why these differences might exist. Understanding both the nature and drivers of behaviour is what allows evidence-based public health interventions to be developed.

The main strength of the thesis is that I have explored differences in physical activity behaviour within the UK South Asian population. To my knowledge these differences have not been fully explored or reported on previously. The HSE has not previously been used to explore age-group differences in the types of physical activity performed by UK South Asians, therefore mine is a unique piece of quantitative work. My interviews with second-generation Indian women also reveal differences in attitudes to physical activity between the first and second-generations and this too, as I am aware, has not been reported in detail in the qualitative literature to date.

While I have already outlined the limitations of the quantitative and qualitative analyses in the relevant previous chapters, there are some particular limitations from both these pieces of work that could affect the overall interpretation and generalisability of the findings. The major limitations of this thesis concern the date of the HSE years used, the measurement of physical activity in the HSE and the number of interviews I conducted with first-generation women. I used the most recent national survey that had boosted its ethnic minority sample and had collected detailed information on physical activity, but these data are from 1999 and 2004. As discussed in chapter three, the fact that these data are ten years old means that they may not necessarily reflect the current situation. However, when compared to Bélanger et al's (2011) paper on how physical activity changes with age, the physical activity patterns of the White British group in my analysis is similar to that published in Bélanger et

al (2011). Without information on trends for physical activity in South Asians however, it is difficult to know whether activity patterns in this ethnic group have changed.

The measurement of ethnicity and physical activity are also limitations of the quantitative analysis, in that there is a likely to be large measurement error. The HSE measures physical activity using a self-report questionnaire, where respondents are asked to recall their physical activity over the past 4 weeks. It can be difficult to accurately recall physical activity over this length of time and respondents are likely to overestimate their physical activity due to wanting to appear more active than they are, known as social desirability bias[159]. It is difficult to know whether different ethnic groups experience the same social desirability bias and so it is possible that some ethnic groups are less or more affected by this than the White British group. The findings from my qualitative study indicate that younger South Asians have a more Western gender identity when it comes to physical activity, therefore for this age-group there may be little difference in the effect of social desirability bias. Participants in the HSE were asked to recall activities that were done for 30 minutes or more, which may also have been subject to recall bias, as it may be difficult to recall the amount of time they did the activity for. While participants were shown cards with lists of activities as examples, it is possible that the respondents' definitions of activities such as 'heavy housework' differed by ethnic group. Some of the older South Asian women in my qualitative study reported their housework to be tiring, or involving physical activity and so it is possible that there is misclassification bias and that some older South Asian women would consider objectively non-strenuous activities as 'heavy housework'.

In my introduction I critiqued the measurement of ethnicity in epidemiology, however for my own quantitative research I used the same measurement of ethnicity that I had

critiqued. By conducting a secondary analysis of an existing dataset, I was restricted by the data collection methods they had used. In the HSE participants were asked to choose their ethnic group from a pre-defined list, which categorises people according to ancestral country of origin and skin colour. Whilst I would argue that the measurement of ethnicity should to be refined and improved, perhaps by measuring its aspects individually, using the same measurement as other national surveys and published research papers does make it easier to compare results to the published literature.

In the HSE analysis, I examined the impact of occupational socioeconomic status, but I had no information on the local neighbourhood of participants. According to the socioecological model, neighbourhood facilities such as parks and leisure centres could affect physical activity, as well as the walkability of the neighbourhood and its actual and perceived crime rate[160]. As many South Asian people in the UK live in deprived neighbourhoods, it would have been useful to quantitatively understand whether neighbourhood has any effect on the types of activities that UK South Asian groups do. A study by Molaodi et al (2012) examined the relationship between ethnic concentration, neighbourhood deprivation, food and indoor and outdoor physical activity facilities. After adjusting for deprivation, there was an association between density of indoor physical activity facilities and areas with a high concentration of Indian and Pakistani people. For outdoor facilities there was no association for areas with a high concentration of Indian people, but there was for areas with a high concentration of Pakistani and Bangladeshi people[161]. While this does not provide precise information on the impact of neighbourhood deprivation on type of physical activity, it does give some indication that there is a variation in the availability of physical activity facilities between areas with high concentrations of different ethnic groups. While I could not explore the quantitative association of neighbourhood with physical activity type, I was able

to get some information on the impact of the physical and social aspects of local neighbourhood on physical activity through the qualitative interviews.

