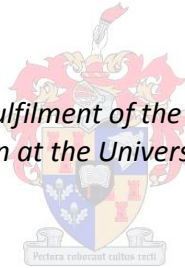


**Exploring the obesogenic environment and  
behaviour in adolescents  
A qualitative study, in the Cape Town  
Metropole of the Western Cape**

by  
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*Thesis presented in partial fulfilment of the requirements for the degree  
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## DECLARATION

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Laura Berry

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## **ABSTRACT**

### **BACKGROUND**

Obesity is now seen as a global pandemic in adults and children. There are many factors that are understood to have an impact on the obesogenic environment for adolescents including those that affect physical activity and nutrition at different levels of the socio-ecological model. However, much more needs to be understood about this complex phenomenon, to tailor programmes for adolescent health needs and address the growing SA adolescent obesity problem.

### **AIM**

The aim of this study was to perform an assessment of school nutrition policies and programmes in the context of the Integrated School Health Policy (ISHP) and in relation to adolescents and the obesogenic environment in urban areas of the City of Cape Town. This was done by engaging with stakeholders and learners through a participatory approach to identify opportunities for having an impact on obesogenic behaviour.

### **METHOD**

This was a qualitative study that made use of focus-group discussions (FGDs) for school learners and individual in-depth interviews (IDIs) for members of the school health team to engage with relevant stakeholders. Seven schools took part in the study. Fourteen FGDs and twenty-one IDIs were held. A boy and girl FGD of 8–12 participants was held at each school. Participants for the IDIs were purposively selected from members of the school health team including: principals, life orientation (LO) teachers, parent-teacher association (PTA) representatives, counsellors and food service managers. The data was audio recorded and transcribed using a transcription service. The raw data was analysed using the qualitative software package *Atlas.ti 8*. Content analysis was performed and the ‘thematic analysis’ approach was employed to interpret the data.

### **RESULTS**

There are many factors that affect the obesogenic environment for urban SA adolescents from Cape Town. The main physical-activity barriers include: intrapersonal factors (feeling lazy, not enough time, low self-esteem and not enjoying the feeling of exercise); interpersonal factors (lack of role models, lack of parental support and not wanting to be a nuisance to parents); environmental factors in the school (lack of resources including school sport facilities and sports equipment); and community safety (gang-related crime).

Physical-activity enablers include: intrapersonal (enjoying the feeling of exercise and finding it fun); interpersonal (team spirit and camaraderie); and environmental factors (school sport facilities and equipment; community fun walk/runs). The main barriers to healthy eating include: intrapersonal (taste preferences, knowledge and psychological); interpersonal (working parents); and environmental aspects, such as easily available (tuck shops, fence vendors, fast-food outlets) and accessible (cheap) unhealthy junk food, together with the limited availability (fewer items in tuck shop) and inaccessibility (more expensive) of healthy food. Opportunities for healthy eating include: intrapersonal (taste enjoyment of healthy foods), together with limited environmental factors (provision of healthy foods by home, feeding schemes and some tuck shops).

Further to these findings, there appear to be several gaps in the implementation of the ISHP within the school environment, particularly with regards to nutrition policy awareness/knowledge, implementation, monitoring and collaboration.

## **CONCLUSION**

Findings from this study highlight several obesogenic barriers and enablers having an impact on adolescent physical-activity levels and nutrition. The main factors that emerged are at the environmental (school and community) level, including food security and accessibility of physical activity. The results of this study should be shared with the Departments of Health and Education as a matter of urgency. Further research is needed to identify the best ways to overcome the identified barriers and use the enablers to curb the growing problem of obesity.

## **OPSOMMING**

### **AGTERGROND**

Vetsug word tans beskou as 'n globale pandemie in volwassenes en kinders, met die hoogste vlak in Suid-Afrikaanse adolessente ooit. Daar is talle faktore wat bydra tot die impak op die vetsug-omgewing vir adolessente wat weer bydra tot die invloed op fisiese aktiwiteite en voeding op verskillende vlakke in die sosiaal-ekologiese model. Daar is egter veel meer om te verstaan oor hierdie komplekse verskynsel met die oog daarop om die groeiende vetsug probleem onder Suid-Afrikaanse adolessente aan te spreek en programme aan te pas vir adolessente se gesondheidsbehoefes.

### **DOEL**

Die doel van die studie was om die skool se beleide en programme ten opsigte van voeding in die konteks van die Geïntegreerde Skool Gesondheidsbeleid (GSBG) te assesser teenoor vetsug in adolessente in die stedelike gebiede in Kaapstad. Die studie is gedoen deur belanghebbendes en leerders te betrek in 'n deelnemende benadering om sodoende geleenthede te identifiseer om 'n impak op vetsug gedrag te maak.

### **METODE**

Die kwalitatiewe studie het gebruik gemaak van fokusgroepbesprekings (FGB) vir skoolleerders asook individuele in-diepte onderhoude (IDO) met lede van die skool se gesondheidspan om sodoende die deelnemende belanghebbendes te betrek. Sewe skole het deel uitgemaak van die studie. Veertien FGBs en een-en-twintig IDOs was gehou. 'n Seuns en meisies FGB met agt tot 12 deelnemers was gehou by elke skool. Deelnemers vir die IDO's was doelbewus geselekteer van die skool se gesondheidsgroep wat insluit: skoolhoofde, lewensoriëntering onderwysers (LO), verteenwoordigers van die ouer-onderwysersvereniging, beraders en voedseldiensbestuurders. Oudio-opnames is getranskribeer met die hulp van 'n transkripsiediens. Die rou data was geanaliseer met die gebruik van die kwalitatiewe sagteware program '*Atlas.ti 8*'. Inhoudsanalise was uitgevoer en die 'tematiese analise' benadering was toegepas om die data te interpreteer.

## RESULTATE

Daar is vele faktore wat 'n rol speel in die impak van vetsug onder adolessente in stedelike gebiede in Kaapstad. Van die hoof fisiese hindernisse sluit in: intrapersoonlike - (om lui te voel, nie genoeg tyd nie, lae selfbeeld en om nie die gevoel van oefeninge te geniet nie), interpersoonlike - (gebrek aan rol modelle, gebrek aan ondersteuning van ouers en om nie 'n oorlas te wees vir ouers nie), en omgewings-faktore in die skool en die gemeenskap (gebrek aan hulpbronne, insluitende skool fasiliteite en sporttoerusting asook bende-verwante misdade).

Fisiese aktiwiteite se bydrae sluit in: intrapersoonlike - (geniet die gevoel van oefeninge), interpersoonlike - (spangees en kameraadskap) en omgewings-faktore (skool sport fasiliteite en toerusting; gemeenskapspretlope/wedrenne). Die hoof struikelblokke tot gesond eet sluit in: intrapersoonlike - (smaak voorkeur, kennis en sielkundige aspekte), interpersoonlike - (werkende ouers) en omgewingsaspekte soos maklike beskikbaarheid (snoepie, straatmouse, kitskos afset punte) en toeganklikheid (goedkoop) van ongesonde gemorskos tesame met die beperkte beskikbaarheid (minder items in die snoepie) en ontoeganklikheid (duurder) van gesondheidskosse. Geleentheid vir gesond eet sluit in: intrapersoonlike - (geniet die smaak van gesonde kos) saam met beperkte gemeenskapsfaktore (voorsiening van gesonde kos by die huis, voedingsprogramme en sommige snoepies).

By verdere ondersoek blyk dit dat daar vele gapings in die implementering van die GSGB in die skoolsomgewing is, met spesifieke verwysing na beleide, bewustheid/kennis, implementering, monitering en samewerking vir voeding.

## GEVOLGTREKKING

Bevindinge in hierdie studie het vele struikelblokke en hulpmiddels wat 'n impak het op adolessente se fisiese aktiwiteite en voeding in die konteks van vetsug, uitgewys. Die hoof faktore wat na vore gekom het, is die omgewing (skool en gemeenskaps-vlak), insluitende voedselsekuriteit en toeganklikheid tot fisiese aktiwiteite. Die uitslag van hierdie studie sal gedeel word met die Departemente van Gesondheid en Onderwys as 'n saak van dringendheid. Verdere studies is noodsaaklik om die beste roete te identifiseer om hierdie struikelblokke te identifiseer en om die hulpbronne te gebruik om die groeiende vetsug probleem te bekamp.

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**CONTRIBUTIONS BY MEMBERS OF THE RESEARCH TEAM**

Members of the research team and their roles in the study

<b>TEAM MEMBER</b>	<b>AFFILIATION</b>	<b>ROLE IN STUDY</b>
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Professor Blaauw	Stellenbosch University Faculty of Medicine and Health Sciences	Supervisor: Developed the research idea and designed Phase-1 of the study Provided input at all stages and revised the protocol and thesis.
Professor Du Plessis	Stellenbosch University Faculty of Medicine and Health Sciences	Co-supervisor: Developed the research idea and designed Phase-1 of the study Provided input at all stages and revised the protocol and thesis.

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## ABBREVIATIONS

BMI	Body mass index
CSTL	Care and Support for Teaching and Learning
DBE	Department of Basic Education
DBST	District-based support team
DOH	Department of Health
EFA	Education for All
FG	Focus group
FGD	Focus-group discussion
GHO	Global Health Observatory
HPS	Health-promoting school
HREC	Health Research Ethics Committee
IDI	In-depth interview
INP	Integrated Nutrition Programme
ISHP	Integrated School Health Policy
MDG	Millennium Development Goal
NCD	Non-communicable diseases
NFCS	National Food Consumption Survey
NGO	Non-Governmental Organisation
NSNP	National School Nutrition Programme
PA	Physical activity
PHC	Primary Health Care
PI	Principal Investigator
RMCH	Reducing Maternal and Child Mortality through Strengthening Primary Healthcare

SADHS	South African Dietary Health Survey
SANHANES	South African National Health and Nutrition Examination Survey
SEM	Socio-ecological model
SGB	School Governing Body
WHO	World Health Organisation
YRBS	Youth Risk Behaviour Survey

**CHAPTER 1: INTRODUCTION**

Obesity is now seen as a global pandemic in adults and children<sup>(1-3)</sup>. According to the WHO, the prevalence of obesity worldwide, has nearly tripled between 1975 and 2016. Approximately 1.9 billion adults aged 18 years and over were reported overweight, 650 million of whom were obese. Approximately 340 million children and adolescents aged 5–19 years are reported to be overweight or obese (WHO GHO report).

Obesity is a complex phenomenon, with a multi-factorial aetiology<sup>(4,5)</sup>. It significantly increases the risk of numerous non-communicable diseases, including: diabetes, cardiovascular disease, hypertension, stroke, musculoskeletal problems and certain types of cancer<sup>(6,7)</sup>. It affects almost all age groups and socio-economic classes, in both developed and developing countries<sup>(8,9)</sup>. The WHO has estimated that around a third of heart disease and ischaemic stroke is attributable to excess adiposity (WHO GHO report). Further to this, overweight and obesity are associated with an increased risk in 13 different types of cancer and in 2014, obesity accounted for 40% of all cancers diagnosed in the USA<sup>(10)</sup>. The consequences of obesity extend beyond the physiological health risks, to debilitating psychological health outcomes<sup>(11)</sup> including social discrimination and low self-esteem<sup>(6)</sup>.

Child and adolescent obesity are also dramatically on the increase. In the last 25 years, the global prevalence of overweight and obesity in 5–19-year olds has more than tripled from 4% in 1975 to 18% in 2016 (WHO GHO report). There have been similar increases in both girls (18%) and boys (19%). Further to this, there has been a 6-fold increase in the global prevalence of obesity from 1% in 1975, to 6% in 2016, putting the figure of obese children between the ages of 5–19 years, at approximately 124 million (WHO GHO report).

It is now well established that childhood obesity, like adult obesity, is associated with physiological, social and psychological health problems<sup>(12,13)</sup>. As well as the increased risk of complications in the short term, such as breathing difficulties and sleep apnoea, and orthopaedic complications like fractures, there is also evidence to support the adverse effects of intermediate health like hypertension, raised early markers for heart disease, insulin resistance and socio-psychological problems. In addition, of serious concern, is the large body of evidence to support that child and adolescent obesity leads to 'adverse consequences of premature mortality and morbidity in adulthood'<sup>(13,14)</sup>. Some findings suggest that childhood obesity may inversely affect the relationship with education attainment and therefore children's ability to reach their full education potential and subsequently their socio-economic status<sup>(15,16)</sup>.

Until more recently, adolescent health and obesity has received little attention in comparison to child health. However, the life phase of adolescence is increasingly being recognised as an opportunistic time for influencing adult health patterns<sup>(17)</sup>. With their own changing physiological<sup>(18)</sup> and behavioural needs<sup>(19)</sup>, adolescents are a vulnerable population group, further predisposed to the potential health risks of the implications of obesity. In light of the growing obesity statistics, co-morbidity statistics and premature mortality rates<sup>(13)</sup> in adolescents, the reduction and prevention of adolescent obesity is increasingly being seen as a priority, crucial to optimising the health of the individual, reducing the burden on health systems as well as having economic and transgenerational benefits.

In South Africa, as in other developing countries undergoing demographic, epidemiological and nutritional transition, the nutritional status picture is complex<sup>(20)</sup>. These transitions are leading to the paradoxical co-existence of under- and over nutrition. Further to this, the problem of obesity in South Africa, consistent with the global picture, is that there is a consequential change in disease profile from one of predominantly infectious diseases to increasing prevalence of chronic degenerative disease, including nutrition-related non-communicable diseases (NCDs) such as diabetes, cardiovascular disease and certain cancers<sup>(21–23)</sup>.

In recognition of this serious global health concern, several guidelines outlining ways in which to address child obesity, have been published around the world, including in, for example, the European Union<sup>(24)</sup>, the United Kingdom<sup>(25)</sup>, Australia<sup>(26)</sup> and South Africa<sup>(27)</sup>. The European Union launched 'The EU Action Plan on Childhood Obesity 2014–2020' in order to halt the rise in obesity in children from 0–18 years of age<sup>(24)</sup>. This plan acknowledges the rising trend in childhood obesity and the negative health consequences thereof. It also provides direction in terms of healthy environments, including: access to healthy meals particularly in schools and space to play; supporting families; and marketing guidelines for foods that are high in fat and sugar<sup>(24)</sup>. The National Institute for Care and Health Excellence (NICE) in the UK published a public-health guideline in 2013, outlining the importance of taking action for child obesity and how child obesity should be addressed<sup>(25)</sup>. The 2013 Australian government guideline focuses on obesity assessment, advice, support and follow-up, as well as the need for further research. In SA, the DOH launched the 2015–2020 strategy to address obesity, highlighting this growing concern as well as the drivers and the multi-sectoral approach required in order to address it effectively<sup>(27)</sup>.

The Integrated School Health Policy (2012), is the current South African school health policy<sup>(28)</sup>. This document outlines the role of the respective departments in addressing the health needs of learners, including adolescents. The policy was drawn up following the former president's commitment in 2010, to re-instate school health programmes in public schools in SA, using the 2003 National School Health Policy as its foundation. Underpinning the nutrition component of the reviewed policy is nutrition assessment and education with the view to promoting healthy weight through physical activity and healthy nutrition. Despite this renewed interest in childhood health, the prevalence of obesity in SA adolescents is at its highest yet<sup>(29)</sup>.

Qualitative research is instrumental in helping us to understand the 'how' and 'why' of human behaviour. It can provide invaluable information about food- and exercise-related behaviour. There is a dearth of qualitative research in SA looking at obesity in the adolescent life phase. To address this major public-health concern, much more needs to be understood about the urban adolescent obesogenic environment that is locally and culturally specific, in order to be able to better inform policy makers for the development of adolescent public-health initiatives and programmes. This backdrop provided the motivation to undertake the study reported here.

## CHAPTER 2: LITERATURE REVIEW

### 2.1 OBESITY

#### 2.1.1 Definition

The WHO definition of overweight and obesity is ‘an abnormal or excessive accumulation of fat that may impair health’<sup>(30)</sup>. BMI is the simple index of weight-for-height that is commonly used to classify overweight and obesity in adults ( $\text{kg}/\text{m}^2$ ). For children between the ages of 5–19 years, the WHO classifies overweight as ‘BMI for age more than one standard deviation above the WHO Growth Reference median’, according to the WHO Growth Reference charts. Obesity in children between 5–19 years of age, is defined as a ‘BMI greater than two standard deviations above the WHO Growth Reference median’ (31). However, these childhood and adolescent definitions are not universally applied and, therefore, there are often different interpretations within the literature.

#### 2.1.2 Global statistics

In 2016, approximately 13% of the world’s population were estimated as obese, 15% of these being women and 11% being men, meaning approximately 650 million adults were obese (WHO GHO). Approximately 39.1% of adults were reported to be overweight (WHO GHO). The situation is even more concerning in children and adolescents (5–19 years), with the prevalence of overweight and obesity increasing more than 4-fold between 1975 to 2016 from 4% to 18% (WHO GHO).

#### 2.1.3 South Africa statistics

Of concern, is the dramatic increase in prevalence of overweight children and adolescents in South Africa, which over the last 25 years, has increased by 21.3%. Table 2.1 demonstrates the increases in prevalence of overweight and obesity in several developed and developing countries. Of further concern is the number of obese children in South Africa, between 5–19 years of age, which has increased by 10.9%.

**Table 2.1: Prevalence of overweight and obesity in children and adolescents (5–19 years), in several developed and developing countries in 1991 and 2016 (WHO GHO)**

	Prevalence of overweight (1991)	Prevalence of overweight (2016)	Prevalence of obesity (1991)	Prevalence of obesity (2016)
<b>Australia</b>	25.5%	34.1% (+8.6%)	6.7%	12.4%
<b>USA</b>	28.7%	41.8% (+13.1%)	11.6%	21.4%
<b>UK</b>	23.8%	31.1% (+7.3%)	5.9%	10.2%
<b>South Africa</b>	3.4%	24.7% (+21.3%)	0.4%	11.3%

Table 2.2 indicates the prevalence of overweight and obesity for girls and boys (5–19 years of age) in South Africa in 1991 and 2016. Girls increased from 6.2 to 31.6% (>4-fold increase) and boys increased from 1.6 to 19.9% (>12-fold increase).

**Table 2.2: Prevalence of overweight and obesity in girls and boys (5–19 years) in SA in 1991 and 2016 (WHO GHO)**

	1991	2016
<b>Girls</b>	6.2% (3.4–9.7)	31.6 (23.2–40.9)
<b>Boys</b>	1.6% (0.7–3.1)	19.9 (12.6–29.1)
<b>Total</b>	3.9% (2.4–5.8)	25.8 (20–32.1)

According to the South African National Health And Nutrition Examination Survey-1 (SANHANES-1) conducted in 2012, females in the age group 15–17 years of age had a mean BMI of 23.0kg/m<sup>2</sup> and for those in the 18–24 years of age category 26.2 kg/m<sup>2</sup>; while males between 15–17 years of age had a mean BMI of 20.4kg/m<sup>2</sup> and for 18–24 years of age 21.3kg/m<sup>2</sup> <sup>(29)</sup>. The mean prevalence of being overweight for males 15–17 years of age was 7.3% and 5.8% for 18–24 years of age; while the prevalence of obesity in males 15-17 years was 1.5% and in the 18–24-year group was 4.2%. For girls between 15–17 years the mean prevalence of overweight was 19.3% and for those 18–24 years 25.3%; while mean obesity prevalence for 15–17 years was 8% and 18–24 years 21.7% (SANHANES-1)<sup>(29)</sup>.

Similar to these figures are those of the third and most recent South African Dietary Health Survey (2016)<sup>(32)</sup>. Of the male adolescents between the ages of 15–19 years surveyed, 8.6%

had a BMI of equal or greater than 25kg/m<sup>2</sup>, i.e.: overweight or obese; and for girls between 15–19 years, 27% had a BMI that was overweight or obese (SADHS, 2016). (Weight statistics for adolescents 10–14 years were not collected).

Further to these surveys, of particular concern was a finding by Van Niekerk *et al.*, in 2014<sup>(33)</sup> from a cross-sectional study conducted in the Cape Metropole of the Western Cape, to determine the prevalence of underweight, overweight and obesity in adolescent girls and boys 13–18 years of age. The highest prevalence of obesity was found in 15-year-old boys (11.1%), nearly 10% greater than the 2012 national figure and the highest prevalence of overweight was found in 17-year-old girls (22%). Both these figures are higher than those reported in the 2012 SANHANES. Reddy *et al.*, studied the prevalence and correlates of overweight and obesity among participants of the South African National Youth Risk Behaviour Survey in 2002 and 2008<sup>(34)</sup>. Their findings were consistent with the above and they also added that overweight and obesity were higher in urban youth than rural youth<sup>(34)</sup>.

#### **2.1.4 Nutrition transition**

Obesity was once seen as a ‘high-income country’ problem. However, the prevalence statistics of obesity in low- and middle-income countries, particularly in urban areas, indicate how overweight and obesity is significantly on the rise in developing countries.

The term ‘nutrition transition’ was first coined by Popkin *et al.* in 1994<sup>(22)</sup>. It is a term used to describe shifts in dietary patterns and energy expenditure, usually at the community or population level, that occur as a result of economic, demographic and epidemiological change<sup>(20, 22)</sup>.

## **2.2 ADOLESCENCE**

### **2.2.1 Introduction**

The period of adolescence is a transitional life phase, in the development of childhood to adulthood, characterised by both physical and psychological growth<sup>(35)</sup>. This crucial period of change, is second only to early childhood in the rate and breadth of developmental change<sup>(36)</sup>. Socially, it is the gradual process of maturation into an adult role with the acquisition of the relevant responsibilities; while physically it is a biologically driven process, the onset of which is puberty and the end point, although difficult to determine exactly, is characterised by physical and sexual maturity<sup>(35)</sup>. This transition involves the acquisition of physical, cognitive,



emotional, social and economic resources, which lay the foundation for future health and wellbeing<sup>(37)</sup>.

### **2.2.2 Definition of adolescence**

The World Health Organisation defines an adolescent as any person between the ages of 10–19 years while a youth has been defined as someone in the 15–24 year age group<sup>(38)</sup>. The adolescent age range falls within the WHO's definition of 'young people', which refers to persons between the age of 10–24 years<sup>(38)</sup>. In South Africa, the term adolescent refers to the population aged 10-19 years (Statistics SA, 2018). The term adolescence is derived from the Latin 'adolescere'; the present participle 'adolescens' means 'growing up', whereas the past participle 'adultus' means 'grown up'<sup>(17)</sup>.

### **2.2.3 Importance of health in adolescence**

Adolescence is often seen as the healthiest time of life, positioned between the peaks of early-life mortality and NCDs in later life. As a result, historically, adolescent health has attracted little interest in the way of global health and social policy development and as such, is a relatively new medicine. The International Paediatric Association was established in 1910, however the International Association of Adolescent Health was not established until 1987, reflecting the lower priority assigned to teenage health issues, until recent years.

At 1.8 billion, the current generation of 10–24 years olds is the largest yet and accounts for more than a quarter of the global population<sup>(35)</sup>. The health of this generation is being determined by an unprecedented and complex interaction of factors including 'population mobility, global communications, economic development and the sustainability of ecosystems', which is laying the health foundations for future generations<sup>(37)</sup>.

These changes are partly what is responsible for driving epidemiological transition, a term used to describe 'changing patterns of population age distributions, mortality, fertility, life expectancy and causes of death'<sup>(39)</sup>. Since publication of this theory more than 30 years ago, the concept has been criticised for its limitations and subsequently revised and developed. Although much still needs to be learned and understood about epidemiological transition, the complex interplay of these generational differences means that the adolescents of today are experiencing different and unprecedented health challenges, to those of previous generations.

As part of the second Lancet series on Adolescent health, Patton *et al.*<sup>(8)</sup> compiled a synthesis of internationally comparable data on adolescent health. It is evident that the health profile of adolescents is significantly different between countries. This can, in part, be explained by the differences in epidemiological transition, which has seen a reduction in the number of deaths in early childhood to increases in morbidity and mortality resulting from NCDs. As a result, where international focus was previously on global-health policy development in infant and maternal nutrition, these disease-pattern changes have brought to light the continued efforts necessary to focus on other life phases and the emerging epidemics like those of NCDs.

According to Patton<sup>(37)</sup>, more than half of adolescents grow up in ‘multi-burden’ countries. These countries have high rates of all adolescent health problems including diseases of poverty (HIV and other infectious diseases, undernutrition, poor sexual and reproductive health), injury and violence as well as NCDs. These countries face the conundrum of dealing with diseases of poverty, while in addition, needing to plan and implement policies to prevent increases and manage NCD risks. According to Patton *et al.*<sup>(8)</sup>, ‘Sub-Saharan Africa has the worst regional health profile, with the highest rate of overweight and lowest rate of physical activity in low-income and middle-income countries’<sup>(8)</sup>. Coovadia *et al.*<sup>(35)</sup> add that ‘NCDs, i.e.: obesity, diabetes, hypertension and mental disorders are the new epidemic in SA’.

The second Lancet Series on adolescent health states that a ‘failure to invest in the health of the largest generation of adolescents in the world’s history jeopardises earlier investments in maternal and child health, erodes future quality and length of life and escalates suffering, inequality and social instability’<sup>(36)</sup>.

As a result of these efforts in bringing adolescent obesity and its health implications into the spotlight, there was an international call to address this rising epidemic. In September 2015, the UN Secretary-General initiated the Global Strategy for women’s, children’s and adolescents’ health, with the ‘Every Woman, Every Child’ agenda becoming the global strategy for women’s, children’s and adolescents’ health.

Patton *et al.*<sup>(37)</sup>, in their commission on adolescent health and wellbeing, summarised and clarified the significance of adolescent health from three perspectives:

- ‘Health and wellbeing underpin the crucial developmental tasks of adolescence including the acquisition of the emotional and cognitive abilities for independence,

completion of education and transition to employment, civic engagement, and formation of lifelong relationships’.

- ‘Adolescence and young adulthood can be seen as the years for laying down the foundations for health that determine health trajectories across the life course’.
- ‘Adolescents are the next generation to parent; these same health reserves do much to determine the healthy start to life they provide for their children’.

Considering health in adolescence laying the foundations of health for future generations, the unprecedented social, cultural and economic changes adolescents face, together with the health inequities they experience, a multi-sectoral, local and global approach is required in order to address and transform health and wellbeing in adolescents and, in particular, the obesity epidemic.

## 2.2.4 Changes in adolescence

### 2.2.4.1 Physical

It is important to understand the biological and neuro-cognitive changes that take place in adolescence, in order to be able to tailor health programmes to adolescents’ specific needs. Physical development in adolescence is characterised by several physiological and neuro-cognitive changes<sup>(19,18)</sup>. Physiological changes include: physical changes in body composition; reduced insulin sensitivity; growth and pubertal maturation; neuro-developmental changes include those of the pre-frontal cortex that influence decision making<sup>(40)</sup> and risk-taking processes and changes of the limbic system that influence pleasure seeking, reward processing, emotional responses and sleep regulation<sup>(19)</sup>.

**Body composition:** Sex-specific body composition changes occur throughout adolescence, including the location and quantity of body fat<sup>(18)</sup>. Early in adolescence there is an increase in the number and size of the adipocytes (fat cells), which partly explains why adolescence has been established as a critical period of abnormal weight gain. Male adolescents tend to deposit more fat in the abdominal subcutaneous region (i.e.: beneath the skin) and the abdominal visceral depot (between the organs), whereas female adolescents deposit more fat peripherally, mainly on the hips. Girls going through puberty are at a greater risk of acquiring excess weight given that the adipocyte number in the gluteal region increases by 34% and adipocyte size increases by 45% compared to boys of a similar age. Adolescent males and females both have increases in fat-free mass, however males have a decrease in total body-fat percentage, whereas females have an increase in total body-fat percentage<sup>(19)</sup>.

**Hormones and insulin sensitivity:** Oestrogen is responsible for the increase in adipose tissue deposition particularly peripherally in females, whereas testosterone is primarily responsible for the increase in fat-free tissue mass in males. Levels of growth hormone are increased during the pubertal growth period<sup>(18)</sup>. This hormone is also linked with increased rates of lipolysis in the liver, elevated circulating free fatty acids and decreased insulin sensitivity. This reduced insulin sensitivity has been observed in both boys and girls and insulin resistance is increased as duration of obesity increases. In view of the fact that insulin sensitivity decreases during adolescence and increased levels of adiposity are strongly related to increased risk of developing metabolic syndrome (insulin-resistance syndrome), overweight and obese adolescents are at increased risk of developing cardio-metabolic disease<sup>(19)</sup>.

**Growth:** The adolescent growth spurt is characterised by a rapid rate of growth in height. Particular indicators of adolescent maturation including menarche and peak height velocity have been associated with increased adiposity<sup>(18,19)</sup>.

**Puberty:** It is now understood that puberty is a highly programmed and biologically driven developmental process that affects behaviour, emotional wellbeing and health in complex ways<sup>(17, 19, 37)</sup>. It is characterised by maturation of the hypothalamic-pituitary-gonadal axis, the appearance of secondary sexual characteristics, increase in growth and the ability to conceive<sup>(18)</sup>. The effect of puberty on the neural development of the brain is still poorly understood. However, studies have shown these significant changes influence perceptions, motivations and behavioural patterns that support a move to more independence and the ability to reproduce<sup>(17, 40)</sup>.

#### **2.2.4.2 Neuro-cognitive**

There are various neuro-cognitive processes that underpin decision making in adolescence, with the key component processes being: value placed; response selection (including inhibitory control); and learning and socio-emotional control<sup>(40)</sup>. MRI studies of the brain in adolescence have demonstrated the changes that occur in the cortical grey matter during adolescence. These changes are region specific and non-linear in manner throughout adolescence. There is an increase in grey matter in the frontal, temporal and parietal cortices during childhood, peaking in adolescence and decreasing in early adulthood<sup>(49, 50)</sup>. This change in grey matter is believed to be because of changes in dendritic growth and subsequent synaptic reduction. It is these neural changes in the brain that are believed to be the reason behind the social, emotional and behavioural responses seen in adolescence.

### 2.2.4.3 Other changes

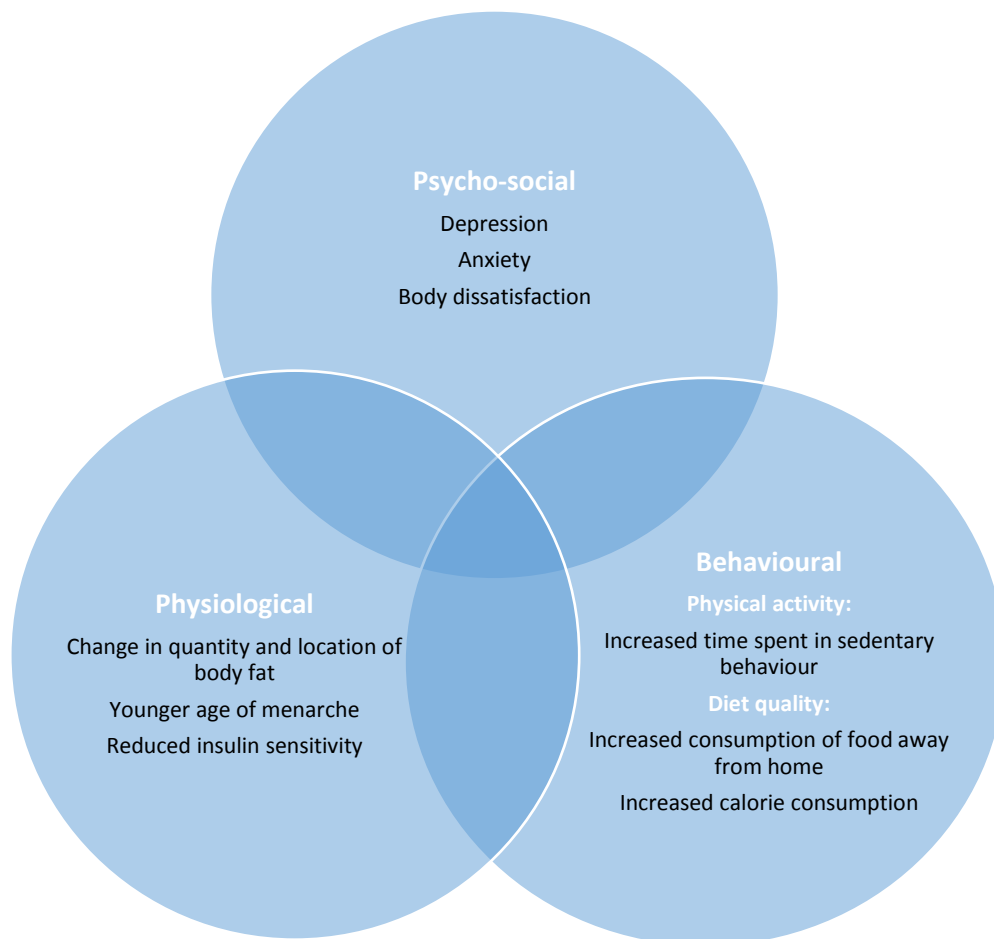
**Diet:** Knowing about dietary patterns and the changes that occur throughout the life phases is helpful for understanding more about disease pathogenesis. Numerous studies provide evidence that the diet quality from childhood to adolescence decreases. The Bogalusa heart study showed, in a sample of 246 young adults aged 19–28 years that completed a survey when they were 10 years old, diet quality decreased from childhood to young adulthood<sup>(41)</sup>. There was a greater consumption of sweetened beverages, salty snacks, beef and poultry in young adulthood while there was a lower intake of foods like fruits/fruit juices and milk. These findings were similar to those of the Norwegian longitudinal study that followed adolescents from age 14–21 years and showed a decreased fruit consumption and increased consumption of sweetened carbonated beverages in young adolescence<sup>(42)</sup>.

This is of concern in light of the findings of a cross-sectional analyses of a US population of children and adolescents by Bradlee *et al.* (2010), which showed that consumption of dairy, grains, total fruit and vegetable intake is inversely associated with central obesity in adolescents<sup>(43)</sup>. A population based study by Feeley *et al.* in SA, looking at the dietary changes in adolescents over a five-year period had findings consistent with these results in that diet quality decreased<sup>(44)</sup>. They demonstrated that fast-food consumption increased, and lunchbox usage decreased.

**Physical activity:** It is well established that a reduction in energy expenditure is one of the contributory factors in the aetiology of obesity. Consistent evidence indicates that there is a reduction in overall activity during the transition from childhood to adolescence, which persists into adulthood<sup>(45–47)</sup>. Adolescents may be further at risk of an energy imbalance and subsequent weight gain, due to cessation in growth and simultaneous decline in physical activity.

The United States 2009 Youth Risk Behavior Surveillance found that only one third of high school students in grades 9–12 attended physical education classes daily and 81.6% of adolescents were not active for at least the recommended minimum of 60 minutes per day on all seven days before the survey<sup>(48)</sup>. The results of these surveys also showed that students in younger grades and males were typically more physically active than students in older grades or females. A systematic review by Dumith *et al.* in 2011 consistently finds evidence to support this finding<sup>(47)</sup>.

**Sedentary activity:** Evidence is growing of the adverse consequences of increased screen time, including its association with reduced quality of sleep, ability to learn and obesity<sup>(49)</sup>. A prospective, population-based study by Dumith *et al.* (2012), showed that in girls, an increase in screen time is associated with a reduction in physical activity<sup>(50)</sup>. The reduction in energy expenditure by reduced physical activity is further compounded by the fact that screen time is associated with an increase in the intake of high-calorie snack foods and reduced hours of sleep, of which both are associated with an increased risk of obesity<sup>(19)</sup>.



**Figure 2.1: Changes that occur in adolescence that may predispose adolescents to obesity<sup>(19)</sup>**

Figure 2.1 provides an overview of the potential changes that occur during adolescence that may predispose certain individuals to becoming overweight or obese. In summary, these changes during the adolescent period, predispose adolescents to risky lifestyle choices that have the potential to affect adversely their evolving physiological status. These changes in a population group whose prevalence of obesity is on the rise, highlights the health vulnerability of the adolescence phase of life.

## 2.2.5 Consequences of obesity in adolescence

There is a growing body of evidence looking at the health impact of obesity in childhood and adolescence. It is now well established that obesity in childhood has adverse consequences both in the short- and intermediate term as well as serious, negative health implications in adulthood. Must and Strauss published a report in 1999, looking at the 'Risks and consequences of childhood and adolescent obesity'<sup>(6)</sup>. Although not a systematic review, this comprehensive report provides a substantial body of evidence on the short-, intermediate and long-term consequences of adolescent obesity. Of particular concern is a key finding by Reilly *et al.* (2003), from their critically appraised, evidence-based summary, in which they found strong evidence for the persistence of obesity from childhood and adolescence into adulthood<sup>(24)</sup>.

Subsequent to this, Reilly and Kelly published a systematic review in 2011, looking at the long-term impact of overweight and obesity in childhood and adolescence on morbidity and premature mortality in adulthood<sup>(13)</sup>. Their findings affirmed the significant adverse consequences of the preceding review, with convincing evidence demonstrating obesity in childhood and adolescence being associated with increased risk of premature mortality and morbidity, particularly cardio-metabolic morbidity. In childhood, it can take many years before these physiological health consequences become apparent; however, the significantly, debilitating psycho-social impact can also be potentially profound. Understanding the extent, degree and quality of the evidence linking the consequences of child and adolescent obesity with the different aspects of ill health, is critical for informing the planning and developing of public-health initiatives and allocating health resources appropriately and equitably.

### 2.2.5.1 Short-term consequences

There is a plethora of evidence linking obesity with acute complications in childhood and adolescence. These range from gallstones, hepatitis, sleep apnoea and psychological problems to conditions affecting the bones, lungs, neurological, gastroenterological and endocrine systems<sup>(6,12)</sup>.

**Orthopaedic:** Must *et al.* (1999) highlight the orthopaedic abnormalities that occur in children who are obese, for example, permanent femoral head damage caused through dislocation at the femoral growth plate, slipped capital epiphyses as evidenced by Kelsey in 1971 and Blount's disease or bowing of the legs by Dietz *et al.*, in 1982. These abnormalities may be partly caused by unfused growth plates of the developing bones and the softer cartilaginous bones, together with premature and excess weight bearing. Studies have shown that between

50–70% of children with slipped capital epiphyses are overweight, while 80% of the children with Blount's disease were obese<sup>(6)</sup>.

**Pulmonary:** In looking at health implications of obesity on the pulmonary system, Reilly *et al.* (2003) identify six papers, five of which are of 'high quality' evidence that link paediatric obesity to asthma<sup>(12)</sup>. They highlighted a longitudinal study by Castro-Rodriguez *et al.*, that found becoming obese significantly increased risk of asthma symptoms in girls who were not obese at baseline<sup>(51)</sup>. Pickwickian Syndrome is a condition where severe obesity is associated with hypoventilation among other clinical symptoms. Although its prevalence is not known in childhood, obesity-hypoventilation syndrome is associated with increased morbidity and mortality<sup>(53)</sup>.

**Sleep related:** Various sleep disorders have been associated with childhood obesity<sup>(52)</sup>. In a descriptive study by Carriere, 98.4% of the obese children were found to have presence of a sleep disorder. Over and above concerns regarding inadequate quality of sleep for daily activities, Rhodes *et al.* (1995) find concerning evidence that obese children with obstructive sleep apnoea, perform significantly worse than obese children without sleep apnoea, in learning and memory function tests<sup>(6)</sup>.

**Gastroenterological:** In the review by Must and Straus (1999), convincing evidence is found of obese individuals having an increased likelihood of developing gallstones, due to the increased excretion of biliary cholesterol, relative to bile acid<sup>(6)</sup>. In children, studies indicate that between 8–30% of gallstones are caused by obesity and in cases where there is no other underlying condition, obesity accounts for most gallstones. Further to this Must and Straus, highlight the finding by Honore in 1980, that the relative risk of gallstones in adolescent girls with obesity compared to those of a normal weight is 4.2<sup>(6)</sup>.

In obese individuals, increased lipolysis together with the increased insulin resistance lead to liver steatosis. Studies have shown that up to 38% of obese children have fatty liver<sup>(54)</sup>, a finding that has been consistent with other reports. Of further concern is that this has been shown to lead to liver fibrosis and cirrhosis<sup>(55)</sup>.

**Endocrine:** There is a growing body of evidence highlighting the association of childhood obesity and insulin resistance<sup>(56–58)</sup>. Bergstrom's findings also provide evidence of the potential subsequent sequelae of other clinical symptoms, including: higher levels of total cholesterol, low-density lipoprotein cholesterol and triglycerides in obese children<sup>(56)</sup>.



**Socio-psychological:** Adolescents are a particularly vulnerable group in light of the physiological and emotional changes they experience as discussed previously in this chapter. Adding to this vulnerability, is the potential of obesity to have a serious adverse impact on the emotional development of children and adolescents, including their view of body image and self-esteem. After examining nine studies, five of which were high quality, the review by Reilly *et al.* (2003) find conclusive evidence that obese children are more likely to experience psychological or psychiatric problems than non-obese children. Girls appear to be at greater risk than boys and the risk of psychological morbidity increases with age, suggesting that an older adolescent population may be at even greater risk<sup>(12)</sup>. ‘Fear of fatness’ in adolescent girls, is documented in the 1980s by Feldman and Moses, with one study finding that almost half of girls believed that they were fat when 83% of girls with this belief were of a normal weight<sup>(6)</sup>.

Compounding their own issues of body image and self-consciousness, Alberga *et al.*<sup>(19)</sup> highlight evidence in two studies of obese children being stressed because of bullying, being a victim of weight teasing and discrimination<sup>(19,59)</sup>. Further to this, of increasing concern is the recognition that overweight adolescents are at risk of poorer school outcomes including attendance and academic performance<sup>(60)</sup>.

A longitudinal study conducted by Swallen *et al.*, in the USA, published in 2005, found a ‘significantly deleterious impact of overweight and obesity on depression/self-esteem and school/social functioning’<sup>(16)</sup>.

#### **2.2.5.2 Intermediate and long-term consequences**

There is a growing body of evidence looking at the consequences of obesity over the medium- and long term including the development of cardiovascular risk factors, metabolic syndrome, Type II diabetes and persistence of obesity into adulthood<sup>(13, 57, 61)</sup>.

**Endocrine:** A recent review in the *Lancet* by Lascar *et al.* (2018), looks at Type II diabetes in adolescents and young adults<sup>(62)</sup>. Alarming, the prevalence estimates of Type II diabetes in adolescents between the ages of 10–19 in the USA between 2001 and 2009, are believed to have increased by 31%<sup>(63)</sup>. Data from SEARCH, an observational study in the USA, involving 11 245 young people with Type I diabetes and 2846 with Type II diabetes (10–19 years) showed that there was an annual increase of 7% in incidence of Type II diabetes between 2002–2003 and 2011–2012.

In the population-based, Bogalusa heart study, 2.4% of the overweight adolescents developed Type II by the age of 30 years, compared to none in the lean adolescents<sup>(64)</sup>.

In another study conducted in the greater Cincinnati area, the prevalence of NIDDM in children increased 10-fold over a 12-year period. Of these patients more than 90% had a BMI greater than the 90<sup>th</sup> C and 40% had severe obesity (BMI>40kg/m<sup>2</sup>)<sup>(65)</sup>.