The majority of the qualitative interviews I conducted were with middle-class, educated women, particularly for the second-generation. It is possible that a sample with more working-class women would have yielded different findings about the impact of ethnic background on physical activity. Ramji (2005) discusses how working-class Pakistani men in Lancashire are more invested in their Pakistani ethnic background than professional, middle-class Pakistani men[162]. The same author has also written about Gujurati women in London who have professional-level jobs, and how these women are able to re-negotiate their roles in the home because they have financial independence[163]. The author also discusses how some of these women felt the need to have an 'ethnically neutral identity' at work, as one way of dealing with racial stereotypes[163 p234]. These two studies show that social class may impact how people negotiate their ethnicity. The role women had at home was an important factor in determining their physical activity in my study. It is possible that second-generation Indian women who were not educated to post-secondary school level would have been more influenced by the traditional roles of Indian women in the home, and so would have been less active. There was some evidence of this in the Sikh women I interviewed, who had begun studying for a post-secondary school qualification in their 20s; they described the difficulties of finding time to be active because they were living with in-laws or had family responsibilities. Despite this however, both of the Sikh women felt it was important to be physically active, indicating that even though social class and Indian culture may affect their ability to be physically active, their British schooling had had a positive impact on their attitudes to physical activity.

The other main limitation of the thesis is in the number of first-generation Indian women interviewed. Under the framework of grounded theory, there is no 'set number' of people who should be included in a qualitative study, rather the aim is to interview people until data saturation is reached, that is, until no new themes emerge from the data. As I only started recruiting first-generation women during the latter part of my recruitment period, I reached the end of my recruitment phase before I had reached data saturation. However, of the nine first-generation women that I interviewed, all reported similar motivations and barriers. One of the women mentioned how racist remarks had affected the route she chooses to walk, and this would have been an interesting theme to explore in future interviews. I would also have liked to recruit first-generation women who did not speak English fluently, Muslim women and those who were on lower incomes, or living in less affluent areas. Including more people with these characteristics would have provided more information on how language barriers, religions and socioeconomic conditions affect physical activity in first-generation South Asian women. I was, however, able to compensate for the lower number of first-generation women by comparing my findings to the available literature, of which, for older South Asian women, there is a satisfactory amount. By combining the findings from my study and those reported in the literature, I was able to compare the motivations for and barriers to physical activity in first-generation Indian women, with the findings from my interviews with second-generation Indian women.

There are a number of different methods of collecting qualitative data. I used semi-structured interviews with individual people, however I could have also carried out focus groups, or taken a more ethnographic approach. The ethnographic approach would have involved me spending more time with participants, observing their daily life and analysing these observations; this would have been in addition to conducting organised interviews

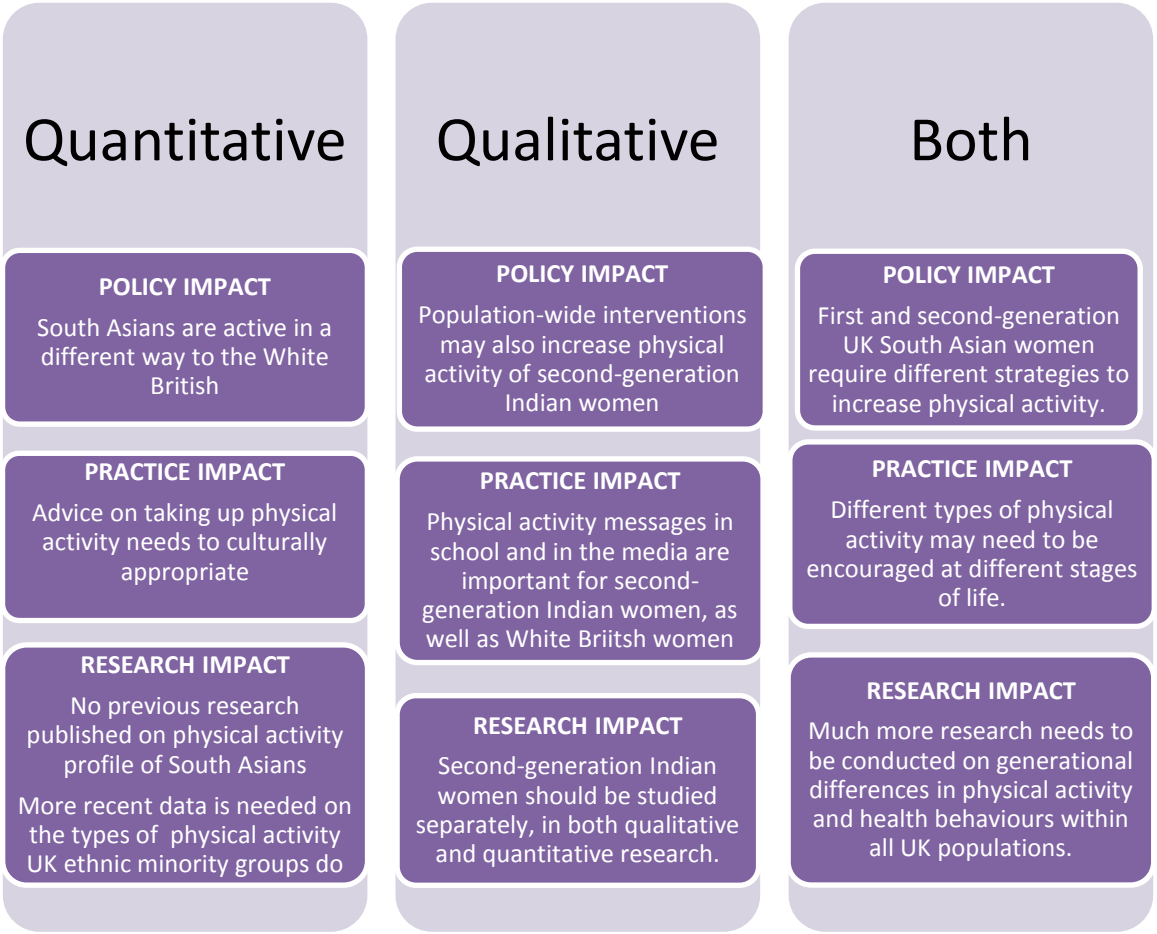
with the participants. The ethnographic method of data collection would have allowed me to gain a fuller understanding of how physical activity fitted in to the participants' lives and gauge the extent to which the accounts given in the interviews matched with their observed behaviour. To do a full ethnography I would have had to leave my job in Oxford, which was the main source of funding for my PhD research. Therefore, unfortunately, I was unable to use an ethnographic approach due to my personal circumstances.

Finally, it is possible that my own skills at qualitative interviewing were a limitation at the beginning of the qualitative project. I underwent training in qualitative methods for this research project as this is the first time I have conducted qualitative research. Although I went on a general introductory course and a specialised qualitative interviewing course, it is likely that my skills as an interviewer progressed as I interviewed more women for the project. This means that the later interviews I did may have been more in-depth and revealing that the first few interviews, where I was still perfecting my interviewing technique. Learning to interview is a process, and it is possible for more experienced researchers to not fully explore research participant' experiences during interviews. While I carried out every interview to the best of my ability, I cannot rule out the possibility of variation in my interviewing skills between the interviews. While it is possible I could have analysed some themes in more depth if some interviews had been more thorough, I feel that my interviews provided enough information to gain a detailed understanding of physical activity in second-generation Indian women.

8.3 Potential explanations for findings and their implications for public health

Figure 8.2 summarises the potential impact of this thesis on policy, practice and research. This section outlines the potential explanations for the findings of my research, which are vital for developing policy and deciding how this will affect the work of public health professionals, and those working in related sectors, such as education and town planning.

Figure 8.2 The impact of this thesis on policy, practice and research



It is possible that differences in attitudes to physical activity were also due to age differences and to variations in childhood experiences. Biological differences between age groups, cultural norms governing the activity of older people, or cultural differences associated with distinct eras in which the different generations grew up, otherwise known

as a cohort effect, are all possible contributors to generational differences in levels of and attitudes to physical activity.

8.3.1 Age differences

Older people in both the White British and South Asian populations do less physical activity than younger people in the same ethnic groups. There are UK physical activity recommendations specifically for people aged over 65, which account for conditions associated with the ageing process, regardless of ethnicity. However 'health scares' in the first-generation motivated both generations of Indian women in my study. Therefore, further promoting the health benefits of physical activity and finding ways to convey the reality of the prospect of future ill-health may help to increase physical activity in South Asian women.