Further to these studies a 'high quality' study by Hypponen and colleagues (2000)<sup>(16)</sup> shows that paediatric obesity is associated with more than a two-fold risk of developing Type I diabetes.

The concern with this evidence, is that 'earlier onset Type II Diabetes is associated with a greater lifetime risk of diabetes-associated complications'<sup>(62)</sup>. Lascar *et al.*, highlight several cross-sectional studies, which suggest that the 'burden of diabetes complications is greater for people with young-onset Type II Diabetes than for people with Type I Diabetes or later onset Type II Diabetes'.

**Metabolic syndrome:** There is no international consensus on the definition of metabolic syndrome in children<sup>(57)</sup>. However, similarly to adults, the term is used to describe a cluster of diseases and disorders including: altered glucose metabolism; hypertension; dyslipidemia; and atherosclerotic cardiovascular disease (CVD)<sup>(57)</sup>. Together with the rise in the prevalence of childhood obesity, the prevalence of metabolic syndrome in childhood appears to be on the increase. As this clustering of CVD risk factors can occur in lean children, Weiss (2013), explains how obesity is therefore a marker and not a cause of metabolic syndrome<sup>(57)</sup>.

**Cardiovascular:** Cardiovascular disease is reported by the WHO to be the largest global cause of mortality (WHO Health statistics), accounting for 17.5 million deaths in 2005 and projected to rise to 23.6 million in 2030<sup>(61)</sup>. Several adult cardiovascular disease risk factors have now been seen in childhood including: high BP, poor lipid profile, metabolic syndrome and impaired glucose tolerance. These risk factors are not seen to represent morbidity, rather the increased risk of progression to CVD.

Evidence from the Bogalusa heart study indicates that 70% of obese children and adolescents between the ages of 5–17 years have at least one cardiovascular risk factor<sup>(66)</sup>. Studies looking at whether childhood obesity is an independent risk factor for adult cardiovascular disease

have yielded strong evidence that there is an association<sup>(14, 61)</sup>. In the systematic review and meta-analysis by Lewellyn *et al.*, they find that a high childhood BMI is associated with an increased incidence of adult coronary heart disease (OR of 1.2 95% CI 1.1–1.31)<sup>(14)</sup>. The systematic review with meta-analysis published in 2015 by Umer *et al.*, finds that childhood obesity is significantly associated with adult systolic and diastolic blood pressure, adult TGs, significantly and inversely associated with adult HDL<sup>(61)</sup>. Their finding regarding hypertension is consistent with that of the systematic review by Reily *et al.* (2003)<sup>(12)</sup>. They assess studies for an association between paediatric obesity and cardiovascular disease risk factors and find that in eight out of nine high quality studies, there are ‘significant associations between atherogenic profiles associated with obesity in childhood and those in adulthood’. Most of these reports were from the Bogalusa heart study. In one report, overweight adolescents (BMI >75<sup>th</sup> percentile) were 8.5 times more likely to have hypertension as adults than lean adolescents<sup>(64)</sup>. Further to this, the study has shown that being overweight as an adolescent is associated with a 2.4-fold increase in the prevalence of total cholesterol values above 240mg/dl, 3-fold increase in LDL values above 160mg/dl and an 8-fold increase in HDL levels below 35mg/dl in adults between ages 27–31 years<sup>(64)</sup>.

### **2.2.5.3 Long-term consequences**

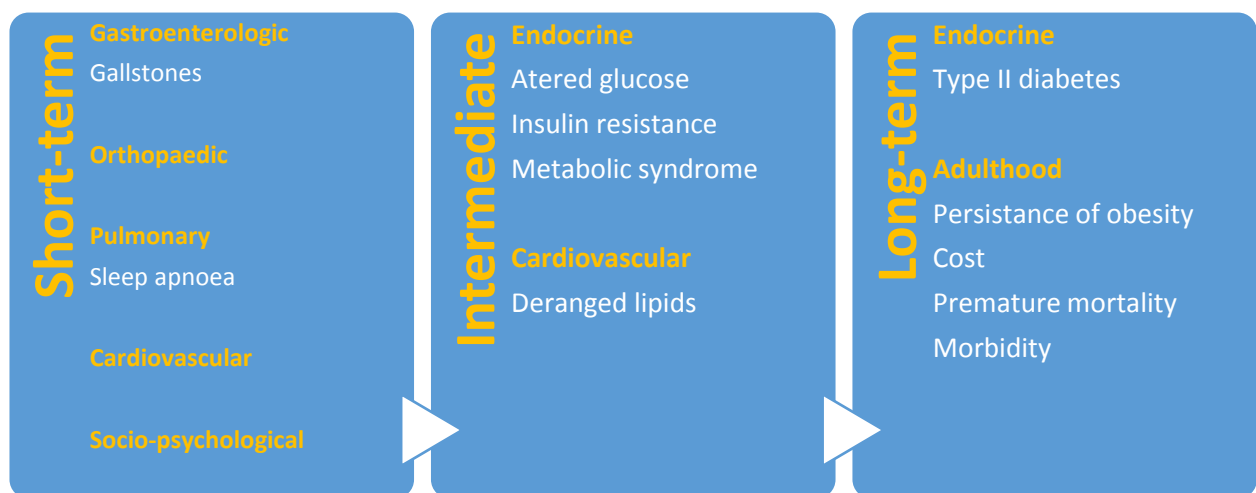
**Persistence of obesity:** In 2015, in order to determine whether or not childhood obesity is a predictor of obesity in adulthood, Simmonds *et al.* (2015) conducted a systematic review with meta-analysis<sup>(67)</sup>. They identified 15 suitable cohort studies including more than 200 000 participants. BMI was used as the measure of obesity in all studies. Their meta-analysis indicated that obese children and adolescents were approximately five times more likely to be obese as adults. Further to this, about 80% of obese adolescents will still be obese in adulthood and about 70% will be obese over the age of 30 years<sup>(67)</sup>.

**Mortality and morbidity:** Childhood obesity and its impact on adult morbidity and mortality has been reviewed<sup>(12,13)</sup>. There appears to be a large and reliable body of evidence to suggest that where individuals have been obese in childhood that there is an increased risk of premature mortality in adulthood. For example in the study by Franks *et al.*, there is an incidence ratio of premature mortality from endogenous cause of 1.9 (95% CI [1.37–2.65]), where BMI is >95<sup>th</sup>C at baseline in a population with mean age of 11 years<sup>(68)</sup>. The evidence regarding increased morbidity in adulthood for childhood obesity is mixed. The review by Reilly *et al.*<sup>(13)</sup> highlights several studies with adjusted odds ratios that indicate a propensity towards various diseases such as diabetes, hypertension and stroke, as does the systematic review and meta-analysis by Llewellyn *et al.*<sup>(14)</sup>. In this study, high childhood BMI was associated with

an increased incidence of adult diabetes OR 1.7 (95% CI [1.3–2.2]) and coronary heart disease OR 1.2 (95% CI [1.1–1.31]). However the researchers concluded that the accuracy for predicting adult morbidity is low<sup>(14)</sup>.

**Cost:** The lifetime costs of overweight and obesity in adolescents has also been investigated. Hamilton *et al.* (2018) conducted a systematic review looking at total lifetime healthcare as well as productivity costs. Despite variability in the methods used in studies, they were able to conclude that ‘childhood overweight and obesity generate considerable lifetime direct healthcare and indirect productivity costs’<sup>(69)</sup>.

Figure 2.2 summarises the potential short-, intermediate and long-term consequences of adolescent obesity.



**Figure 2.2: Overview of the potential adverse consequences of obesity in adolescence**

### 2.2.6 Aetiology of adolescent obesity

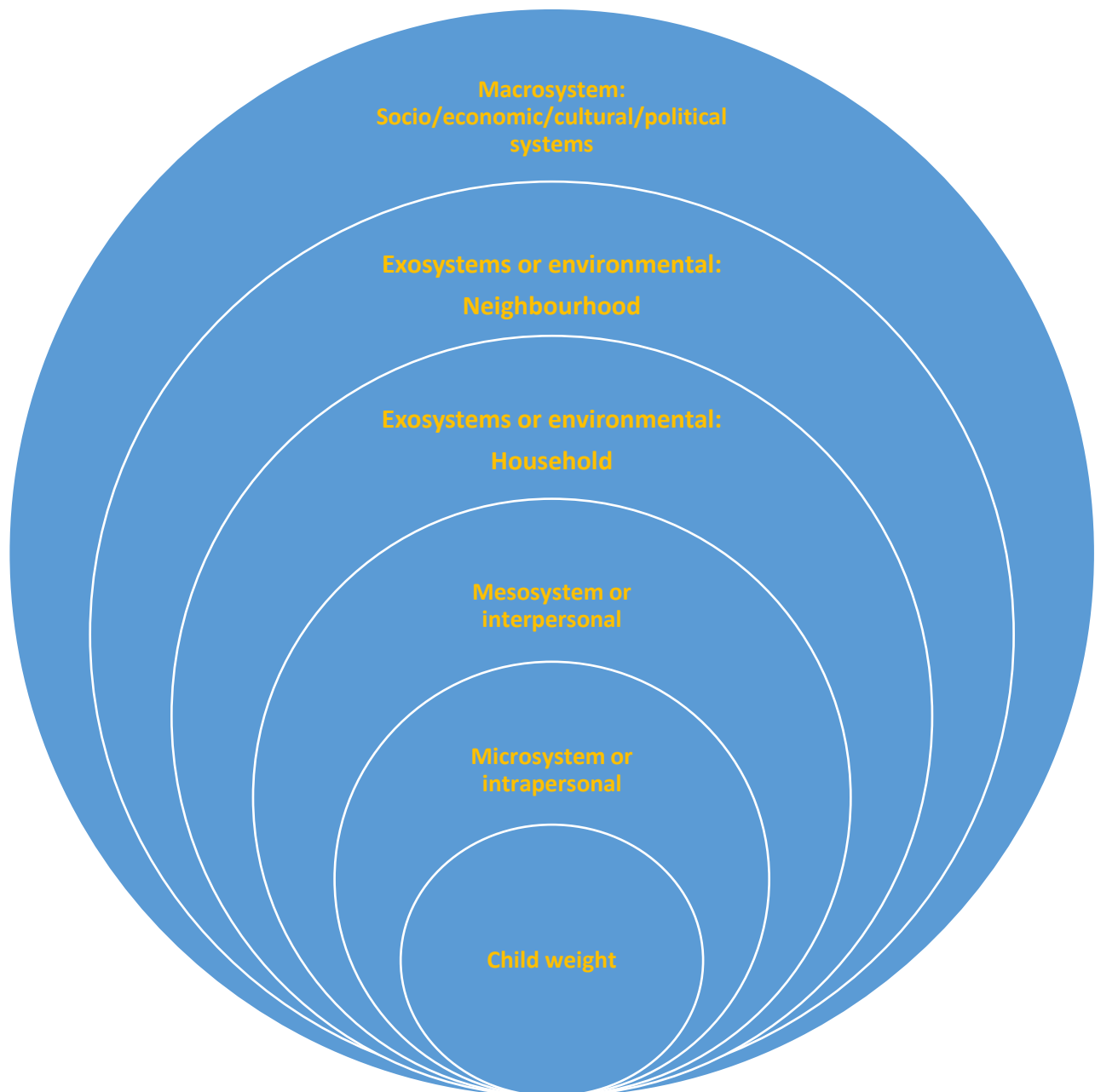
Obesity is a multi-factorial disease and its development and progression is the result of multiple interactions between genes and the environment at different levels, which are yet to be completely understood. It is well established that obesity occurs as a result of an energy imbalance between energy intake and energy expenditure with a positive energy balance leading to weight gain<sup>(70)</sup>. There is much evidence linking lifestyle choices including dietary habits<sup>(71)</sup> and physical-activity levels<sup>(49)</sup> to this positive energy balance. However, much still remains to be understood particularly from qualitative research with regards to the ‘how’ and ‘why’ these factors have an impact on each other<sup>(72)</sup>.

### **2.2.6.1 Socio-ecological model (SEM)**

The WHO defines the social determinants of health as ‘conditions in which people are born, grow, live, work and age’<sup>(73)</sup>. Further to this, they are described as ‘the conditions or circumstances that are shaped by families and communities and by the distribution of money, power, and resources at global, national and local levels and affected by policy choices at each of these levels’<sup>(73)</sup>.

The concept of a socio-ecological model was originally introduced by Urie Bronfenbrenner in the 1970s and was continually revised by him until his death in 2005<sup>(74, 75)</sup>. He postulated that in order to understand human development, one needed to examine it in the entire context in which growth occurs, including: individual aspects of a child (genetic and psychological, e.g. sex, age, health); microsystems (physical and social environment, e.g. family, friends, school, church, health services); mesosystems (interactions among systems); exosystems (social, political and economic, e.g. social service, neighbours, industry, local politics, mass media); and macrosystems (beliefs and attitudes shared by society). The SEM is based on an ecological systems theory, which suggests that changes in individual outcomes are influenced not only by individual-level factors such as age and gender but also by interactions with the larger social, cultural, economic, political and environmental contexts in which individuals live<sup>(1, 76)</sup>.

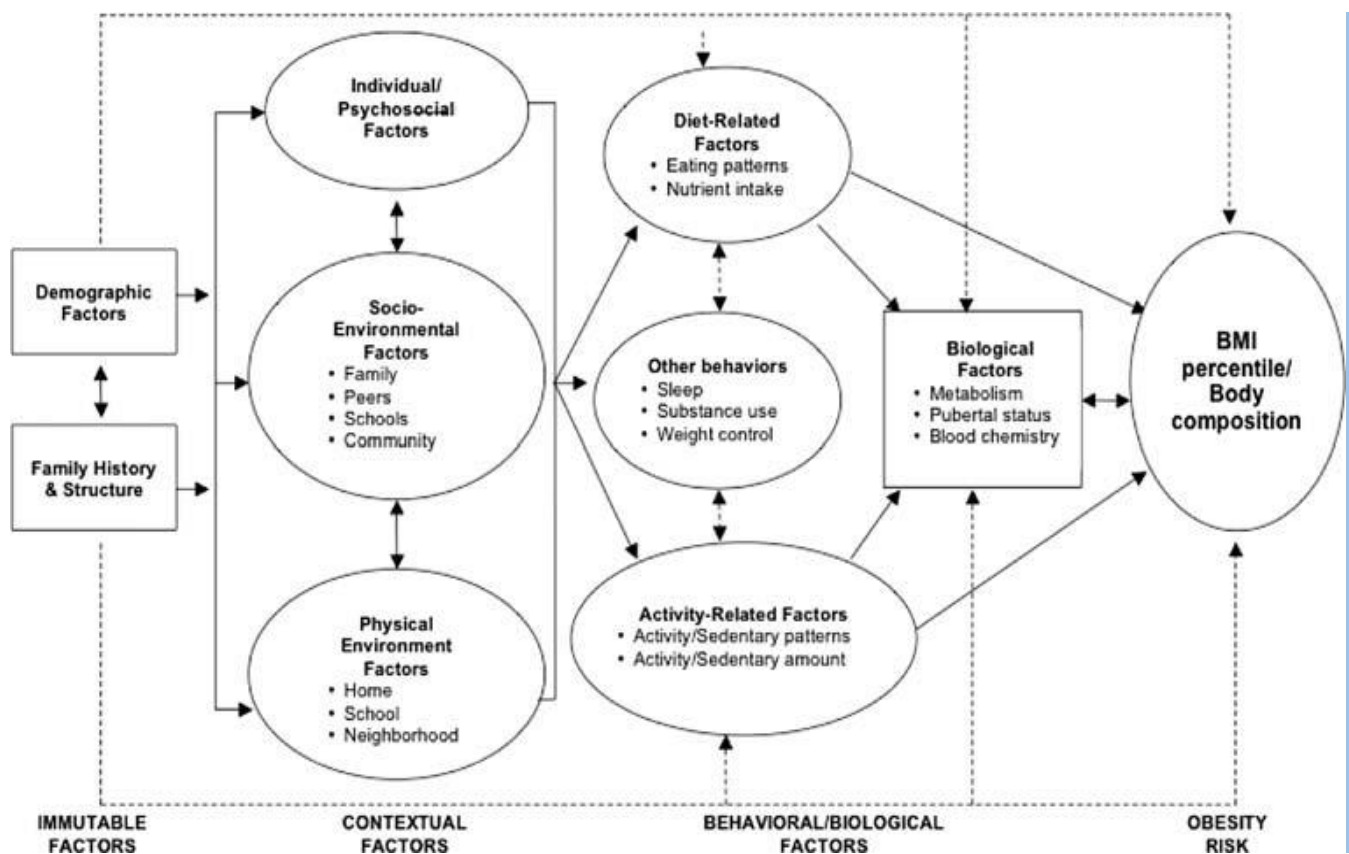
The social ecological model was used by the Institute of Medicine’s 2005 Report, *Preventing Childhood Obesity: Health in The Balance*, to describe the possible aetiology of the childhood obesity epidemic and to lay the groundwork to plan for future interventions<sup>(77)</sup>. This model has been widely used in childhood obesity research and prevention efforts<sup>(76, 78, 79, 80, 81, 82)</sup>. In light of its ‘transdisciplinary’ and ‘multi-level’ nature it is recognised as a relevant and appropriate mode for investigating childhood obesity<sup>(79)</sup>. It has therefore been applied for the purposes of interpreting and making sense of the data for this study. Figure 2.3 provides a schematic representation of an adapted and version of Bronfenbrenner’s SEM to demonstrate the different levels having an impact on child weight status.



**Figure 2.3: Adapted socio-ecological model explaining the aetiology of childhood obesity**

#### ***2.2.6.2 Transdisciplinary Research in Energetics and Cancer (TREC) Identifying Determinants of Eating and Activity (IDEA) Conceptual Model of Obesity***

Another model in the literature developed to conceptualise the factors affecting weight status, is shown in Figure 2.4. This was developed by the IDEA project in order to guide empirical research on the aetiology of obesity<sup>(79)</sup>. This model shows the interrelation between immutable, contextual and behavioural/biological factors, which have an impact on obesity risk.



**Figure 2.4: TREC IDEA conceptual model of the aetiology of obesity<sup>(79)</sup>**

The scope of this Master's project does not permit researching the aetiology of obesity in further detail. However, these two models provide an overview of the numerous factors that exist on multiple levels, many of which are 'reciprocal and bi-directional' that have an impact on child and adolescent weight status<sup>(79)</sup>.

## 2.2.7 Adolescent obesogenic environment

As outlined above, childhood overweight and obesity is a multi-dimensional issue with a complex aetiology. Extensive research has been conducted to understand this global phenomenon better, however, much remains unclear in this regard, not least of which are some of the definitions. One of these terms includes the 'obesogenic environment'.

### 2.2.7.1 Definition of 'obesogenic environment'

The Merriam-Webster medical definition of 'obesogenic' is promoting excessive weight gain; it states obese as 'having excess body fat' and genic as 'producing' or 'forming' with its first known reference in this regard, in 1970 (Merriam-Webster.com). The term 'obesogenic' was

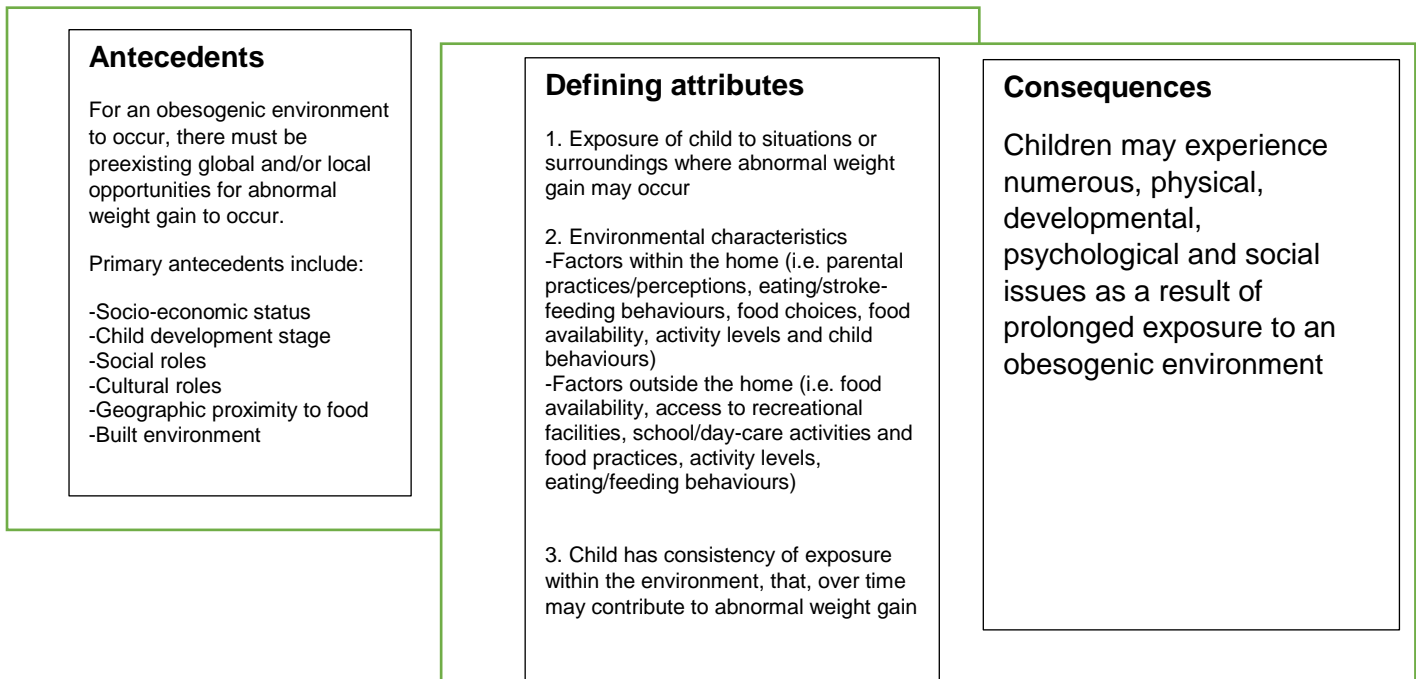
used by Weidenhofer in 1996, in order to explain environmental causes of weight gain<sup>(83)</sup>. In 1999, Swinburn *et al.* applied the term ‘obesogenic environment’ to one that promotes obesity in individuals or populations<sup>(84)</sup>. According to the 2012 *Collins English Dictionary*, ‘obesogenic’ is an adjective used to describe ‘causing obesity’.