One first-generation woman did describe an Indian or Asian cultural idea that older women can 'slow down' once they have a daughter-in-law to take on some of their domestic responsibilities. While this idea may genuinely exist, it was not mentioned by any other participants in my study and is not reported in the literature on South Asians and physical activity in the UK. A report by the Joseph Rowntree Foundation on perspectives on ageing in UK South Asians, states that South Asian elders expect the younger generation to look after them[164]. This observation may be related to a decline in the domestic physical activity among older women, which contributes the bulk of older South Asian women's physical activity. It is also possible that the idea of 'old' may have different connotations for older South Asian and White British ethnic groups, because life-expectancy in South Asia is much lower than in the UK, and high-quality healthcare not as widely available. Further research would be needed to understand whether and how this impacts physical activity in the first-

generation of South Asian women, and whether the second-generation has different attitudes.

8.3.2 Cohort differences

While this thesis has focused on differences between South Asians who had a British childhood, and those who grew up abroad, some of the reported differences in activity and attitudes may be due to the time-period in which second-generation women were born and raised.

The second-generation Indian women all appeared to be influenced by Western gender expectations, as opposed to Indian ones. As discussed, this is likely to be due to exposure to these attitudes in school and from the media. However the Western gender messages they received during the 1970s and 1980s are likely to be different from the Western gender messages they would have received in school during the 1950s and 1960s. Between these two time periods a significant feminist movement was established, which promoted equal rights and pay for women, and more sexual freedom. The role of a woman in 1950s England shares some cultural factors with the role of women in India today, with the main role of a 1950s English women being to marry, have children and look after the home[165]. It is likely that these expectations affected the physical activity of English women in the 1950s and previously, just as they have affected the physical activity of many first-generation Indian women. A comparison of adverts between the 1990s and the 1950s also demonstrate differences in how women have been portrayed in the media, and ideas about what it means to be feminine.

The second-generation women have also had childhoods in places where local physical activity facilities are available, where it is normal for women to attend these facilities and

where car use for short journeys has become more common. These factors may have affected the development of attitudes to physical activity in the women growing up in the 1980s and 1990s.

Cohort differences between generations illustrate that the wider determinants of health behaviours, such as cost, availability and even social movements can have a significant impact on physical activity.

8.3.3 Impact of the life-course

There are different theories on how childhood experiences affect adult behaviour and health. The two main, complementary theories are that there are critical periods in a person's life which affect their future health, and that people accumulate risk over their lifetime[25].

Hivernsalo & Lintunen (2011) have written an overview on life-course theories and physical activity behaviour, with a focus on accumulation theory[166]. In their paper, they discuss how physical activity has been shown to track throughout life, with those having an active early childhood and adolescence going on to have an active adulthood. However, transitional events in life, such as changing schools, puberty, starting work, getting married or having children all affect physical activity. Earlier events may affect later events, and subsequently the likelihood of physical activity levels remaining fairly stable or changing a lot throughout the lifespan[166]. The paper also reports that transitions and life changes may be good opportunities for health promotion interventions, as people may be more receptive at these times. This theory fits with the descriptions from the women in my study, with many saying that having children and marriage changed their activity levels. Almost all the women also described how they were more active as children than as adults.

The implications for public health are two-fold. Life events affected the physical activity of the women in my study, regardless of generation or age. Therefore directing physical activity promoting interventions at people going through common life transitions is also likely to be beneficial to Indian women in the UK. The second implication for public health is that high levels of physical activity in childhood and experiences of physical activity in school are important. The second-generation of Indian women in my study were all positively influenced by physical education lessons at school, in that even those with low physical activity understood the importance of physical activity for health and wellbeing. While school appears to have had a positive influence on attitudes to physical activity, none of the women in my study regularly participated in team sports. All of the second-generation women did some form of activity, such as using the gym, dancing in some form, walking as a commute, yoga, swimming or using an indoor bicycle. While these are all physical activities, only a minority of the women described their school as being responsible for developing an interest in a particular activity. As discussed previously, it has been reported in the literature that young women often wish there was more choice of activity in school. Widening or changing the physical activity curriculum may therefore be beneficial to both second-generation Indian women and White British women. School clearly has a large impact on physical activity in adulthood, and for the second-generation Indian women was vital for some in developing their positive attitudes towards being active. School is an ideal setting to encourage high levels of physical activity in children, and certain life-events permitting, gives children the best chance of being active as adults.