Gauthier and Krajicek<sup>(83)</sup>, highlight that a term like ‘obesogenic’ may be applicable to both adults and children. They point out in their Concept Analysis and Paediatric Perspective, that ‘concepts must be related to the contexts’. According to the *Oxford English Dictionary*, ‘environment’ is the surroundings or conditions in which a person, or animal or plant lives or operates. Swinburn *et al.* define an obesogenic environment as one where the obesogenicity of an environment is ‘the sum of influences that the surroundings, opportunities or conditions of life, have on promoting obesity in individuals or populations’<sup>(84)</sup>.

#### **2.2.7.2 Significance of obesogenic environment to adolescents**

Much research has been conducted regarding the obesogenic environment in relation to the individual and population, however little has been done to define obesogenic environment in relation to children and adolescents. Based on their review of the literature and previous definitions, Gauthier and Krajicek (2013) define the obesogenic environment, within a paediatric context as ‘instances where a child is placed into a situation, circumstance, or surrounding where there exists the opportunity to choose, engage in, or be influenced by internal (i.e. within the home) or external structures (i.e. outside the home) where the aggregate effects promote (or result in) an abnormal, or elevated BMI percentile<sup>(83)</sup>. They developed a visual representation from a synthesis of the literature, to define antecedents, attributes and consequences of an obesogenic environment framed within the paediatric context as seen in Figure 2.5.





**Figure 2.5: Visual representation of the antecedents, attributes and consequences of obesogenic environment framed from within the paediatric context <sup>(83)</sup>**

## **2.3 BARRIERS AND ENABLERS OF HEALTHY LIFESTYLE BEHAVIOURS IN ADOLESCENTS**

### **2.3.1 Barriers to healthy eating**

#### **2.3.1.1 Intrapersonal**

In their scoping review looking at barriers and enablers of healthy lifestyle behaviours in adolescents, Kebbe *et al.* (2017) identify two studies that highlight individual factors as barriers to healthful eating<sup>(85)</sup>. These factors included: a lack of control in the purchase and consumption of the food, as well as temptation and lack of impulse control or discipline<sup>(59, 81)</sup>; forgetting long-term goals; and being away from home and parents.

They found substantial evidence regarding adolescents emotional eating being a barrier to healthful eating choices. In particular, adolescents described eating in response to anxiety, loneliness, sadness and being upset as triggers influencing the amount and type of foods eaten<sup>(85)</sup>. Further to these emotional states, mindless eating, eating in response to boredom and eating with screens or while studying, were recognised by adolescents as barriers to healthful choices or negatively affecting healthy weight<sup>(85)</sup>.

The feeling of being hungry was also described as a barrier to healthy eating, a finding consistent with that of Neumark-Sztainer *et al.*<sup>(86)</sup> as was taste. Taste was a major factor in influencing adolescent food choices, with junk food being described as ‘tasting better’ than healthier food options like fruit, vegetables and dairy.

In a study in the USA, looking at enablers of healthful weight management, temptation, lack of discipline and being bored were individual or intrapersonal barriers to healthful eating choices. Although this study was conducted in college students, comparisons can be drawn with adolescents, in light of the narrow age gap and overlapping behavioural patterns<sup>(81)</sup>.

### **2.3.1.2 Interpersonal**

There is a growing body of research looking at the impact of the relationship between adolescents and their parents and the influence this has on relationship with food, with inconsistencies in the findings.

The review by Kebbe *et al.* describes a barrier to healthy eating as lack of family support for making healthy nutrition choices<sup>(85)</sup>. By the family not setting a good example in terms of portion sizes and eating healthier options, adolescents found this to have a negative impact on their food choices.

A qualitative study on adolescents in the USA, confirms the finding that family eating habits are some of the greatest barriers to healthy eating. These include: eating out; unhealthy cooking; and the availability of unhealthy snack food in the home<sup>(59)</sup>.

A systematic review of the literature, published in 2015 by Blewitt *et al.*, an Australian team, looks at the parent-child relationship quality and obesogenic risk in adolescence<sup>(87)</sup>. They identify 26 suitable papers. Although there is no conclusive evidence to support or refute the association, due to limitations in ability to measure the relationship and weaknesses in design of the studies, the review does highlight the importance of certain perceived aspects of the bond in terms of impact on adolescent eating. Some of their findings suggest that ‘a secure bond between parent and child and high parental care and connectedness appear to be associated with lower levels of disordered eating attitudes and behaviours, while an insecure bond, over protection and conflict, were related to poorer eating outcomes’<sup>(87)</sup>.

Outside the family circle, in looking at peer support, adolescents describe it being challenging to make their choices healthy if friends are choosing less healthy options as this makes them feel ‘self-conscious’<sup>(88)</sup>. They also describe peer get-togethers as a barrier to making healthy

food choices<sup>(89)</sup>. Further to the above, adolescents find that special occasions in the form of family celebrations and holiday gatherings are opportunities that generally promote making unhealthy food choices<sup>(90)</sup>.

### **2.3.1.3 Environment**

Adolescents find that a lack, or limited availability, of healthy food in the home environment, together with the actual provision of unhealthy food options for mealtimes by parents are barriers to making healthy nutrition choices<sup>(59, 91)</sup>.

These findings are similar to those of the scoping review conducted by Munt *et al.* (2017), which finds that some of the main barriers to healthy eating include lack of facilities to prepare, cook and store healthy foods as well as the widespread presence of unhealthy foods<sup>(92)</sup>. Although this review looks at young adults between the ages of 18–24 years, the environmental circumstances highlighted would also influence a younger adolescent age group. In addition to the above, adolescents describe a lack of healthy food options like milk and salads in fast-food outlets, as well as poor visibility and quality of healthy foods, if they are available<sup>(86)</sup>. Further to this, they express concern about the poor quality of healthy food like fruit in the school cafeterias and the higher cost of healthy food.

### **2.3.1.4 Societal**

Cultural differences influence perceptions of a healthy weight and food, and this affects nutrition choices. A situational analysis in a rural community in the Limpopo, South Africa, found that there was no awareness of the concept of obesity and little knowledge of health-related risks of obesity<sup>(93)</sup>. Another study conducted by Puoane *et al.* in a black township in Cape Town, South Africa, found that a moderate BMI (27kg/m<sup>2</sup>) was preferred as this was found to be associated with ‘dignity, respect, confidence, beauty and wealth’<sup>(94)</sup>.

Research in an adolescent South African cohort, has demonstrated a move to a ‘Westernised’ view of body image with subsequent influences on eating attitude and behaviour including a risk of developing an eating disorder<sup>(95)</sup>.

## **2.3.2. Enablers of healthy eating**

### **2.3.2.1 Intrapersonal**

In the study conducted by Greaney *et al.*, participants shared their feelings that having an awareness of ‘what to and what not to eat’ as well being able to self-regulate their own

intake<sup>(81)</sup>, by for example, watching portion sizes, are important enablers of healthy weight management. Although this is a study in college students, comparisons can be drawn with adolescents in light of the narrow age gap and overlapping behavioural patterns.

Kebbe *et al.*, in their 2017 scoping review, highlight a study conducted by Watts *et al.* (2015), which finds that in adolescents who are obese, healthy foods need to be ‘tasty’ in order for them to consume them<sup>(85)</sup>; this is consistent with that of Neumark-Sztainer *et al.*<sup>(86)</sup>. The scoping review conducted by Munt *et al.* (2017), identifies key individual enablers of healthy eating as: ‘female interest in a healthy diet, healthy diet of friends and family, desire for improved health, desire for weight management, desire for improved self-esteem, desire for attractiveness to potential partners and others, possessing autonomous motivation to eat healthy and existence and use of self-regulatory skills’<sup>(92)</sup>.

### **2.3.2.1 Interpersonal**

In the scoping review by Kebbe *et al.*, the evidence strongly demonstrates that an enabler for health by adolescents is support from their families<sup>(90)</sup>. This ranges from emotional, motivational or verbal support to that of being actively involved in healthy eating practices themselves. Further to this, adolescents describe enablers of healthy eating as being actively involved in the planning and preparation of meals and having family meals together<sup>(90, 91)</sup>. Draper *et al.*’s (2015) scoping review looks at the impact of social norms and social support on diet in adolescents<sup>(96)</sup>. In looking at the family influence on dietary intake, they find that the fruit and vegetable intake of adolescents as well as other ‘healthful eating behaviours’ are positively influenced by the parental consumption of fruit and vegetables. Further to this, they identify several studies that demonstrate that an authoritative parenting style, where one is ‘responsive to their child’s needs’ as well ‘controlling of children’s behaviour’ is ‘positively related to fruit and vegetable intake, and ‘healthful eating patterns’<sup>(96)</sup>. They also highlight a study by Sleddins *et al.* (2011), which finds a ‘higher degree of maternal control’ is associated with, or an enabler of, less frequent snacking in adolescents<sup>(96)</sup>.

A systematic review by Blewitt *et al.* (2016), looking at associations between parent-child relationship quality and obesogenic risk in adolescence, identifies that there are several aspects of this relationship including ‘felt emotional bond between parent and child, the child’s perception of how much the parent cares for them and the mother’s sensitivity towards the child’ that may be influential on eating attitudes and behaviour<sup>(87)</sup>. However, they also highlight the lack of conclusive evidence regarding the association between parent-child relationship quality and weight status.

One study by Huang *et al.*<sup>(39)</sup> finds that, although a child's perceived level of parental engagement did not vary in obesity status between 10–18 years of age, it was, however, related to a deceleration of obesity risk across this age range<sup>(87)</sup>.

In a cross-sectional study by Davis *et al.* (2011), looking at parental sensitivity towards adolescent children, it was observed that obese teenagers are more likely than their normal-weight peers to perceive their mother as 'less sensitive'<sup>(97)</sup>. However, Blewitt identifies another study, which finds that it is the view of overweight girls that their fathers and not their mothers are 'less caring and more overprotective than normal weight peers'<sup>(98)</sup>.

In summary of the above, Blewitt's findings do suggest that children who 'perceive a connected and supportive family environment may eat more meals at home, spend less time with peers where encouragement to engage in unhealthy behaviours may be amplified and be more willing to follow health advice from their parents'<sup>(87)</sup>.

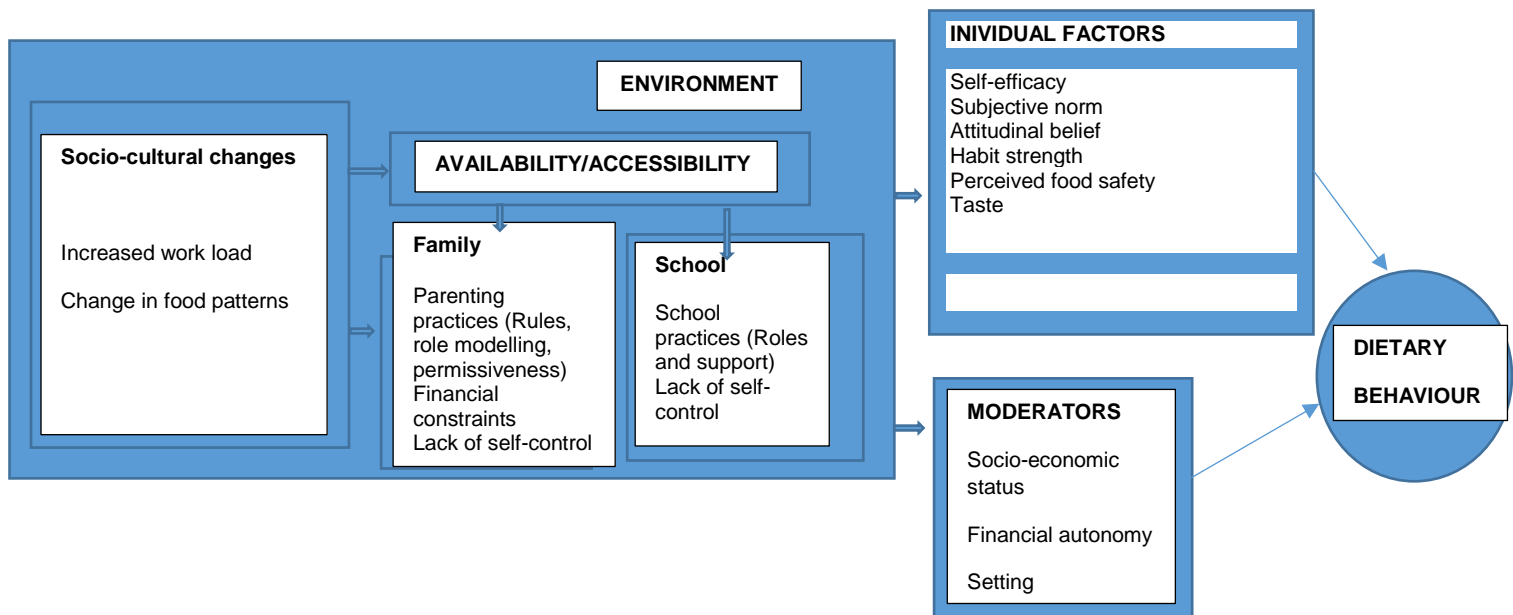
Although Draper *et al.* (2015) find less evidence on peer influences in dietary intake, they do observe that studies on peer influences and eating disorders appear to be most influential in the early adolescent years (12–14 years) with this influence being less so in later adolescent years<sup>(99)</sup>. Fletcher *et al.* (2011) also find evidence in their review of the concept of 'homophily', where young people who have obese friends are more likely to become obese themselves and that they choose friends with a similar BMI<sup>(99)</sup>.

With regards to further support outside the home, the review by Kebbe *et al.* (2017) finds that in adolescents who are obese, being involved in a weight-management programme is beneficial from the support and nutrition education received in enabling healthy eating choices and in helping with mindfulness of 'frequency', 'speed' and 'compulsive eating'.

Kebbe *et al.* (2017) also draw attention to a study by Woolford *et al.* (2016) that looks at the use of mobile phone text messaging as an adjunct to obesity treatment for overweight adolescents. This study found that adolescents like to receive practical food ideas as part of a weight-management programme including meal suggestions and recipe ideas, which serve as a reminder to make healthy choices.

### 2.3.2.3 Environment

The scoping review by Draper (2015) highlights several studies that indicate a positive relationship between the availability of fruit and vegetables in the home to adolescent fruit and vegetable consumption. This positive finding regarding the availability of healthy food being an enabler of healthy choices is consistent with other studies that find that, if healthy food is readily available and convenient in the home environment, healthy eating choices would be enabled<sup>(89, 100)</sup>.



**Figure 2.6: Conceptual framework for eating behaviour in adolescents<sup>(78)</sup>**

Figure 2.6 is a conceptual framework that provides an overview of individual and environmental factors and moderators that have an impact on adolescent dietary behaviour<sup>(78)</sup>.

### 2.3.3 Barriers to physical activity

It is well established that participation in regular exercise is associated with numerous health benefits across the life course and plays an essential role in the prevention of non-communicable diseases<sup>(101)</sup>. The WHO recommends that children between the ages of 5–17 years, take part in at least 60 minutes of moderate to vigorous PA daily (WHO). A report by Hallal *et al.* (2012) indicates that 80% of 13-15-year olds are classed as physically inactive<sup>(102)</sup>. Considering the significant known health impact, understanding the enablers and barriers to PA is critical to the success of public-health programmes. As such, there is a growing body of evidence, which is helping to develop a better understanding of the factors that affect

adolescents PA levels including those at the intrapersonal, interpersonal and environmental and cultural level<sup>(85,103–106)</sup>.

### **2.3.3.1 Intrapersonal**

The scoping review by Kebbe *et al.*, (2017) highlights several studies, which provide evidence of the cognitive and physical challenges obese adolescents have with regards to taking part in PA<sup>(85)</sup>. Some of the most commonly cited reasons for not taking part in PA by a population of overweight adolescents include medical reasons, lack of motivation and energy to participate<sup>(59)</sup>. Others include fatigue, lack of energy, physical discomfort, PA being too difficult and PA being boring. Others describe not being motivated to do PA, nor finding it pleasurable. Being self-conscious about being overweight, add to the list of intrapersonal barriers to PA.

Time constraints as a result of academic, job and home responsibilities are also acknowledged as barriers to participation in PA<sup>(85)</sup>. In a cross-sectional study of school-going-aged adolescents in Spain, looking at the perceived barriers to PA, the barriers seen in general as the most important for teenage students in terms of practising PA are life demands and lack of time, followed by tiredness and laziness and then body image. This is perceived to be a greater barrier in those who are overweight than normal weight. The reason least perceived as a barrier is facilities or environment<sup>(107)</sup>.

In the study by Peeters *et al.*<sup>(105)</sup> looking at the barriers in exercise intervention in obese youth, time is one of the main perceived barriers to PA at three weeks (18%), three months (12%) and six months (21%). It is the third main reason given after lack of transport and conflict with school work at six months.

### **2.3.3.2 Interpersonal**

A review conducted in 2005 by Ferreira *et al.* looks at the built environment and how it correlates with physical activity in youth<sup>(104)</sup>, including the socio-cultural environmental. Some of the correlates investigated in adolescents include family structure, PA at the family level and modelling of exercise by family. Overall these studies show no association with PA. There is however, a trend towards a positive association between PA and general 'support from significant others'<sup>(104)</sup>.

The scoping review by Kebbe *et al.* (2017) studies the impact of parental involvement in sport regarding adolescent PA levels. They find that where parents are less inclined to role model

participating in physical activity, obese adolescents are also less likely to take part in physical activity<sup>(85)</sup>.

The study by Sleddins (2011) finds that authoritative parenting style in adolescents is a 'positive predictor of physical activity'. In addition to this, adolescents of parents with this parenting style, appear to spend less leisure time on sedentary activities. In line with this positive effect, Van der Horst *et al.* (2007) finds positive associations between physical activity in adolescents and family influences, such as parental encouragement and support for physical activity<sup>(108)</sup>.

The scoping review by Draper *et al.* (2015), looks at social norms and social support on the impact on physical activity<sup>(96)</sup>. Draper *et al.* highlight that, in looking at peer influences on physical activity, Van der Horst *et al.* (2007) find a positive association between friend support and physical activity of adolescents while Salmon & Timperio (2007) show adolescents' physical activity positively associated with social interaction at the neighbourhood level<sup>(96)</sup>.

Draper *et al.*, acknowledge the limited effectiveness of interventions in adolescents to change sedentary behaviour but highlight that interventions involving families or schools seem to be more successful; therefore, suggesting that interventions aimed at increasing physical activity are potentially more promising when integrated with social support<sup>(96)</sup>.

In contrast to findings of this review, Kebbe *et al.* (2017), find that adolescents' behaviour regarding physical activity is negatively influenced by their peers, in that their peers often have unhealthy exercise habits or do not take part in PA. Further to this, some describe negative experiences with peers and bullying, which has led to have negative views of physical education at school, discouraged their participation and even changed activity.

Other intrapersonal issues found by Kebbe *et al.* include being conscious about feelings of inadequacy regarding physical skills and this being on display for peers to see as well as being self-conscious and not wanting to change in front of peers<sup>(43)</sup> or wear revealing clothing<sup>(36)</sup>.

In the study by Peeters *et al.*, the lack of time available to family members is seen as a further barrier to PA<sup>(105)</sup>. Work responsibilities, together with commitments to social gatherings including those for friends and family, mean limited time for PA<sup>(105)</sup>.



### 2.3.3.3 Environment

The review conducted in 2005 by Ferreira *et al.*, looks at the built environment and how it correlates with physical activity in youth<sup>(104)</sup>. The researchers find that there are relatively few studies that examine the physical, socio-cultural, economic or policy aspects of the school environment. There is no association between teacher role modelling and support with adolescent PA, nor is there with the instruction of PA health benefits or special PE programmes. They find that the most consistent positive environmental correlates of PA, are time spent outdoors and school PA-related policies (in children) and non-vocational school attendance (in adolescents)<sup>(104)</sup>.

When looking at potential determinants at the neighbourhood level, although many were identified, only a few were investigated in more than three samples. Interestingly, availability and/or accessibility of PA equipment or facilities were not associated with PA. However, within the socio-cultural environment crime incidence was inversely associated with adolescents PA in two out of three studies<sup>(104)</sup>.

A more recent review was conducted in 2017 by Carlin *et al.*, looking at the physical determinants of physical activity<sup>(106)</sup>. This review was part of the DEDIPAC-KH project looking at biological, psychological, behavioural, physical, socio-cultural and economic policy determinants of PA across the life course. For the adolescent population group, five reviews looked at the physical environmental determinants of PA. There were 'inconsistent associations reported for access/availability of play/PA facilities and equipment in the home' (results mixed) and overall PA, while 'access/provision of school facilities/resources' was positively associated with overall PA in adolescents in all reviews examined<sup>(106)</sup>.

This finding is consistent with that of Kebbe *et al.*, who report that in obese adolescents a 'lack of access to specialised equipment was a barrier to PA'<sup>(89)</sup>. Carlin *et al.* also find that resources like equipment, are in more than 75% of the studies positively associated with PA<sup>(106)</sup>.