8.3.4 Acculturation

As discussed in the introduction, acculturation is a difficult concept to measure quantitatively. While adopting a cultural idea is likely to affect health behaviour and physical activity, it is possible that any behaviour associated with cultural beliefs and attitudes is likely to vary according to a person's locality and social networks.

In my study, expectations of femininity were a strong influence on physical activity and the second-generation in my study all appeared to have internalised a Western cultural system in terms of gender. Generally, there was a negative relationship between being feminine and being active, reported in both my study and the existing literature. This means that changing gender expectations around physical activity in the general population is also likely to affect the second-generation of Indian women in the UK.

Norms of femininity come from a variety of sources, including the media, family, friends and school. Some of the women in my study alluded to factors reported in the literature, in that looking sweaty and being sporty is not traditionally associated with being feminine. As discussed, school is a good setting for encouraging physical activity in childhood, and could also be a vehicle for addressing social norms around physical activity in women. The media, both online and elsewhere can be effectively used to deliver health-promotion messages[167], and could be used to help alter social norms[168], such as negative perceptions around physical activity and femininity.

The physical activity of first-generation Indian women is still affected by Indian cultural values around the role of women. Despite social norms, some of the women in my study were open to physical activity, often needing a health scare to motivate them. Some women suggested that having women-only facilities and family-based activities would also help this

group. Nierkens et al (2013) have reviewed the literature to assess the effectiveness of culturally adapted interventions for physical activity and other risk factors. They found that most studies were in the United States and that those that included a range of cultural adaptations and incorporated family values were more likely to have a positive effect[169]. It is also possible that taking advantage of life-transitions could also help this group. The majority of first-generation women in the UK are in the older age groups. Delivering interventions when they or their husbands retire from their jobs or when their children finish school may be opportune times to help this group increase their physical activity. Some of the women were only active when they had someone to be social with, or in order to socialise with their friends. Social or group physical activities are therefore also more likely to appeal to first-generation Indian women. All the women in my study were able to speak English, but those who do not speak English may have slightly different needs in terms of culturally adapting physical activity interventions.

8.3.5 Individual socioeconomic status

All of the second-generation Indian women in my study were at university, had a professional level job or were employed in administrative or intermediate occupations (as classified by the National Statistics Socio-Economic Classification). Smith et al (2012) analysed generational differences within ethnic groups in obesity and behavioural risk factors using the HSE data. They reported that the second-generation of Indian ethnic groups were as likely to have achieved higher-level qualifications as the White British group. Additionally, there was evidence of upward social-mobility for the second-generation; all ethnic groups, with the exception of the Irish ethnic group, had a higher socioeconomic profile than the first-generation[62].

Physical activity levels are known to be socially patterned, with those on lower incomes doing less total physical activity, and those in higher social classes participating in more sport. It would be expected therefore, that the improved socioeconomic status of the second-generation would lead to higher participation in physical activity. While Smith et al's (2012) analysis did show that physical activity was higher in second-generation women as compared to the first-generation, physical activity levels were still lower than in the White British ethnic group. In my analysis of the ways in which South Asian groups are active, socioeconomic status was associated with housework, DIY and sports in the Indian ethnic group, but not walking. When I looked at Indian women aged 16 to 34, more of their total physical activity was from housework and less was from sport, as compared to the White British women; levels of walking were similar. These results from the quantitative analysis tie in with my findings that Indian women are expected to do housework, and it is not traditional for Indian women to do sports.

Some of the second-generation Indian women in my study did report that cost had stopped them from going to classes or joining gyms, indicating that even though they are in a relatively higher socioeconomic class, they may not have high incomes. This may be related to the age of the women I interviewed, in that most were below 40 and many were still students. If cost is still genuinely an issue, either for the Indian ethnic group, or young women generally, subsidises for local classes or gyms may be worth considering.

It was interesting to note that some of the second-generation women felt that their parents had learnt about the importance of physical activity through their daughters being educated in the UK. This again, emphasises the importance of physical activity messages in school.