In looking at active means of commuting to school, a positive association with PA was found in more than 75% of the studies reviewed for adolescents<sup>(102)</sup> while limited evidence being identified regarding 'access/availability of PA infrastructure/equipment' in the neighbourhood and an association with overall PA in adolescents, with most of the findings being inconsistent<sup>(102)</sup>. Kebbe *et al.* (2017) report that lack of transportation options in relation to parental support<sup>(59)</sup> impedes adolescents' physical-activity options including access to gyms, as were financial constraints, which therefore limited access to a paid gym membership<sup>(36)</sup>.

When looking at the neighbourhood level, certain characteristics were negatively associated with PA including: 'negative street characteristic e.g.: a steep terrain and traffic related hazards e.g. roads and intersections'<sup>(102)</sup>. Further to this, an important reason identified for not exercising was safety. Adolescents who perceived being less safe in their neighbourhood were less inclined to exercise<sup>(59,109)</sup>.

#### **2.3.3.4 Culture**

As part of the DEDIPAC study in Europe, another systematic review looking at the factors influencing physical activity and sedentary behaviour in ethnic minority groups in Europe, was conducted<sup>(110)</sup>. By looking at qualitative and quantitative studies, Langoien *et al.*, identify a number of factors as barriers and enablers of physical activity that are classified according to various clusters, including: social and cultural environment; psycho-social; physical environment and accessibility; migration context; institutional environment; social and material resources; health and health communication; and political environment<sup>(110)</sup>. An important finding, was that 'cultural and religious issues, in particular those relating to gender were recurring factors across the clusters'<sup>(110)</sup>. Findings in research in adolescent population groups showed that during the adolescent period consciousness of one's own body and religious consciousness evolve and affect an individual's involvement in and meaning with regard to physical activity. They highlighted that 'cultural and religious factors can both hinder and facilitate physical activity'.

#### **2.3.4 Enablers of physical activity**

Ferreira *et al.*, conducted a review in 2005 to determine the environmental factors that have an impact on physical-activity levels<sup>(104)</sup>. They found that variables of the home and school were particularly associated with PA levels. The most consistent correlate with PA levels were: fathers' PA level and time spent outdoors and school-related PA policies; support from significant others; mother's education level; family income; and non-vocational school attendance (adolescents). From the neighbourhood perspective, lower crime incidence was associated with high PA levels in adolescence<sup>(104)</sup>. Dumith *et al.* (2012) conducted a population-based study to determine the predictors of changes in physical activity in adolescents. Their findings demonstrate that there are numerous levels of the SEM that have an impact on levels of physical activity including: family, social, biological, behavioural and environmental<sup>(50)</sup>.

#### **2.3.4.1 Intrapersonal**

A study by Peeters *et al.* (2012) finds a number of cognitive, motivating factors for obese adolescents to take part in physical activity, including enjoying it, wanting to reach their goals and having intrinsic motivation<sup>(105)</sup>.

#### **2.3.4.2 Interpersonal**

Evidence shows that adolescents are more inclined to exercise if family members either take part with them or support them with regard to exercise<sup>(89, 90, 105)</sup>. Further to this, support from professionals helps them to realise their exercise potential or by way of the structured professional support through a programme and facilitates them in taking part in PA<sup>(85)</sup>. In the study by Peeters *et al.*<sup>(105)</sup>, one of the perceived facilitators of PA in obese youth taking part in a randomised exercise trial, is 'Family supportive comments'. The percentage of participants who name this as a facilitator at three weeks is 20%, 32% at three months and 33% at six months.

Kebbe *et al.* (2017) find there are mixed opinions as to whether adolescents with obesity enjoy it or find it helpful to exercise with peers, where some do, and others prefer not to. A qualitative study in Australia, which interviewed adolescents, their parents and other community stakeholders, looking at enablers for participating in a healthy lifestyle programme, which included a physical component, identifies some of the key enablers of 'retention' in the programme as, among others: being a 'good experience for adolescents'; 'fun and practical'; 'involving the family'; using online components; and 'having good facilitators'<sup>(111)</sup>.

#### **2.3.4.3 Environment**

Environmental enablers of physical activity including the school and neighbourhood environment have been extensively reviewed<sup>(85, 104, 106)</sup>.

Consistent with the findings of lack of transport being a barrier to PA, studies demonstrate that support from parents by way of transport to a gym facility is helpful in supporting PA<sup>(90,105)</sup>. In the school environment, physical education is seen by some adolescents as an opportunity to acquire new skills, which incentivises them to do better in sport. In looking at studies of children and adolescents combined with respect to 'availability of family transport' i.e. 'parents providing support through transportation', more than 75% of the studies report a positive association with PA<sup>(102)</sup>.

Interestingly, in the review of environmental correlates of PA in youth by Ferreira *et al.*<sup>(104)</sup>, ‘one of the most consistent positive correlates of PA was time spent outside and school activity related policies’. In addition to this they find that with respect to the neighbourhood environment, low crime incidence in adolescents is associated with higher PA<sup>(104)</sup>.

## **2.4 PUBLIC-HEALTH STRATEGIES FOCUSED ON ADOLESCENCE**

### **2.4.1 International guidelines**

The World Health Organisation’s (WHO) Health Promoting School’s (HPS) framework, is a holistic, settings-based approach to promoting health and educational attainment in school<sup>(112)</sup>. A Cochrane review to assess the effectiveness of this approach has been conducted<sup>(113)</sup>. It demonstrated that interventions using the HPS approach were able to reduce students’ BMI, increase physical-activity levels and improve fruit and vegetable consumption.

Further to the general health of learners in schools, there is growing recognition of the specific issue of obesity with several countries developing separate public-health strategies to address child and adolescent obesity, in order to raise awareness and offer guidance on the management of this global health pandemic<sup>(24–26)</sup>.

The WHO further recognises this significant period of growth and development during adolescence and the significance this has on policy and programme development by outlining the importance of adolescent needs as follows:

- ‘Adolescents need explicit attention
- Adolescents are not all the same
- Some adolescents are particularly vulnerable
- Adolescent development has implications for adolescent health
- Adolescent development has health implications throughout life
- The changes that occur during adolescence influence how adolescents think and act
- Adolescents need to understand the processes taking place during adolescence
- To contribute positively, adults need to understand the processes taking place during adolescence.
- Public health and human rights converge around concepts of adolescent development’

## 2.4.2 Local guidelines: The Integrated School Health Policy (ISHP)

In South Africa, the current school health service is a 'health promotion and preventative school-based service, delivered to children who attend formal school'<sup>(114)</sup>. It forms a continuum of healthcare between the early childhood years and adulthood.

In 2003, following the observation that there were health inequities in SA school health services (115), there was a call to bring about change and greater equality in health, with the development of the National School Health Policy (NSHP). However, an evaluation of the policy six years after it had been put in place, identified various shortcomings in its development and implementation<sup>(114)</sup>. These included: 'low service provision coverage across most districts, as measured by coverage by Grade 1 health assessments, suboptimal and inequitable nurse to school ratios and the absence of referral services to respond to problems identified through screening assessments'<sup>(114)</sup>.

These failures brought the inadequacy of the SA National School Health Policy into the spotlight. The South African Government was also committed to 'putting children first'. As such, in 2010, it became a signatory to the United Nations Convention on the Rights of the Child, which then spearheaded the revision and development of the ISHP. The ISHP was drafted to outline the collaborative approach between various South African role players, in order to achieve optimal health and wellbeing for children in order to help them reach their fullest potential<sup>(28)</sup>.

The revised school health policy was launched in 2012, by South Africa's former President Mr. Jacob Zuma<sup>(28)</sup>. It is an integrated policy between the National Departments of Health (NDoH) and Basic Education (DBE) with a five-year plan (2012–2016).

It has several key components:

- Health assessments
- Health education and education
- Psycho-social and mental health assessments
- Identification and support of children with chronic health conditions
- Facilitating the creation of safe and healthy school environments
- Preventative interventions
- Addressing minor ailments

The South African ISHP draws its direction and focus from national legislative frameworks, together with a range of health, education and social development policies as well as a number of international initiatives, including the following:

- The FRESH (Focusing resources on effective school health) model, which is an interagency initiative launched in 2000 at the World Education Forum in Dakar. FRESH revolves around four activities: health-related school policies; providing safe water and sanitation; skills-based health education; and school-based health and nutrition services – all of which should be made available together in schools<sup>(116)</sup>.
- UNICEF's concept of Child Friendly Schools, has a rights-based approach to development in learning with a focus on removing barriers to learning, promoting inclusiveness, and addressing education quality, safety and protection issues as well as health<sup>(117)</sup>.
- The WHO's Global School Health Initiative led to the emergence of the Health Promoting School Concept, which recommends: a school environment that focuses on caring for oneself and others; making healthy decisions and taking control over life's circumstances; creating conditions that are conducive to health (through policies, service, physical/social conditions); building capacities for peace, shelter, education, food, income, a stable ecosystem, equity, social justice and sustainable development; preventing leading causes of death, disease and disability (helminths, tobacco use, HIV/AIDS/STDs, sedentary lifestyle, drugs and alcohol, violence and injuries and unhealthy nutrition); and influencing health-related behaviours (knowledge, beliefs, skills, attitudes, values, support)<sup>(112,118)</sup>.
- Within the basic-education sector, school health services are an integral part of the National Department of Basic Education (DBE)'s framework, *Care and Support for Teaching and Learning* (CSTL). The CSTL is a comprehensive, co-ordinated, multi-sectorial response to address barriers to teaching and learning, with nine priority areas, two of which include nutritional support and health promotion.

### **Aim of the ISHP**

The aim of the ISHP project was to reduce maternal and child mortality across South Africa by strengthening primary healthcare services through a collaborate approach between existing departments and teams and facilitating the 'support' and 'technical' requirements of the delivery of these services<sup>(28)</sup>.

### **Goals of the ISHP**

The goal of the ISHP, as outlined in the ISHP, is 'To contribute to the improvement of the general health of school- going children as well as the environmental conditions in schools and address health barriers to learning to improve education outcomes of access to school, retention within school and achievement at school'.

The ISHP seeks to build on existing school health services using several strategies including the following:

- Health promotion and health education
- Provision of a preventative and other health services in schools
- Co-ordination and partnership
- Capacity building
- Community partnership

The policy explains that health education is to be carried out as part of the life orientation curriculum, however that, particularly in secondary schools, life-skill teaching should be supplemented by 'extra co-curricular or school-based activities' where there may not be sufficient time to cover health and social issues comprehensively.

The policy outlines the school health package for each of the learning phases: Foundation Phase (Grades R-3), Intermediate Phase (Grades 4-6), Senior Phase (Grades 7-9) and Further Education and Training (Grades 10-12). For each of these stages the health screening and assessment, on-site service and health education is described.

One of the key elements of the ISHP is the recommended implementation of nutritional assessment and nutrition education for learners, in each of the learning phases. Nutritional assessment is described as measurement of height, weight and BMI, with appropriate nutritional interventions to be planned accordingly.

Further to the above the policy describes under 'Follow Up and Referral', that there should be 'mechanisms' in place for learners to access services where needs cannot be met in the school.

### **Review of the ISHP policy**

The Reducing Maternal and Child Mortality Through Strengthening Primary Healthcare (RMCH), was a three-year, UK-funded project, implemented by the SA Government from 2012 to 2015<sup>(119)</sup>. The overall goal of the project was to 'strengthen efforts to improve the quality of and access to reproductive, maternal and child health services in districts with the worst maternal and child health outcomes in order to work towards their goal of reducing maternal and child mortality across SA<sup>(119)</sup>.

The programme had four key focus areas. For this thesis we will only be addressing output number 2. The second output focused on strengthening the delivery of ward-based PHC, part of which included school health services. The aim of the RMCH programme was 'to strengthen school health delivery to support achievement of the ISHP goal of improving the general state of health of school aged children, environmental conditions in schools and addressing the health barriers to learning'<sup>(119)</sup>.

Unfortunately, one of the limitations of the ISHP, is that little focus is placed on the adolescent obesity public-health concern. The SA Government has developed the 2015–2020 strategy for tackling obesity including the prevention of childhood obesity<sup>(27)</sup>, which was published after the development of the ISHP. To address this SA adolescent obesity issue, the obesogenic environment needs to be better understood so that public-health promotion programmes can be better tailored to suit adolescent specific needs.

## **2.5 MOTIVATION FOR STUDY**

In South Africa, public-health promotion initiatives for adolescents, focusing on physical activity and healthy eating, are essential to addressing the growing adolescent obesity epidemic evident in urban areas.

Although the government has implemented the ISHP to address health in schools, assessment of the implementation of the ISHP has demonstrated its's short comings. Further to this, studies assessing the awareness and implementation of specifically the nutritional component are lacking.



There is more need than ever, for further research to better understand this adolescent obesity phenomenon. Greater awareness and knowledge of the specific barriers and enablers of the urban adolescent obesogenic environment is required. This will facilitate the tailoring of intervention programmes to better meet the specific cultural and generational needs of the SA urban, adolescent population; qualify the appropriate provision and allocation of limited resources and help to inform Government for legislation change and policy development.

This qualitative study sought to develop a greater understanding of the awareness and implementation of nutritional aspects of the ISHP through soliciting the opinions of members of the school health team through individual interviews. Further to this, it sought to gain a sound understanding of the perceptions of the barriers and enablers of physical activity and healthy eating for the urban adolescent population of the Cape Town Metropole, through exploring the views of adolescent learners by holding focus-group discussions. This study will help to inform stakeholders of the awareness of nutritional aspects of the ISHP and guide policy makers in the development and implementation of locally relevant, specific public-health promotion interventions, for addressing the South African, urban, adolescent obesogenic environment at a local and national level.

## CHAPTER 3: METHODS

### 3.1 AIM OF THE STUDY

The aim of this study was to perform an assessment of school nutrition policies and programmes in relation to adolescents and the obesogenic environment in urban areas of the Cape Town Metropole, by engaging with stakeholders and learners through a participatory approach in order to identify opportunities for impacting on obesogenic behaviour.

This thesis argues that there is a need to better understand the complexity of the urban South African adolescent obesogenic environment and in so doing identify barriers and opportunities to address these.

### 3.2 RESEARCH QUESTION

What is the nature of the obesogenic environment for adolescents in the Cape Town Metropole of the Western Cape, South Africa and what are the potential barriers and enablers of the obesogenic environment?

### 3.3 OBJECTIVES OF THE STUDY

In order to meet the proposed study aim, the following objectives were set:

- To assess the interpretation and implementation of National Integrated School Health Policy in schools in the Western Cape in relation to obesity in adolescents
- To assess the knowledge and awareness of stakeholders in relation to the ISHP in schools in the Metropole District of the Western Cape
- To assess the extent of nutrition programmes and activities in schools in the Metropole District
- To identify which programmes/interventions are in place to address obesity and physical activity
- To identify resources available for nutrition services available for adolescents in school
- To assess barriers and enablers affecting obesogenic behaviour including those for physical activity and nutrition

### **3.4 STUDY DESIGN**

The overall project is a three-phase study, titled 'Investigating Nutrition and Physical Activity Behaviour of Adolescents in the School Environment' with the aim to assess the nutritional profile, obesogenic environment and physical-activity behaviour of adolescent boys and girls in secondary schools in the Western Cape province, South Africa.

This study reported here formed Phase-2. Phase-1 and 3 will not be discussed in this thesis.

Phase-2 was a cross-sectional qualitative study. The study made use of focus groups and individual in-depth interviews to engage with stakeholders, including school learners and members of the school health team, to assess barriers and enablers affecting the obesogenic environment.

### **3.5 STUDY POPULATION**

A Cape Metropole school population was studied. This included approximately 27 406 Grade 8 learners as well as school staff and members of the PTA from 160 government secondary schools across the four EMDCs of the Cape Town Metropole.

#### **3.5.1 Focus-group discussions (FGDs)**

The focus groups participants included male and female Grade 8 learners, from government secondary schools based across the four EMDCs of the Cape Town Metropole: North, Central, East and South in the Western Cape, South Africa.

#### **3.5.2 Individual in-depth interviews (IDIs)**

Participants for the individual interviews included those at school level with representation from the school health team (principals, life orientation teachers and counsellors) school tuck-shop managers and parent representatives from the PTA.

Originally the plan was to interview individuals from school, district and provincial level. However due to time and financial restraints and the amount of data collected at school level, it was decided, together with the study supervisors, that for the purpose of this Master's thesis, it would only be realistic to collect data at school level for the individual interviews.

### 3.6 SAMPLING STRATEGY

#### 3.6.1 Sample size and selection methods

A list of all public secondary schools was obtained from the Department of Education for the Cape Town Metropole District. A proportional stratified sampling method was followed. First, for logistical reasons, the sampling frame was stratified into the four sub-districts (Central, East, North and South). See Table 3.1. Schools were then randomly selected from each of the Cape Town Metropole Districts so that the number of schools selected was proportional to the total number of schools for that district.

To achieve the sample size required for Phase-1 for statistically appropriate figures, five schools were selected randomly from the 160 public secondary schools in the Cape Town Metropole, from each of the four EMDCs, identifying a total of 20 eligible schools. Of these 20 schools only 10 schools agreed to take part in Phase-1. The parents of 1031 learners provided consent for their participation resulting in this final number of participants who also provided assent.

**Table 3.1: Sample frame**

<b>Districts within Metropole</b>	<b>Total no. of secondary schools</b>	<b>No. public schools</b>	<b>Total no. of children (public schools) (Grade 8–12)</b>	<b>No. of Grade 8 children (public schools) (assuming equal distribution between grades)</b>
Central	60	46	31499	6299
East	34	31	34381	6876
North	51	48	46986	9397
South	42	35	34172	6834
	<b>187</b>	<b>160</b>	<b>147 038</b>	<b>27 406</b>

\* Assuming an equal number of children per school, 160 schools will yield an average of 183 Grade 8 learners per school

Initially it was proposed that for Phase-2, a sub-sample of 50% all Grade 8 adolescent boys and girls who took part in the Phase-1 study were eligible for the focus-groups discussions. However, because the sample for Phase-1 was smaller than originally intended, all 10 of the schools that took part in Phase-1 were considered for inclusion in Phase-2. Of the 10 schools, seven agreed to take part in Phase-2. One school was cancelled due to safety and security

concerns following a school homicide and two of the schools were not approached to take part in Phase-2 due to time and budget constraints.

**FGDs:** Purposive sampling of the learners who participated in Phase-1 of the study was carried out by the school study facilitator based on guidance criteria given by the study investigator. Twelve girls and boys in each school were approached and offered the opportunity to take part in Phase-2. Two focus-group discussions, a girls' and boys' group at each of the seven schools, totaling 14 focus-group discussions took place. Each focus group had between eight and 12 participants. Boys and girls were separated due to the sensitive nature of the topic of obesity and the perception that adolescents may feel more comfortable talking about the topic with peers of the same sex.

**Individual interviews:** Initially it was proposed that purposive sampling of three people representing the school health management team would be performed. During Phase-1 and with the commencement of Phase-2 it became apparent that in most of the schools, there was no official school health team. The study investigator requested that the school study facilitator offer the opportunity to be interviewed, to the principal, LO teachers, school nurses and any other members involved in learner health (counsellors) as well as members of the PTA and school tuck-shop managers and/or other food service managers.

There were three interviews held at six of the schools. At the seventh school, two interviews were held due to there not being another eligible participant available on the day of data collection. As there was sufficient data collected with representation of individuals across the school level it was decided that it was not necessary to go back to the school to conduct another interview.

A total of 20 individual interviews were held and included: six principals, six LO teachers, two PTA, four food service management (i.e. tuck-shop or other) and two counsellors.

### **3.7 DATA COLLECTION**

#### **3.7.1 Preparation and training**

Considering this being a 3-part study, initial contact in writing, with the DOE, was made by the main supervisor Professor Blaauw, who requested permission to conduct Phase-1 and Phase-2, once Ethics approval of the study had been granted (Addendum 1). Once permission had been granted by the DOE (Addendum 2), contact was then made, and permission sought from

the principals of the 20 randomly selected schools to conduct Phase-1 and subsequently Phase-2 (Addendum 3). Of these 20 schools, 10 principals agreed to take part. Study information sheets and parental consent forms were then sent to all eligible participants inviting them to take part (Addendum 4).

Although attendance at the Phase-1 data-collection days, was not a requirement for Phase-2, the study investigator felt it would be beneficial to be present to see the implementation of Phase-1. The Phase-2 study investigator attended the data-collection days for seven of the nine schools that took part in Phase-1 between 28<sup>th</sup> February and the 16<sup>th</sup> March 2017. This provided an opportunity to gain a richer understanding of the environment including the location and school facilities, for the purposes of data analysis and discussion, in Phase-2. Further to this, it provided an opportunity to meet and become acquainted with the school study facilitators in order to be able to better facilitate the co-ordination of Phase-2.

Once Phase-1 of the study had been completed, the Phase-2 study investigator contacted the key contact/study facilitator within each school via email and/or telephone with further specific information regarding Phase-2, including a summary, outlining the following:

- Phase-2: What the study was about
- Participants: Who was eligible, and the number required for FGDs and individual interviews
- Venue: What was required (private, quiet and comfortable)
- Language: Conducted in English with option of an Afrikaans or a Xhosa interpreter offered. The school study facilitator was asked, based on the learners' language fluency, whether the focus-group discussion should be held in English, Afrikaans or Xhosa, in order that an interpreter could be arranged, if necessary.
- Dates: The study investigator requested that the study facilitator identify potential convenient dates and times for the school for the investigator to conduct the data collection.

**FGDs:** The study investigator then sent the school study facilitator a list of learners who took part in Phase-1 and the facilitator was asked to purposively select 10–12 female and 10–12 male learners who they felt would have been most willing to share their thoughts and views in a group discussion.

**IDIs:** The school study facilitator was asked by the study investigator to liaise with the eligible participants for the IDIs, as outlined above in the sample population.

### 3.7.2 Raw data collection

Data collection of Phase-2 was performed by the study investigator and took place from 16<sup>th</sup> May 2017 until the 1<sup>st</sup> June 2017. Once a mutually convenient date and venue had been arranged for each school, the investigator attended the school to conduct the focus-group discussions and interviews. The investigator was presented with the list of the participants for focus-group discussions and individuals for the interviews either the day before or on arrival at the school.

**FGDs:** At each school, the purposively selected learners were called to attend the FGDs with girls being held separately from boys. FGDs were held on the school premises, in school hours during a non-significant academic time slot for the learners with all due permissions. All of the focus-group discussions were held in English; although Afrikaans and Xhosa interpreters were offered, none were requested.

Once the participants had arrived at the venue, the investigator verbally checked that each participant had taken part in Phase-1 and that their name was on the list compiled by the school study facilitator. They were asked to take a seat at one of the chairs arranged in a small group formation. The study investigator welcomed them and thanked them for coming. They were informed further about the study and provided with the informed-assent forms (Addendum 5). They were requested to sign the assent form if willing to take part in the study. As the learners had already taken part in Phase-1, their parents were not required to complete another informed consent as Phase-1 informed them of Phase-2 and in signing, they gave their permission for their child to take part in Phase-2.

The study investigator then proceeded to run through a predetermined list of questions (Addendum 6). As different methods of data collection can be used in qualitative research, the researcher identified a semi-structured approach to be most appropriate method for the use of data collection for both the FGD's and the IDI's. The predetermined list of question for the focus groups was initially drawn up by the study investigator to ensure that relevant information was collected to answer the research objectives. This list was reviewed and edited by the study supervisors and further prompts added by the study investigator. The focus-group discussions lasted between 20–45minutes. Although the guides were designed to guide the FGD's and IDI's to meet research objectives the participants were encouraged to freely share their views around the subjects raised.

Each FGD was audiotaped with permission from all the participants (See Addendum 5) by the investigator using a Philips DVT2510 audio recorder. In addition to the audio recording, the researcher had a hardcopy of the predetermined questions on hand to record the data in the event of failures of the audio-recording equipment. There were no issues with the functioning of the audio-recording equipment during the recordings.

At the end of the FGD the participants were thanked for taking part and handed a copy of the information sheet (Addendum 5) and given an apple as a token of appreciation for their time and efforts.

**IDIs:** Individual interviews took place at the schools in an allocated room arranged by the school study facilitator. A semi-structured approach was used in which a pre-determined list of questions guided the interview. The predetermined list of questions (Addendum 7) was initially drawn up by the study investigator, reviewed and edited by the supervisors and further prompts added by the study investigator. This style of data collection ensured that the investigator was able to address the issues to be investigated but be flexible with phrasing and probe further where relevant. All interviews took place in English. Upon their arrival, participants were welcomed and thanked for being willing to take part. Participants were given further information about the study; asked to provide consent (Addendum 8) if willing to take part and requested to complete the socio-demographic form (Addendum 9). For each interview the investigator ran through a predetermined list of questions (Addendum 7). Each of the interviews was audiotaped with permission from the participants, by the study investigator using a Philips DVT2510 audio recorder. In addition to the audio recording, the study investigator had a hard copy of the predetermined questions on hand to make notes of the data in the event of failures in the audio-recording equipment. There were no issues with the functioning of the audio-recording equipment.

At the end of the interview, the participants were thanked for taking part, handed a copy of the information sheet (Addendum 8) and given an apple as a token of appreciation for their time and efforts.

### **3.8 ANALYSES**

Ritchie *et al.*<sup>(120)</sup> describe the analysis of qualitative data as a continuous and iterative process, meaning that it is an active and reflective process requiring the researcher to visit and revisit the data, connect it to emerging insights and refine interpretations further<sup>(121)</sup>. There are two important stages that characterise the process: the first being data management and the



second being data interpretation<sup>(120)</sup>. Data management is the process of making the vastness of the raw data manageable, while the interpretation stage is the process of 'making sense' of the data<sup>(120)</sup>.

### **3.8.1 Data management**

Raw data in qualitative research can come in different forms<sup>(120)</sup>. In this study, the raw data is in the form of audio files from the recorded FGDs and IDIs. Once the raw data of individual interviews and focus-group discussions had been collected, because of the volume of raw data, a transcription service ([www.toptranscriptions.co.za](http://www.toptranscriptions.co.za)) was employed to transcribe the audio in order to save the study investigator time. To make the raw data more manageable, the qualitative data-analysis approach as outlined by Ritchie *et al.* (2014) has been applied.

These five steps include:

1. Familiarisation of data
2. Construction of an initial thematic framework
3. Indexing and sorting of data
4. Reviewing data extracts
5. Data summary and display

#### **3.8.1.1 Familiarisation of data**

To get a clearer overview of the content, the raw data set was reviewed by the study investigator. In this process, the investigator simultaneously revisited research aims and objectives and re-examined the profile of the sample collected to identify gaps and over-emphasis of data. This process allowed the investigator to get a clearer picture of the characteristics of the data set. This process was performed for all 14 FGs and 10 of the 20 interviews. The researcher felt that the familiarisation of these transcripts had provided enough information to determine the main characteristics of the data set.

The study facilitator used a manual approach of reading and then writing notes to identify key words and emerging themes. Through this process, as well as feedback from the main supervisor during data collection, the facilitator noted the importance of using the initial questions as an 'ice-breaker' and moving on to the collection of other relevant data so as not to run out of time. It was noted from the raw data that little awareness, and what felt like limited data was emerging regarding the ISHP. However, following a discussion with the study supervisors, this in itself was thought to potentially provide answers to objectives, rather than being a shortfall or limitation.

### 3.8.1.2 Construction of initial thematic framework

By reading and examining the data, the study investigator identified topics of a predominantly 'substantive nature' that is, attitudes and views around the relevant questions about the ISHP and obesogenic environment for adolescents in the Cape Town area. This process and the information it provided, allowed the study investigator to identify the initial emergent themes and concepts. These initial themes were summarised in the form of two thematic frameworks. Table 3.2 outlines the thematic framework for FGDs while Table 3.3 indicates the thematic framework established for IDIs.

**Table 3.2: Outline of the thematic framework for FGDs**

<b>Main theme</b>	<b>Sub-theme</b>
<b>Favourite foods</b>	What?
	Reason?
	Frequency?
	Affordability?
	From where?
<b>Least favourite foods</b>	What?
	Reason?
	Frequency?
	Affordability?
	From where?
<b>Physical activity</b>	Liked or not?
	How does it make one feel?
	What?
	When?
	Why not if don't?
<b>Healthy weight</b>	Linked with health or not?
	Where do messages come from?
	Where would they like to get them from?
<b>Overweight</b>	Causes?
	Problems?
	What is done to lose?
<b>Solutions to help problem of obesity</b>	What needs to change?
	Who can help?
	What can schools do?
	What can the community do?

**Table 3.3: Outline of the thematic framework for IDIs**

<b>Main theme</b>	<b>Sub-theme</b>
<b>Perception of current nutrition situation</b>	Nutrition profile
<b>Obesity</b>	General
	Causes
	Consequences
	Who needs to help?

	What support do parents need? How can the community help? What can Government do?
<b>ISHP</b>	Familiar with it?
	What is being implemented?
	Who is implementing?
<b>Nutrition services</b>	Who is responsible?
	What structures/resources are in place?
	What system is in place?

### 3.8.1.3 Indexing and sorting of the data

'Coding' in the context of qualitative research, refers to active the process of 'labelling and systematising the data' or 'identifying data as belonging to some type of phenomenon'<sup>(121)</sup>.

**Primary-cycle coding:** The 'initial' or 'first cycle' coding is also known as primary-cycle coding. In this study, the computer software package '*ATLAS.ti 8*' has been used for the data management and analysis. Being a sophisticated research software package, it provides one with the tools for computer-aided coding and linking of data in an efficient and meaningful way. This is particularly beneficial when dealing with a significant amount of raw data, as in this study. The transcribed word documents were uploaded to '*ATLAS.ti 8*'. From the emergent themes 24 Primary-level codes were then created (See Table 3.4). The data was read in '*ATLAS. Ti 8*' and words or phrases were assigned to one of the primary-level codes. This analysis was carried out in conjunction with re-reading the 'familiarisation phase' hand notes made on Post-It notes.

**Table 3.4: List of the 24 primary-level codes**

Challenges – general
ISHP- awareness
ISHP- current nutrition policy
ISHP- monitoring
ISHP- who responsible
ISHP- awareness
ISHP- support from outside
ISHP- Government involvement
What do you enjoy about PA?
What are enablers for PA?
What needs to change in community?
What needs to change in school?
What needs to change in general to be healthier?
Obesity programmes
Obesity solutions
Sources of information
Barriers to exercise
Barriers to HE

Enablers of HE  
 Nutrition profile in school  
 Obesity causes  
 Obesity consequences  
 Support parents need  
 Who is responsible for helping adolescents?

In addition to establishing primary-level codes, the study investigator formed groups of like participants in order to be able to compare and contrast the content between participants. The following groups of participants were set up: principals, LO teachers, counsellors, PTA representatives, other members involved in nutrition services, girl FG participants and boy FG participants. While coding in 'ATLAS.ti 8', memos were concurrently written on the emergent themes on 'ATLAS.ti 8' and copied to Word for back-up purposes. See Table 3.5 for list of the coding memos.

**Table 3.5: List of the coding memos**

Causes of obesity  
 Challenges – general  
 Barriers to exercise  
 Barriers to HE  
 Enablers of healthy eating  
 Enablers of PA  
 Foods – favourite  
 Foods – least liked  
 ISHP  
 Nutrition support from outside  
 Solutions to obesity  
 Sources of health info  
 Support required  
 What needs to change in community?  
 What needs to change in school?

Throughout this process, the research questions were reviewed and the suitability of the data assessed in order to determine whether there was adequate information to answer the research objectives. This was cross-referenced as in Table 3.6.

**Table 3.6: Table of cross-checking of codes and study objectives**

Code Number	Code	Research question answered	Objective answered
1	Challenges – General	ISHP	1
2	ISHP – Government involvement	- What is the awareness	2
3	ISHP – Responsible		3
4			5

5	ISHP – Awareness	- What nutrition aspect implemented?	
6	ISHP – Current service		
7	ISHP – Policy		
8	ISHP – Monitoring ISHP – Support from outside	- What activities taking place?	
9	What do you enjoy about exercise?	PA enabler	6
10	What are enablers of PA	PA enabler	4, 6
11	What needs to change in community?	HE barrier/enabler PA barrier/enabler	6
12	What needs to change in school?	PA barrier/enabler HE barrier/enabler	6
13	What needs to change to be healthier?	PA barrier/enabler HE barriers/enabler	6
14	Obesity programmes		4
15	Obesity solutions		6
16	Obesity sources of information?		
17	Barriers to exercise	PA barrier	6
18	Barriers to healthy eating	HE barriers	6
19	Enablers of HE	HE enabler	5, 6
20	Nutrition profile in school		
21	Obesity causes	PA barriers HE barriers	6
22	Obesity consequences		
23	Support parents need?	Extra – solutions	6
24	Who is responsible for helping?		6

**Secondary-level coding:** This stage of coding involves ‘explaining, theorizing and synthesizing’ the data<sup>(121)</sup>. It is the process whereby one is looking for ‘patterns, rules or cause-effect progressions’<sup>(121)</sup>. In this phase, the study investigator examined the primary-level codes and content associated with it, then categorised the codes into interpretive concepts. These interpretive concepts were then used to form secondary-level codes, otherwise known on ‘ATLAS.ti 8’ as Code Groups. See Table 3.7.

**Table 3.7: List of secondary-level codes (Code Groups)**

<p><b>Overview of nutrition in Cape Town schools in relation to ISHP (Objectives 1, 2 ,3)</b>  ISHP awareness  ISHP responsibility  ISHP policy  ISHP education, assessments, referrals  Other: programmes</p> <p><b>Barriers to healthy living for Cape Town adolescents (Objectives 4, 5, 6)</b>  Barriers to PA  Barriers to healthy eating</p> <p><b>Enablers of healthy living for Cape Town adolescents (Objectives 4, 5, 6)</b>  Enablers of PA</p>
--

Enablers of healthy eating

**Solutions to addressing obesogenic environment for Cape Town adolescents  
(Objectives 4, 5, 6)**

What needs to change in school?  
What needs to change in community?  
What support do parents need?  
Resources required?

**3.8.1.4 Reviewing the extracts**

According to Ritchie et al.<sup>(120)</sup>, it is in this stage that the collections of indexed data are reread and refined further. The study investigator continually checked the data content being assigned to primary codes to ensure that there was data from each of the relevant participants or participant groups.

If there were gaps, then the transcription was reread, and relevant content assigned to the appropriate primary-level code. In some instances, this may have meant that the data was found to be relevant to another code. When this occurred, the data was added to further relevant codes.

**3.8.1.5 Data summary and display**

Data was then analysed using the 'ATLAS.ti 8' software programme in conjunction with hand-written notes. For each secondary-level code, the search quotations were identified by 'ATLAS.ti 8' and checked by the investigator to determine if all relevant participants or participant groups were adequately represented. If not, the documents were re-read to see if any relevant information, perceptions and corresponding relevant quotes had been omitted and were subsequently added if this was so.

Once the investigator was satisfied that all relevant participants were represented, the facilitator determined the overall similarities and differences in the participants' views for the relevant secondary-level code, from the search quotations retrieved by 'ATLAS.ti 8' together with hand-written notes. These quotations, hand notes and memos made throughout, were then written up and presented accordingly in order to share the 'essence of the evidence' as recommended by Ritchie et al<sup>(120)</sup>.

## **3.9 ETHICAL CONSIDERATIONS**

### **3.9.1 Ethics and permission**

The study proposal was submitted to the Division of Human Nutrition, Stellenbosch University, for review by the study supervisors. In addition to this, since the research involved direct interaction with participants, the study was also reviewed by the Health Research Ethics Committee of Stellenbosch University. Ethics was granted in October 2016 (Ethics Reference #: N16/08/100) (Addendum 1). Permission to conduct the study in schools was granted by the DOE in 2016 (Addendum 2).

### **3.9.2 Informed assent and consent**

#### **3.9.2.1 FGDs**

Parents of learners were asked to provide written consent prior to Phase-1 taking place, which, by so doing, also granted permission for the learner to take part in Phase-2. It was therefore not necessary to request consent again separately prior to Phase-2. When the participants arrived for the FGD, information regarding the study was given, including the intention to audio record the discussion. Adolescent participants were requested to give informed assent (Addendum 5) immediately prior to taking part in the focus-group discussion.

#### **3.9.2.2 IDIs**

When the participants arrived for the individual interviews, information regarding the study was given, including the intention to audio record the interview. Participants were required to consent in writing prior to the interview both to take part and for their responses to be recorded (Addendum 8).

### **3.9.3 Participant confidentiality**

Participants were assured of confidentiality both in writing on the informed consent and assent forms, in addition to verbally prior to signing the assent and consent forms.

Privacy in information gathering has been conducted at all times. Focus-group discussions and individual interviews were held in private spaces. Socio-demographic forms completed by individual participants have been coded to maintain confidentiality. Anonymity of information collected has been further exercised by deleting any names mentioned in the audios on the transcripts and saving audio files with codes.

Personal details have not been linked in any way to personal views or experiences. The data collected has only be used for the purposes of this study and will not be shared with anyone in any form in the future, other than for the purposes of the study.

No issues arose where there was a need to refer an individual due to concerns raised and therefore no individual details have been disclosed.

Stakeholders at school and district level will be invited at a mutually convenient time for feedback regard the findings of the study.

### **3.9.4 Refreshments and transport costs**

Participants of the FGD and in-depth interviews were given a piece of fruit once they finished taking part in the study. No transport costs were incurred by the participants.

### **3.9.5 Perceived risks**

There were no perceived risks with taking part in this study. The proposed benefits of the study would be that it would provide a better understanding of the awareness and implementation of nutrition aspects of the ISHP, as well as perceptions of the barriers and enablers of the obesogenic environment for the adolescents in the Cape Town Metropole.

This information will be passed on to relevant stakeholders and could be used to inform future research and the design of public-health policy and programmes in order to address the adolescent obesity epidemic.

## **3.10 PILOT STUDY**

The first school to be visited for Phase-2 of the study was used for the purposes of the pilot study. This pilot study took place on the 16<sup>th</sup> May 2017.

Two focus groups were held, one of girl participants and one of boy participants. Three IDIs were conducted (principal, LO teacher and nutrition co-ordinator).

The study investigator asked the school study facilitator to purposively select individuals who would be willing to contribute to the discussion.

The pilot study offered the study investigator the opportunity to see logistically how feasible it would be to recruit participants, arrange the data-collection days, co-ordinate data collection



on the day, check operation of the dictaphone as well as facilitate the discussions and interviews.

The study investigator was able to see that the communication and organisation in preparation for the day had worked well. In addition, the FGD guide and IDI schedule were judged to be appropriate. The investigator downloaded the recording in the evenings and was able to check that the operation of the dictaphone had been successful.

Although the room allocated for the purposes of the discussions and interviews was private, it proved slightly disruptive with the corridor noise from other pupils. The investigator used this experience to emphasise the importance of a quiet room for future data-collection days in order to be able to hear and record the participants effectively.

Further to this, the study investigator was able to see that, although the FG participants were purposively selected based on being willing to contribute, some of the participants made few or no comments. This highlighted to the study investigator the importance of recognising sensitivity issues in FGDs as well as the importance of being mindful in her choice of words, tone and body language to make individuals feel comfortable enough to comment. It also highlighted potential cultural and language barriers and the importance of offering the translator for future schools.

For this pilot study the investigator forgot to take the information sheets to be handed out at the end of the study. This led the study investigator to develop a checklist of resources required for the purposes of each school visit (Addendum 10).

Due to the dates that were granted by the DOE for the purposes of data collection in schools, time pressure to meet this deadline did not allow the study investigator to transcribe and analyse the data at the time of collection, for the purposes of the pilot study.

## CHAPTER 4: RESULTS

The results chapter commences by providing a description of the profile of the participants of this study. This is followed by a description of the main themes that emerged from all discussions. Predominant themes from the FGD and IDI are grouped together. An overview of participants' perceptions of nutrition services currently taking place in schools is described; it includes participants' awareness and understanding of the ISHP (nutrition) and the implementation thereof. This is followed by participants' views of the aetiology of obesity, and their thoughts on the challenges and opportunities of the obesogenic environment for adolescents. Finally, participants' suggestions for potential ways to address some of the obesogenic challenges for adolescents is outlined.

### 4.1 DESCRIPTION OF THE PARTICIPANTS

#### 4.1.1 Focus groups

Fourteen FGDs were held, totalling 153 participants. Participants included 78 boys and 75 girls from seven secondary schools. Two FGDs were held at each school – one of boy participants and one of girl participants. Table 4.1 outlines the number of participants in each of the focus groups at each school and the total numbers of both girl and boy participants.

**Table 4.1: Number of participants (focus groups)**

Focus groups	School 1	School 2	School 3	School 4	School 5	School 6	School 7	Total
Girls	9	10	12	11	11	11	11	75
Boys	12	11	11	12	8	12	12	78
<b>TOTAL</b>	<b>21</b>	<b>21</b>	<b>23</b>	<b>23</b>	<b>19</b>	<b>23</b>	<b>23</b>	<b>153</b>

#### 4.1.2 IDIs

Twenty participants took part in the individual interviews. These included: six principals, six LO teachers, two PTA representatives, two counsellors and four individuals involved in nutrition services in the school. One participant (a counsellor), requested to discontinue the IDI after a few minutes, for health-related reasons. Table 4.2 describes the profile of the participants for the IDIs.

**Table 4.2: Description of participants selected for IDIs**

School	Participant	Gender*	Age	Position
School 1 Interview 1	1	M	63	Principal
School 1 Interview 2	2	M	26	SHT (counsellor)
School 2 Interview 1	3	M	58	Principal
School 2 Interview 2	4	F	37	SHT (National Nutrition Programme Support)
School 2 Interview 3	5	F	22	SHT (National Nutrition programme Support)
School 3 Interview 1	6	M	52	SHT (rugby coach)
School 3 Interview 2	7	F	Incorrectly recorded	LO teacher
School 3 Interview 3	8	M	62	Principal
School 4 Interview 1	9	F	32	LO
School 4 Interview 2	10	F	54	PTA
School 4 Interview 3	11	F	57	Department head and psychologist/counsellor
School 5 Interview 1	12	M	58	Principal
School 5 Interview 2	13	F	43	Tuck-shop manager
School 5 Interview 3	14	M	31	LO teacher
School 6 Interview 1	15	F	40	PTA member
School 6 Interview 2	16	F	25	LO teacher
School 6 Interview 3	17	M	58	Principal
School 7 Interview 1	18	M	50	Principal

School 7 Interview 2	19	F	52	LO teacher
School 7 Interview 3	20	F	Incorrectly recorded	SHT (Feeding support)

\*M=Male, F=Female;

The main themes identified during the analysis could be grouped into five overarching categories:

1. Participant perceptions of school nutrition services in relation to the ISHP and obesity
2. Perceptions of the aetiology of obesity in adolescents
3. Challenges of the obesogenic environment
4. Opportunities within the obesogenic environment
5. Suggestions of ways to address the obesogenic environment

## 4.2 SCHOOL NUTRITION SERVICES IN RELATION TO THE ISHP AND OBESITY

### 4.2.1 ISHP: Awareness

Participants of the IDIs were asked about their awareness and understanding of the ISHP. There seemed to be little or no awareness of the ISHP. Of the principals who took part, one knew of the ISHP while two had heard of it but explained that they did not know much about it. One principal said that he *'probably'* knew of it and two principals said they had not heard of it.