8.3.6 Local neighbourhoods and deprivation

Twelve of the 19 second-generation women were living in local authorities that ranked in the top two quintiles for high deprivation, and five were living in a local authority that ranked in the two lowest quintiles for high deprivation. Many of the second-generation women were students, which may explain why they were living in areas of high deprivation. All women in both generations were aware of their local parks and leisure centres, however some of the women were concerned about the safety of parks at night. While the second-generation described using parks to socialise or be active in, the first-generation almost all described parks as being for children, indicating a different attitude towards the same facilities.

For other factors, there were no obvious differences between the generations in how their local area affected their physical activity. Both generations talked about walking as a commute and walking to get food or see local friends. In general, issues such as having a large, busy road by the house and not having close enough shops to walk to prevented people from walking in their local neighbourhoods. For activities other than walking, Hillsdon et al (2007) found that more deprived areas in England have fewer indoor physical activity facilities available[170]. While in my study, women in deprived areas did not always report fewer leisure centres, it is possible that a study with more variation in neighbourhood deprivation scores could find this to be a barrier for South Asian women living in more deprived neighbourhoods.

To help address these issues, local governments would need to consider how road plans and high-street developments affects the walkability of their local areas. Smith et al (2010) published a paper exploring the walking neighbourhood of English adults, and found that

perceived neighbourhood boundaries were often smaller than the standard boundaries used in physical activity research[133]. It is possible therefore, that local authority planning may not be taking local people's walking areas into account, and so there are some places within local authorities that are not faithfully evaluated for how changes may impact walking.

8.4 Recommendations for further research

8.4.1 Understanding ways to create an intrinsic value for physical activity in the UK

The second-generation of Indian women in my study often described how physical appearance during physical activity stopped some of their friends from exercising, or made them feel uncomfortable if seen being active in public. Many women also talked about how women socialise in less active ways. As discussed, these issues are related to Western gender expectations of what it means to be feminine, and how being physically active or sporty conflicts with this. The conflict of being feminine and physically active means that for some women, they decide not to do sports or vigorous activities.

The second-generation Indian women in my study all appeared to have adopted the Western gender role when it came to physical activity, therefore it makes sense that interventions on gender expectations aimed at the general population, will also influence the second-generation Indian women. To encourage more women to take up leisure-time physical activity, or more active methods of transport, it may be necessary to address both facilities and gender expectations.

8.4.2 Understanding ways to increase physical activity in first-generation Indian women

The first-generation of Indian women all prioritised their family responsibilities over their own physical activity. To increase physical activity in this group, it is likely that more family-based activities are likely to appeal. Some women also felt that female-only facilities were necessary, as some first-generation women did not feel comfortable being physically active in front of men. Two women also mentioned that the local advertising of facilities did not reflect their personal ethnic background, and that this may have discouraged some people from attending the local facilities.

The first-generation women all watched Asian media channels available through digital television packages, much more than UK media. While there were some reports of yoga and healthy cooking messages, nobody was able to report a message from the Asian media that encouraged moderate or vigorous physical activity. It is possible that this is a ripe area for intervention, as many Asian women watch these television channels and are consequently influenced by the information on them.

Some women also thought that positive role-models would be beneficial for first-generation South Asian women. As many of the second-generation women did not feel the need for Asian-specific role models for physical activity, it would be important that any role models were aimed at the older, first-generation. The Asian media channels could also be used to promote relevant role models, perhaps in conjunction with positive physical activity messages.

8.4.3 Exploring physical activity influences in other UK ethnic groups

In this thesis, I have explored the differences in physical activity behaviour within South Asian groups, with a focus on Indian women. Pakistani and Bangladeshi women in the UK are known to do even less physical activity than women of Indian origin, therefore it would be useful to also explore generational differences in these two ethnic groups. Pakistani and Bangladeshi women are also more likely to be in a lower socioeconomic status household and live in a deprived area, which may have a strong effect on physical activity. The two Muslim participants in my study also indicated that Islam has an influence on physical activity, therefore interviewing these two groups may give more insight into the role of religion.

The Black Caribbean population in the UK is often measured as being more active than all other ethnic groups, including the White British. A qualitative study which aims to understand why this is the case would be useful in learning what might help increase activity in the rest of the population.