*'Not so familiar. I've read it but I mean I won't be able to quote it.'* (Principal)

The majority of LO teachers were not aware of the ISHP, while one stated that the school had the manual but that they were not using it.

Neither of the counsellors nor PTA representatives were aware of the policy. Of the nutrition service participants, most were not aware of the ISHP and one participant had *'heard of that'*.

*'No, the only thing we, we've, they've put it in the curriculum that I know, after 2010, that exercise class once a week is, every school must do it, but some schools doesn't do it, ja.'* (Counsellor)

#### 4.2.2 ISHP: Responsibility

When asked about a nutrition lead within the school, most of the principals interviewed explained that there was no one who took responsibility for the nutrition policy or services within the school.

One of the participants explained the reason for this was that they could not ask someone to be responsible for a policy if there was no policy indicating what to do.

*'I will say that if there is a structured programme of what this person should do or is expected to do or broad guidelines then we can work on that. I can get somebody and say right, who is interested in this or even appoint somebody... 'I can't just ask this person now, will you be in charge of promoting healthier living at the school and somebody might say yes and two months later, come say 'Principal I don't know what I am supposed to do'...' (Principal)*

A couple of the principals felt that the ISHP (Nutrition) was their responsibility.

*'That is me.' (Principal)*

Of the counsellors interviewed, both felt that there was no one who took responsibility for nutrition services within the school; however, one explained that it was usually the sports organisers who took the lead in arranging outsiders to offer nutrition talks.

*'It's usually the sport organisers that bring them in and use them...We get quite a lot of them, speak of nutrition and healthy eating.' (Counsellor)*

Most of the LO teachers shared the sentiment that there was no one who took the lead in being responsible for nutrition services. One of the LO teachers stated that it is the principal's responsibility. Other LO teachers acknowledged that nutrition was addressed in LO and that *'The expectation is the PE and the life orientation teacher, ya...'* are responsible for nutrition policies.

A PTA representative stated that in their school, the Grade 12 head was responsible for taking the lead on the ISHP.

#### 4.2.3 ISHP: Nutrition policies

The participants were then given a brief verbal explanation of the ISHP by the facilitator and asked if there were any nutrition policies in place within the school environment.

The majority of principals interviewed stated that there were no nutrition policies in place. One principal seemed to be aware of the policy but felt it made 'no sense'.

*'INTERVIEWER: Yes, so in terms of health and nutrition policies and programmes, are there actually any in place in the school? MALE SPEAKER: For me the best is, whatever the Department sends.'* (Principal)

Another principal stated that there was no nutrition programme 'outside' of what was covered as part of the curriculum. Further to this, some participants associated a nutrition policy or programme with feeding support.

*'With feeding them, we do not have a special programme, we used to have it, I explained to you the two pastors, but now the pastors came at the end of last term and they said the need is greater over the road, the park, and I said no it is fine, I will give whoever needs food because my food is still sealed.'* (Principal)

One principal felt very little had come from the central Education Department in the way of nutrition policies and programmes and referred to a wellness programme that had been implemented for staff.

*'I must say in my two years here I haven't seen much coming from Central Education Department...There's a wellness programme that the department's been getting off the ground but that refers to or that relates to staff...So I haven't, I've seen very little about that from Western Cape'* (Principal)

Like the counsellors and a PTA representative, many of the LO teachers did not feel that there was a nutrition policy in place at the school. One LO teacher felt that there might be 'on paper'. Another was aware of 'the manual' but was not using it. One counsellor offered that heights and weights were done as part of PT classes with the data being used for children who do sport.

*'Ja, ... it's part of the curriculum and, ja, it's.... in life orientation...there's quite a lot of work about exercise, healthy eating, lifestyle and lifestyle choices. As from the, the policies, we've... quite a lot of policies about exercise and sports. Nutrition we don't have; we only have something for our tuck shop but not in general.'* (Counsellor)

*'No. There's only policies in place for the sports but not specifically for physical exercise and the nutrition, there is no policy for that.'* (LO teacher)

#### **4.2.4 ISHP: Nutrition services**

In order to get a better understanding of nutrition services happening within the school, participants were prompted about nutrition assessments, nutrition education and referral systems. Consistent with the results of there being little in the way of a nutrition policy within the schools, or anyone taking the lead for a nutrition policy as such, there appeared to be little in the way of nutrition services taking place.

#### **4.2.5 ISHP: Nutrition assessments**

One LO teacher explained that measurements like BMI were carried out as part of the curriculum but not as part of a health-monitoring programme. At another school, an LO teacher stated that BMI measurements were carried out as part of the PE curriculum, once a term. Another LO teacher explained that nurses did come and do height and weight measurements, however it was only done for the children who volunteered to go.

A counsellor at one school told of having a sports scientist. She explained that regular assessments of height and weight were carried out for the learners as part of their exercise classes.

#### **4.2.6 ISHP: Nutrition education**

One principal explained that in their school nutrition education was offered as part of the LO curriculum.'

*'If it is part of the curriculum and syllabus then we co-ordinate by the subject head but only if it is part of the syllabus. There's not going to be a programme outside of it.'* (Principal)

Contradictory to this, an LO teacher explained that nutrition education was not offered as part of their LO programme for the Grade 8 or 9 learners.

*'I am thinking about it now actually, because in Grade 8 and 9 life orientation we don't speak at all about nutrition...Possibly in the life science department or the structuring of life science or natural science perhaps they speak about nutrition.'* (LO teacher)

In another instance a counsellor explained that outsiders were from time to time, brought in to offer nutrition talks.

*'We get quite a lot of them, speak of nutrition and healthy eating.'* (Counsellor)

#### **4.2.7 ISHP: Nutrition referrals**

There was little in the way of referrals or outside collaboration with other healthcare professionals for nutrition-related reasons. One principal explained that his priority for the children was their safety. Another principal explained that it was urgent cases like rape that would be prioritised over other health-related issues, for referral to outside healthcare services.

*'And then I work very closely with safer schools, but we concentrate solely on safety of learners, you understand? INTERVIEWER: Not nutrition? MALE SPEAKER: Not nutrition but then at another high school across the road, they would apply for money to buy food and things like that. (Principal and Interviewer)*

Further to this, another participant (counsellor), explained that it was only if she took the initiative to address an issue that something would be done about it. She explained that government departments were overworked, which consequently led to long waiting times before being able to see a healthcare worker. Through her professional experience and contacts in the community she was able to refer to relevant healthcare professionals, if necessary. However, this was in a private capacity and not through DOH or DOE assistance.

*'No, it's really, if, if there's someone in the school that takes the initiative and do that, then it happens, but if there's no one in school it won't happen. I try to work with, with the health people in the community. So, I have psychiatrists, I have doctors, I have physios, I have a dietician that work with me, but it was my initiative. It wasn't the Government or, that help, or our school, they, they're not helping. If I need a, a, someone from the welfare then I must wait three months for the lady to come to my school because she's overworked, and I understand*



*it. So, I have someone private that helps me, but if I don't do that in the school it won't be there.... 'It's my passion, I want to help the kids. So, if there's a girl that's very obese or underweight then I get my people in, but I don't have support from, and I do understand their problem because they're all, they're overworked. There's one social worker and she must go to about 20 schools. So, if there's a rape crisis and there's a girl that's underweight, she must choose. (Counsellor)*

She went on to add that recently she had had a very ill child and despite the child being financially disadvantaged, she was able to get the child seen by a private doctor on a *pro bona* basis, through her community contacts.

Some participants associated nutrition services with feeding support/schemes and tuck shops.

#### **4.2.8 ISHP: Nutrition monitoring and collaboration**

Across all IDI participant groups there was little, if any knowledge of nutrition monitoring and collaboration with other departments and services.

*'There is nothing structured for nutrition.'* (Principal)

*'We don't do so much of that.'* (FS participant)

One of the LO teachers however, felt that although there was nothing in place in terms of monitoring or collaboration, that they potentially could do something about this.

#### **4.2.9 ISHP: Outside nutrition support**

Participants of the IDIs were asked about whether there were any outside support services that visited the schools particularly for nutrition-related reasons. The consensus across the participant groups was that either no healthcare workers visited for nutrition-related reasons or that the participants were not aware of any. Some participants described social workers and nurses visiting the school but that these visits were 'ad hoc', on a 'need' basis and mostly not for nutrition-related concerns, rather for medical-related reasons like immunisations or public-health concerns like STDs.

*'We... no mostly social workers and a school nurse on occasion to maybe discuss some things with the children but not necessarily nutrition.'* (Counsellor)

*‘Social workers from the department from time to time. Psychologists then the teacher and tell the learner about wellness and contact them with any special cases then they would come out. INTERVIEWER: Is it more that they’ve identified a need then they get those healthcare workers in as opposed to them coming on a regular basis? INTERVIEWEE: Yes, because they are also overburdened, I won’t say overburdened because it is their work, but for example, one social worker has at least 24 schools to attend. It amounts to about 24 000 plus learners.’ (Principal)*

*‘Yes, we do have a clinic. The school nurse is available to us. We don’t or haven’t made any referrals with regard to nutritional needs, most of our referrals are in regard with sexual and domestic issues.’ (Counsellor)*

One counsellor explained how, from time to time, their school would arrange outside speakers to talk to the children, for example: motivational speakers and dietitians. These might include health- or nutrition-related topics. The counsellor went on to add that their school advertised workshops being held at local hospitals that might be of interest to the learners or parents. A principal described how they occasionally had students return to the school to speak about topics from which they felt the children would benefit.

From an NGO and faith perspective, there was again little in the way of regular and permanent support, particularly in the way of nutrition. One principal explained how the school staff, of their own accord, had previously provided sandwiches for hungry learners. Local pastors had then become involved in this initiative and subsequently branded it the ‘Lunchbox Initiative’. However, after four years this had recently been discontinued due to the perception that there was no longer a need for the service. It was then moved elsewhere.

One counsellor described how they had mothers and churches who were concerned about some children, but that nothing was being done to specifically address nutrition-related concerns.

Although other outside support was mentioned including, the ‘Rice Project’ and ‘Adopt a School’, these projects focus predominantly on other health-related issues. The Rice Project mentioned by an LO teacher, addresses health issues for girls, including teenage pregnancy, HIV and AIDS. ‘Adopt a School’ was highlighted by a principal and addresses various health-

related issues including nutrition topics. One FS participant highlighted the 'Peninsula' feeding service when asked about outside services.

Another participant acknowledged the assistance of Virgin in supporting the school with exercise bikes and assisting teachers with support in setting up a school gym. This was a relationship established through the school's efforts to make contact.

*'...we approached Virgin Active Constantia, Health and Racquet Club. They adopted us, they then sponsored a mat and sponsored nine bikes you know, second-hand bikes and then they also then followed up by saying that they will sponsor a speaker with a cordless mike. And then they went as far as to invite the whole staff [interruption 17;41] he is a health freak, you must actually speak to him. They invited our whole staff to a session in Constantia with the gym from three till five and then thereafter they said we needed to identify three educators that they will empower to start a little gym here.'* (Principal)

#### **4.2.10 ISHP: Other nutrition- and physical-activity resources described by the FG participants**

##### **4.2.10.1 Obesity programmes**

In exploring more about health-related programmes and specifically as to whether there are obesity-related programmes in schools or the local community, participants of the FGs were asked if they had tried to lose weight and if so, to share how they had done so.

There were mixed responses in terms of whether participants had tried to lose weight. Most participants of the girl and boy FGs had tried to lose weight. There were a few who had not tried to do so while other boy participants had tried to gain weight.

In terms of how they had tried to lose weight, participants described self-managed approaches to addressing their weight, including focusing on nutrition and exercise. Some participants described looking at the types of foods and how much they were eating. Others explained how they had tried to increase exercise frequency or tried to do a particular type of exercise.

A few participants described having access to a Virgin Gym through a gym membership and using this.

One girl FG participant mentioned trying the product '*Herbex*' for a couple of days and another '*fat-burning tablets*'. Both participants tried these products for a short duration and did not feel that they worked.

No participants in either the girl or boy FGs mentioned being part of, or using, a programme specifically for the management of obesity.

### **4.3 PERCEIVED AETIOLOGY OF OBESITY**

In this study, participants' thoughts of what causes overweight and/or obesity are presented according to a socio-ecological model, namely: intrapersonal, interpersonal and environmental (including community/organisation/Governmental/industrial/societal) causes. Although not a specific objective of this study, this information introduces some of the participants' perceived barriers with regard to the obesogenic environment. These are outlined in Table 4.3.

#### **4.3.1 Intrapersonal factors**

##### **4.3.1.1. Genetics**

Both girl and boy participants of the focus groups cited intrapersonal factors such as genetics and types of food consumed, together with inactivity, as contributory factors to obesity.

*'Sometimes it runs in the family...Genes like.'* (Girl FG participant)

##### **4.3.1.2 Dietary foods consumed**

Some of the foods that boys felt contributed to obesity, included: pizza, oily foods, KFC<sup>1</sup>, sweets, cool drinks, chips, fast foods, Gatsby's<sup>2</sup> and ice-cream. Girls concurred with some of these foods including chips, junk food, oil, Coke and Jive and added pies, samosas, *vetkoek*, pizza, and donuts.

*'They bring KFC chickens every day to school, to eat in their breaks.'* (Boy FG participant)

*'Like every second day you get pizza in or nuggets or burgers, yes.'* (Boy FG participant)

##### **4.3.1.3 Physical activity and screen time**

From an activity perspective, both boys and girls explained that it was their perception that not playing sport, sleeping a lot, video games, sitting on the couch and watching too much TV were factors that contributed to obesity.

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<sup>1</sup> Kentucky Fried Chicken

<sup>2</sup> A long bread roll with a variety of fillings and cut into four pieces; usually eaten by hand

*'A lot of people just sit at home or don't do any sports, yes, couch potatoes. They don't do anything with their lives. They get a little bit overweight' (Girl FG participant)*

*'Some people are more like into gaming like online... So they keep to themselves that they rather do, play online than they would on a like a, like a, on a field...'* (Girl FG participant)

Girls added that it is because some of them like to sit, while boys stated that laziness is a factor.

#### **4.3.1.4 Psychological factors**

##### **Stress**

Together with this, a number of behavioural and psychological factors were cited as causes of obesity.

Both girls and boys highlighted stress as an issue.

*'I think maybe it can be stress eating and then afterwards when you don't have stress, it becomes a habit.'* (Girl FG participant)

*'Some people are like sad or angry or something and then they like eat to, to eat their problems away.'* (Girl FG participant)

##### **Boredom**

Girls added that boredom and the need to chew were factors that contributed.

##### **Depression**

Boys cited depression as a cause of obesity, as well as an addiction that develops for sweet and salty flavours.

*'...chocolate and like saltiness of chips make, the taste, then afterwards you eat it and then the taste goes away then you get addicted to it. Then that's why they keep on eating and then, so they are gaining weight...'* (Boy FG participant)

#### **4.3.1.5 Time**

Girls described other intrapersonal issues as being not having enough time and the cost of healthy food. Some girls explained that inadequate time leads to an unhealthy choice being made food wise, because healthy food takes longer to prepare and is more expensive.

*'There's not time to do anything. Sometimes unhealthy food are just quicker to grab and go. Healthy food takes longer to make and it is harder to take on, your cars get messy. It is more expensive. Healthier food is more expensive.'* (Girl FG participant)

Participants of the IDIs described other intrapersonal factors including: lack of knowledge; lack of exercise; lack of packed lunches; and lack of fruit and vegetables.

*'I don't think all our students participate in sport so spending a lot of time playing video games, watching TV'* (Counsellor)

*'So, a lack of knowledge about what they should be eating and then lack of options that are healthy at home'* (LO teacher)

*'...ignorance and habits of a lifestyle...'* (Principal)

*'...a lot of them they don't do exercise at all. I will say 30% of my pupils don't do exercise. They don't eat balanced meals at home, because if I ask them, whom of you had veggies last night, then it's only one or two or three that will put up their hands.'* (PTA representative)

#### **4.3.2 Interpersonal issues**

##### **4.3.2.1 Parents and grandparents**

Boys felt that interpersonal factors like parents and grandparents, as well as societal issues like smoking drugs were contributory factors.

*'their parents spoil them too much sometimes...'* (Boy FG participant)

*'Grandparents...They're on a mission to make you...Fat.'* (Boy FG participant)

*'Dopa...Smoking drugs'* (Boy FG Participant)

#### **4.3.2.2 Lack of role models**

One of the participants of the IDIs added interpersonal issues such as a lack of role models was a factor in contributing to overweight and obesity.

*'I would say, yes, lack of role models in the house, lack of education of healthy eating habits and money also.'* (LO teacher)

#### **4.3.3 Environmental**

##### **4.3.3.1 Societal factors**

Societal issues cited included those affecting socio-economic status, like level of employment, housing issues and parents' working hours. A principal explained that, because extended families live together, houses become crowded; while a counsellor shared that because parents work long hours and get home late, *'children eat something that is 'quick and easy and not very healthy'.*

*'Huge levels of unemployment and then that all impacts on, and then also overcrowdings within the confines of the home you will find that they are not staying mom, dad and three sisters. The three sisters is married, their children is in the house, the aunt that moved in originally from District Six is in the house, so it is completely overcrowded.'* (Principal)

##### **4.3.3.2 Community factors**

Participants across the different IDI groups shared some of the sentiments of the FGs, in particular, with regards to community factors, like types of foods available in the community and in the tuck shops, being causes of obesity. Across the participant groups there was strong consensus that the availability of junk food in the community including the likes of 'MacDonald's', 'vetkoek', 'chips', 'pie', 'Coke' among others, were major contributory factors.

*'We happen to be very close to a MacDonald's and other fast-food outlets and so students have, if they have cash, they have the opportunity to go before school, they arrive at school early, after school and it's a commonplace for them to hang out, MacDonald's.'* (Principal)

*'...before coming to school might have a junk food, a vetkoek.'* (Principal)

*'...if they do not have the lunch that is packed in for them then they would just go to the tuck shop, and the only source of like a good meal would be a pie.'* (LO teacher)

*‘Ja, and they don’t have very good eating habits. I mean, if you see what they eat when they come, come from break, it’s like, chips and Coke and Bar Ones, pies.’ (PTA representative)*

*‘In our community we don’t tend to really concentrate on fruit and veg.’ (Food service participant)*

**Table 4.3: Summary of participants’ perceived causes of obesity**

<b>Participants’ perceived causes of obesity</b>
<p><b>Intrapersonal</b></p> <ul style="list-style-type: none"> <li>Genetic</li> <li>Dietary</li> <li>Types of food eaten</li> <li>Lack of certain foods (packed lunches and vegetables)</li> <li>Quantity of food eaten</li> <li>Frequency of eating</li> <li>Emotional eating (stress, boredom and depression)</li> <li>Physical activity</li> <li>Not playing enough sport</li> <li>Too much screen time (TV, gaming, phone)</li> <li>Ignorance</li> </ul> <p><b>Interpersonal</b></p> <ul style="list-style-type: none"> <li>Parents working long hours</li> <li>Parents not educating children</li> <li>Grandparents</li> </ul> <p><b>Environmental: Household</b></p> <ul style="list-style-type: none"> <li>Overcrowding</li> <li>Housing circumstances – children living with single parents and extended/new family</li> </ul> <p><b>Environmental: Community</b></p> <ul style="list-style-type: none"> <li>Culture – not eating fruit and vegetables</li> <li>Food security</li> <li>Availability/proximity of fast-food outlets to schools</li> <li>Availability of junk food in tuck shops</li> <li>Fence vendors</li> <li>Availability of fast-food outlets in community</li> <li>Limited availability of healthy food options in tuck shop and at street vendors</li> <li>Limited availability of healthy convenient food options in community</li> <li>Resources: Sport</li> <li>Lack of sports facilities</li> <li>Lack of sports coaches</li> <li>Safety, gang-related issues and drugs</li> </ul> <p><b>Environmental: Societal</b></p> <ul style="list-style-type: none"> <li>Economics</li> <li>Poverty</li> </ul>



## 4.4 CHALLENGES OF THE OBESOGENIC ENVIRONMENT

In order to obtain a greater understanding of the challenges of the obesogenic environment, participants of the FGs and IDIs, were asked to share their perceptions of factors affecting adolescents' ability to be a healthy weight. These have been categorised according to physical-activity and nutrition-related factors. They are presented according to a socio-ecological model in keeping with the previous outline of aetiology and consistent with models in the literature.

### 4.4.1 BARRIERS TO PHYSICAL ACTIVITY

#### 4.4.1.1 *Intrapersonal factors*

Girl FG participants described different intrapersonal factors as barriers to taking part in physical activity, including: feeling lazy and shy; having a low self-esteem; not being interested in sport; not having adequate time; and not enjoying the feeling of being sweaty.

*'So, then they not feel good about themselves and then they're too shy to go do sports, because they might not run as fast as the other kids. Then they're like too shy to exercise.'*  
(Girl FG participant)

*'And if start programmes to also build up self-esteem because of that is also causing maybe why girls don't want to exercise in physical education.'* (Girl FG participant)

*'I think some people just don't like, like things just like sports, they don't do sports. They just don't like it; they'd be more of an academic person than a sporty person. So they don't really find interest in sport, but academics.'* (Girl FG participant)

*'And studying, so busy with other things.'* (Girl FG participant)

*'Miss, if you doing it then you sweat and it stinks.'* (Girl FG participant)

One boy FG participant explained that his reason for not taking part in physical activity was because he did not enjoy how the exercise made him feel. He did not enjoy the feeling of being tired.

The issue of lack of motivation for taking part was affirmed by one of the IDI participants.