8.4.4 Exploring generational differences in diet and alcohol use

This thesis focused exclusively on physical activity, however poor diet, alcohol and tobacco use are also significant risk factors for CVD, cancers and mental health problems, which are some of the largest causes of mortality and morbidity across the world. It would be useful for a study comparable to mine to be carried out, with a focus on these risk factors. This would help us to find out whether the changes seen in physical activity behaviour are also present in these other risk factors. The roles of gender expectations, religion, cost and availability are likely to be different for the different risk factors, which in turn will have an effect on the interventions that are developed to improve these risk factors.

8.4.5 Measurement of ethnicity in epidemiology

As discussed in the introduction, the epidemiological measurement of ethnicity is quite crude, despite a nuanced definition. This research has shown that there are differences in behaviour within ethnic groups that are masked by the current measure of ethnicity. Religion, cultural expectations of women, other social norms and racism are all aspects of belonging to an ethnic group that may affect physical activity (and other health behaviours). However, the current measurement does not allow for any of these factors to be assessed. Multiple questions on ethnic background may therefore be more useful when directly exploring differences between ethnic groups, as this would then allow a more thorough understanding, at a quantitative level, of why any differences between ethnic groups might exist. Given the strong impact of UK schooling and media, it may also be worth considering measuring whether people have attended UK schools during young childhood.

8.5 Dissemination strategy

In August 2014 I attended a 'Roundtable Discussion' on physical activity in ethnic and religious groups which was organised by Public Health England. The aim of this meeting was to contribute to the National Physical Activity Implementation Framework, which is being launched by the Minister for Public Health in October 2014. During the discussions I was able to share the results of my thesis, emphasising the need for consideration of age-differences within ethnic groups. Charity groups working with South Asian groups in the UK also attended the meeting and verbally corroborated my findings that the younger, second-generation of South Asian groups have a different attitude to physical activity as compared to the older, first-generation groups.

Within the next year I aim to have published four papers from this thesis in peer-reviewed journals. By publishing these papers, I intend to add knowledge about the physical activity of second-generation UK South Asians and in what ways they are different to the first-generation.

1. A review of the literature on physical activity prevalence in younger UK South Asians. International Journal of Behavioural Nutrition and Physical Activity.
2. A review of the literature on physical activity in younger UK South Asians: motivations and barriers. BMC Public Health.
3. The physical activity profile of UK South Asians. Journal of Epidemiology and Community Health.
4. Attitudes, motivations and barriers to physical activity in second-generation Indian women. Social Science and Medicine.

8.6 Conclusions

I have demonstrated in this thesis that there are generational differences in physical activity within UK South Asian ethnic groups. The differences between generations are in not only the amount and way that they exercise, but for the Indian women I interviewed, also in their attitudes to exercise. This understanding of not just how, but why the second-generation differs from the first-generation is key to developing appropriate and targeted interventions. Addressing inequalities in health and health behaviours is vital if we aim for the whole population to be healthy but it is important that resources are directed in a cost-effective and, if possible, evidence-based manner.

In 2011, the UK census reported 43% of the Indian ethnic group living in England and Wales as having been born in the UK, 83% were aged under 55 and 18% were aged under 16. The Indian ethnic group is therefore still relatively young, and has the potential to increase their physical activity to reduce significantly their chances of ill health. The second-generation of Indian women in my study were strongly influenced by their British school and the media in their attitudes to physical activity, which were very similar to those of the majority White British population. There is ongoing research to learn which culturally tailored interventions may be the most effective[169], which is necessary for some South Asian groups . Culturally tailored interventions may still be necessary for the first-generation, and perhaps some of the second-generation Indian women, who are older or who have particular religious beliefs. However, this thesis has shown that there are population-wide interventions that would have a beneficial effect on the physical activity of second-generation Indian women in the UK, and possibly other UK South Asian groups.

To help increase the physical activity of second-generation Indian women, and White British women, it may be necessary to use a variety of approaches. The existing literature reports young women wanting more choice of sports in school, but at the same time feeling that being sporty and looking sweaty is at odds with their femininity – as was also reported in my interviews. Schools and local authorities may need to offer a wider variety of sports, and keep teaching the message that physical fitness is important for health. Diverse methods including mass media campaigns are necessary to address the nature of femininity. As cultural norms about femininity exert a strong influence on the physical activity of both young Indian and White British women, I would argue that shifting Western notions of femininity would be incredibly beneficial to the physical activity of young women in the UK, regardless of their ethnic background.

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