*'...how do we push off, you can't force them to partake in it...' (LO teacher)*

Another of the IDI participants, added that a limiting factor for taking part in club sports was not having the finance to purchase the required sports kit; socks and shoes were mentioned.

*'Just because, the thing is you go to the club but you need to have money for your socks and your shoes and your, so you need to have money for that at least.'* (FS participant)

#### **4.4.1.2 Interpersonal factors**

##### **Lack of role models**

An interpersonal issue described by participants for adolescents potentially not taking part in exercise, was not having role models in adults. Not having anyone who set a good example for taking part in physical activity, meant there was no lead to follow. This sentiment was shared by principals and LO teachers.

*'And now I... it figures a variety of factors you know I always say that if... because learners take the cue from us as adults so if there are no adults that are leading that then they are not going to take part.'* (Principal)

*'But then at the same time I also think if mom and dad is active then there's something for them tomorrow but if your father's coming home, you know, on the couch then...' (LO teacher)*

An LO teacher added, that insufficient staff numbers as well as a lack of staff willingness to help with sport are both concerns.

*'In general we need a lot of help. For instance, the rugby, there are only two involved with the rugby at the moment, two teachers at the school. There's also a lack of teachers helping to facilitate that.... And staff willingness' (LO teacher)*

##### **Not wanting to be a nuisance to parents**

Another IDI participant went on to say, that some children even feel that they are a *'nuisance'* to their parents for asking them to take them to sport on the weekends and that their parents would rather be sleeping.

### **Lack of parental support**

The IDI participant went on to describe further about the lack of parental support for their children in taking part in sport on the weekend. It was his observation, that despite families living in the area of the school, few parents would support the sport event in which their child was taking part on the weekend. In some instances, parents would not give permission for the child to play the sport, due to not wanting to go to the school on a weekend.

*'It makes it a little bit difficult and we've got many instances where parents just say, you know, the child can't play sport or doesn't want to because they don't want to come to the school on a Saturday and pick him up. You know they'll live in the areas and they won't even come and support their kid. So I've always been involved in under-14 sports and if you've got seven or eight parents there, you're lucky. And all those teams have got you know 11, there should be 11 parents in the team. And eight is usually a lot and then there will be other sports where there's not even, the parents won't, and they'll live in the area. And so I think it's also parents, if your child's partaking in sport, they don't even come and support them so...'* (LO teacher)

### **Team strength/skill**

Both girl and boy FG participants described issues with having an 'A team'. One boy FG participant explained that if some boys did not make the A-team for a sport, that they would stop playing the sport. A girl FG participant explained that there was only a First side for some sports so if you were not selected for the First side then it was not an option to play.

*'If you're not, if you don't get A team and play B team they just stop, stop playing the sport.'* (Boy FG participant)

*'We need more, we need more sport choices because like we feel so limited and some sports you can only be in the first team and be...'* (Girl FG participant)

#### **4.4.1.3 Environmental: school**

##### **Lack of resources (facilities and equipment)**

The boy FG participants predominantly listed a lack of resources as a reason for not being able to take part in physical activity. They described a lack of sport options, facilities and space, for example, not having the option to do water polo, not having a swimming pool, cricket field or hockey field.

Further to this, one boy FG participant described a lack of optimal use of sports spaces year-round, for example: not using the cricket field in winter.

*'They can have more parts of athletics like water polo.'* (Boy FG participant)

*'Maybe they can also build an extra hockey field because all the teams that the school has plays on just the one field.'* (Boy FG participant)

*'A cricket field also. It only gets used in the summer and in the winter, it stays.'* (Boy FG participant)

Another boy FG participant explained that insufficient gym equipment and hockey sticks were limiting factors to being able to exercise. In addition to equipment resources, one boy FG participant explained that there was inadequate time for using gym equipment and that the cost of gym fees should be reduced to make gyms more accessible.

*'I think they should lower the gym fee so that people can do join.'* (Boy FG participant)

Similarly, to the boys, the girl FG participants highlighted issues with regard to inadequate resources, such as not having a pool or adequate equipment in the gym.

*'FEMALE SPEAKERS: Yes, and actual stuff in it. It is empty. We can still see the lines of netball court. INTERVIEWER: So, it is a court more than a gym. Does it have equipment in it? FEMALE SPEAKERS: No, nothing, it is just empty.'* (Interviewer and girl FG participant)

Lack of resources in terms of sports facilities and equipment was also described by principals and LO teachers. One LO teacher went on to explain that one of the reasons for not having equipment was because it had been stolen.

*'...there is nothing here at school. We cannot play our matches here, we have to play at the sportsgrounds, at the municipal sports grounds. We don't have the infrastructure at school. ...We had but there is nothing anymore, they have been stolen.'* (LO teacher)

*'Secondly we don't have sport facilities right here, so now the kids have to move to municipal facilities.'* (Principal)

*'That's the thing and also you look at even the facilities there are no facilities here there is only one sports ground and... so you'll find that it's very difficult for them to participate even in those activities that are there ...' (Principal)*

In contrast to other schools not having sport options available, another participant (Principal), talked of having access to sport at their school but described the complexity and interrelatedness of accessibility to sport and safety in their community. Many sports are offered through the school, however because the sports facilities are at municipal buildings and children are dependent on public transport, this means there are issues with children crossing over into different gang-controlled areas for sport, while on public transport, which increases their vulnerability from a safety perspective.

*'At the moment in the school we have most of the sport that you can think of alright but again two things, one is how available are the kids? Some of them travel to school by bus. Secondly, we don't have sport facilities right here, so now the kids have to move to municipal facilities. And given the [inaudible 25:17] of ... those facilities are in other areas from the school. So that now becomes another problem because can the kids enter there, because at the end of the day the society is so sick that if you live in a particular area then you get the label that you are of that particular area, so you cross the lines into my area. You are not even a gangster, but just the fact that you live there...'* (Principal)

### **Lack of coaches**

Further to lack of sports facilities and equipment, boy FG participants perceived a lack of coaches as well as a lack of funding as limiting factors of physical activity.

*'The school needs more coaches because we don't have a lot of coaches.'* (Boy FG participant)

#### **4.4.1.4 Environmental: community and society**

##### **Safety and gang-related crime**

The presence of gangs and gangsterism appears to be a significant threat among communities. Both girl and boy FG participants described safety, drugs and gangsterism as limiting factors of physical activity. This sentiment was shared by FS participants as well as LO teachers and principals. Across all participant groups there is a strong belief that this has led to individuals to restricting their physical activity by staying indoors for fear of being robbed, hurt, abducted or even murdered.

*'I think some of these kids, maybe crime-ridden areas that they come from so the luxury we have of, you know, putting a crate down in the road and playing for, without being knocked over. You know, they don't have that.'* (LO teacher)

*'...you cannot really create a facility in those areas where people can exercise freely and feel the outdoor life because they cannot even come out of their own backyards; they are stuck there literally because of the violence in the area...'* (Principal)

One of the girl FG participants described the community fear of violence and crime leading to restrictions in outside playtime. She described how the freedom to play outside had changed since she was younger. Where she had once been allowed to play in the road until late in the evening, because of concerns regarding violence in the road, proximity of drug houses as well as kidnapping of the children, now very few people go outside.

*'Because like that they'll say, because a lot of people kidnap children.... FEMALE SPEAKER: Yes. FEMALE SPEAKER: But it's very scary... Like when I was younger, I would, on like a Friday or even in the week then we, I was allowed to play outside until like late, like on 12:00 and then the one day there was like a big fight in the road because one person stole the other one's drugs or something... And then we got the gates and after that like people broke up, broke into our house because there's like a drug house like near, in our street. So nowadays no one really goes outside.'* (Girl FG participant)

A boy FG participant explained that inadequate fencing around schools, meant gangs can have easy access onto school premises, which leads to children choosing not to go outside for fear of gang-related crime and for their lives.

*'MALE SPEAKER: Sometimes the gangsters, ma'am, come here to the school. INTERVIEWER: So, you are saying because there aren't fences, the gangsters come in? MALE SPEAKER: Yes ma'am. INTERVIEWER: You don't like to go out there. MALE SPEAKER: Yes ma'am. INTERVIEWER: You choose not to go out there and be active because you are worried about the gangsters coming in? MALE SPEAKER: Yes ma'am. INTERVIEWER: Into your school? MALE SPEAKER: Yes, ma'am. Because they can kill you ma'am.'* (Boy FG participant)

### Lack of sporting culture

Despite there being club sports available and club sport played, an LO teacher described the issue of a lack of ‘*sporting culture*’ in the community. He added that this leads to a lack of sport being played on the streets in the community and therefore a lack of physical activity.

*‘That’s a culture of, they won’t play sports and stuff and even if they’ve got club cricket and club hockey, they won’t play the sports in their community necessarily on the street and that sort of thing to be active. So that’s a difficult one...’ (LO teacher)*

A summary of participants’ perceived barriers to physical activity is presented in Table 4.4.

**Table 4.4: Summary participants’ perceived barriers to PA**

<p><b>Intrapersonal</b></p> <ul style="list-style-type: none"> <li>- Lack of motivation</li> <li>- Lazy</li> <li>- Lack of self esteem</li> <li>- Being unprepared – tired because of poor night’s sleep therefore not allowed to play</li> <li>- Don’t like how makes them feel (sweaty, tired)</li> <li>- Not enough time (study, homework)</li> <li>- Injury</li> </ul> <p><b>Interpersonal</b></p> <ul style="list-style-type: none"> <li>- Lack of parental support (won’t bring them to, or support, sport on weekends)</li> <li>- Don’t want to be nuisance to parents</li> <li>- Lack of role models (parents, staff)</li> </ul> <p><b>Community – School</b></p> <ul style="list-style-type: none"> <li>- PE – offered but not on regular basis, depends on if finished work</li> <li>- Lack of resources <ul style="list-style-type: none"> <li>Facilities (field, pool)</li> <li>Equipment (hockey sticks)</li> <li>Coaches (change in staff and insufficient coach time)</li> </ul> </li> <li>- Competitive element – only the best players allowed to play</li> <li>- Safety concerns in school with regard to gang-related crime</li> <li>- Admin – learner starting late and not being given extramural slips</li> </ul>
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**Society/community:**

- Safety issues with regard to gang-related crimes
- Children not being encouraged to play on the street because of fear of being kidnapped
- Culture issue of not playing sport even if facilities are available

#### 4.4.2 Barriers to healthy eating

One of the themes that emerged from the FGDs and IDIs was the factors that make it challenging to implement healthier food choices. In keeping with the flow and interrelationship of the previous results, this sub-theme has been presented according to the SEM.

##### **4.4.2.1 Intrapersonal**

###### **Preference**

Although both boy and girl FG participants enjoy a wide variety of healthy and unhealthy foods, one of the predominant least-liked foods was vegetables, including among others spinach, cabbage, peas, beans and tomatoes. The main reasons given for this, were dislike of the taste and texture of these foods. Other participants explained that the look and smell also made them dislike these foods.

*'INTERVIEWER: What are your least favourite foods? Mushrooms, vegetables... Tomatoes.... Olives, gherkin, potatoes...Sweet potatoes and olives. Peas.'* (Boy FG participant)

*Beans don't feel nice in my mouth.'* (Girl FG participant)

*Sometimes I don't like the smell of it and then I don't want to eat it.* (Girl FG participant)

Further to this, some of the most common favourite foods included those that are less healthy, including among others: pizza, burgers and chips.

Some participants expressed an enjoyment of the feeling of fullness from eating certain less healthy choices, for example: full cream yoghurt and cheese on pizza.

*'I love to eat double-cream yoghurt instead of like normal yoghurt because it makes me a bit fuller.'* (Girl FG participant)



## **Knowledge**

The participants of the FGs and IDIs were asked about a link between foods and health. From the discussions it seemed apparent that there is an awareness that foods affect health in both a positive and negative way. However, there seems to be a variable level of knowledge and understanding of the impact of foods on health.

Lack of knowledge of preparation of foods that are healthy, was raised as a potential issue by both LO teachers and LO principals.

## **Psychological**

It appears that psychological factors may play a role in being a barrier to healthier choices being made. One participant expressed eating for comfort reasons and choosing to eat 'sweets' in these situations.

*'I eat sweets when I'm sad and it make me happy.'* (Girl FG participant)

Another participant described accepting oneself even if overweight. Therefore, choosing not to select healthier food options because of apathy for change (the 'what's the point?' attitude if already overweight).

*'And some, like a few girls I know in our grade that are like overweight and stuff. They don't really care because they've accepted the way they are and that is actually something that people can be encouraged by...'* (Girl FG participant)

### **4.4.2.2 Interpersonal**

A lack of role models was described by principals.

## **Working parents**

Participants seemed to have a strong perceived association between working parents leading to less healthy food being eaten. Although shared across participant groups, it was predominantly LO teachers who highlighted concerns regarding parents working long hours and the impact that this has on types of meals eaten. They acknowledged concerns about this parental absence leading to children having to produce their own meal. Further to this, they felt that working parents are therefore under more pressure time-wise, which leads to opting

for quick, easy meal solutions, which tend to then be less healthy for example: pies, takeaways and bowls of noodles.

*'Parents not been at home, mother or father is working late shift, they have to feed themselves. Then you hear no we had takeaways, or we had just a sandwich or a bowl of noodles but that would be about it. But for the most I think the parents are very involved with ensuring that their meat and vegetables in their diets.'* (LO teacher)

*'Most of the parents work, some of them are single parents, they are not there during the day to see what the kids are eating and stuff like that. Some of the kids have to prepare food; that is very difficult.'* (LO teacher)

*'Moms work, and they work late, and I think that's a big problem. INTERVIEWER: So, it's the social issues of working... INTERVIEWEE: So the kids must go home and they must make their own food. Then it's easy ways just to take bread or whatever, or a pie.'* (Counsellor)

*'Nowadays with schedules and work schedules and stuff, I think, they come home later and, you know, they don't really have time to make health, mostly healthy meals, so they sometimes just buy quick stuff or just make quick stuff, which isn't all that healthy.'* (LO teacher)

*'The busy life they, that everybody has, you know they, everybody has things to do and mom doesn't have time to come home and cook a nice balanced dinner or whatever, so let's just go get takeaways, it's easier...'* (FS participant)

*'So, you know it is mum and dad works so it is maybe quite easier to get to quick food outlet, I don't know. I think it is a time issue...'* (Principal)

*'I think it's probably parents that don't have time to put in healthy lunches, so they just give the kids money and they kind of get something at the tuck shop.'* (FS participant)

*'I think some of them, most of them have working parents and working moms and then they don't cook, they fast foods the whole time, ja.'* (Counsellor)

## **Non-working parents**

In contrast to this view, another IDI participant acknowledged that non-working parents were an issue and the subsequent excess consumption of alcohol as a result of socio-economic conditions.

*'INTERVIEWER: Social ...INTERVIEWEE: Economic conditions because there is this although I do not always make it as an excuse, most of the parents here are not working but...the drinking of alcohol it's rife' (Principal)*

### **4.4.2.3 Environmental: Household and community food security**

#### **Access to unhealthy food/junk food/fast food**

Interviewees felt overwhelmingly that the ease of access to fast food/junk food was a strong barrier to healthy eating. Boy and girl participants of FGs as well as the principals, LO teachers, counsellors and PTA participants of the IDIs all shared this concern.

All participant groups, particularly the LO teachers, described the ease of availability of these foods in school via tuck shops and fence vendors, as well as in the community through community tuck shops and fast-food outlets. One of the principals talked of a dependency on fence vendors.

*'Look if you look at the menu by the tuck shop it is pies, it is chips you know, it is soft drink and they do sell water, but I don't think the child can afford a water. INTERVIEWER: Okay. MALE SPEAKER: You know so the diet at school is pies, chips, soft drinks...'* (Principal)

*'INTERVIEWEE: I think accessibility to healthy foods. I think unhealthy food is more readily available. You have to really go out of your way to get something that is a bit more healthy ...INTERVIEWER: Okay and in terms of sort of the readily available unhealthy food that you can think of, can you name some sort of examples specifically around here that are so readily available? INTERVIEWEE: The closest is our tuck shop and Spar is just across the road, which also has a lot of unhealthy food that is cheap and across from that or next door actually is a fish and chips shop. And I think the closest to us, which would be a bit healthier is about two kilometres but within that you've already passed three other stores to get to it.'* (Counsellor)

*'...some of the kids will live in Athlone and if you've ever driven through Athlone, every second block there's a fast-food restaurant.'* (LO teacher)

*'We have bakeries just over here and we have fisheries. We have a little centre around the corner at Wetton Circle, so it would be Steers, Fishaways and Debonaires at the same time. INTERVIEWER: Okay. FEMALE SPEAKER: So there is a lot of involvement with learners with that in fast foods in their diets. INTERVIEWER: And available? FEMALE SPEAKER: And availability obviously. INTERVIEWER: All right. FEMALE SPEAKER: Not during school, they are not allowed to leave during the school day, but you would see them coming in the morning with the little boxes of donuts and then after school because they are waiting for their buses and would have their lunch or their snacks.'* (LO teacher)

*'It is easier to get junk food and stuff, they eat mostly that and during break you will see very few children that bring food from home. They buy that 50 cent chips, junk chips and pies sometimes here at the tuck shop but they don't eat nutrient food here at school.'* (LO teacher)

*'You will see that most of the stuff that is in the "snoepie" isn't that healthy. INTERVIEWER: You are talking about the tuck shop? INTERVIEWEE: Yes, the tuck shop. It would be pies and gas cold drinks and chippies and sweeties and doughnuts. There's nothing really healthy like fruit or fruit juice and there are Zero Coke if you want that.'* (LO teacher)

### **Limited access to healthy food**

Further to this, it was not only the availability of these less healthy choices but also the difficulty in accessing healthy options that was expressed. Counsellors and LO teachers described the lack of healthy options in the tuck shop or coffee shop on school premises as did both boy and girl FG participants. Another counsellor described *'having to go out of your way'* to access healthier options.

*'And in the tuck shops they can also give the option of having... FEMALE SPEAKER: Healthy stuff. FEMALE SPEAKER: Yes. Because in the tuck shop they don't sell fruit, it's just fast foods. It's just fast foods all the time, so you're also like, oh there's nothing healthy to eat so I'll just eat this unhealthy foods. INTERVIEWER: And, pardon? FEMALE SPEAKER: And the cafe as well, they sell some sweets ya... (Girls FG participants)*

*'MALE SPEAKER: People selling unhealthy food and the fences. INTERVIEWER: The food at the fences is unhealthy...? MALE SPEAKER: Yes ma'am. We don't want it there. INTERVIEWER: You don't want it there? MALE SPEAKER: They sell unhealthy food ma'am. INTERVIEWER: What do you want them to sell more of? You want them to sell more healthy*

food? MALE SPEAKER: Yes ma'am. MALE SPEAKER: Sandwiches. INTERVIEWER: Fruit and sandwiches. MALE SPEAKER: Eggs. INTERVIEWER: And eggs. MALE SPEAKER: Veggie patties. (Boy FG participant)

*'More health food in the tuck shop and less junk food.'* (Boy FG participant)

*'I think it's, we have a tuck shop and they do, they, you know, give toasted sandwiches and they do have wraps nowadays, but there's not a lot of options like salads and stuff like that. So it's, I see a lot of kids just eat chips and, you know, like sweets, more chips really.'* (LO teacher)

*'What is not here is healthier snacks from the tuck shop that is what I am thinking, yes. INTERVIEWER: The availability of good healthy food choices? FEMALE SPEAKER: Yes. INTERVIEWER: Okay. FEMALE SPEAKER: Because basically they are just getting like a sugar rush.'* (PTA representative)

### **Cost of healthy food**

There seemed to be mixed opinions regarding the affordability of healthy foods. Although some felt they were affordable, other participants did express their concern that healthy foods were too expensive, explaining that it could also depend on seasonality, as well as where the food is purchased.

*'Sometimes the fruit is very expensive. FEMALE SPEAKER: But in the, yes, the healthy food is very expensive. Especially by Woolworths if you like to buy that salads or some of the fruits, it's very expensive.'* (Girl FG participant)

*'Especially when the fruit is like out of season and you want to buy it, it's very expensive.'* (Girl FG participant)

*'The main one is finance. No other way around that, it is finance because if they had more money they would have more options, which they could pursue. I can just give you one example, I tried to sell bottled water here at the school or even the flavoured water. The learners then told me, no Sir, I can get water at my house for free. Again, it is an educational process that you tell them the reason why we sell it, we keep it cold for you, refrigerated and to enjoy it and to promote a healthier living. I thought about having health sandwiches with only certain types of what they can have on the sandwich but if you try, we had a person here*

*for about two months and she just packed up her stuff and said the learners are not buying this stuff. Then she reverted back to the bread and the chip rolls and that type of thing. Then they would buy more into that, that is why still right in the beginning, it is just to get full and filled' (Principal)*

One concern regarding tuck shop options, was that there is usually an unhealthy junk food option that is cheaper than the healthy foods if they are available.

*'If there's like a chicken salad and then there's like something else that's less healthy, the thing that is like less healthy will generally cost a lot less than something that...'* (Boy FG participant)

*'FEMALE SPEAKER: Because like we have like a few health foods but it's like very expensive...at the cafe they have the croissants with...that lettuce and it's like...R20.00...pieces of chicken is like over R50.00...I think that why we just result, eat like the unhealthy foods...Because the, the healthy foods are very expensive.'* (Girl FG participants)

A summary of participants' perceived barriers to healthy food options is presented in Table 4.5.

**Table 4.5: Summary of participants' perceived barriers to healthy food options**

Summary of barriers to making healthy food options
<p><b>Intrapersonal</b></p> <p><b><i>Personal preference</i></b></p> <p>Dislike of healthy food:</p> <p>Taste (vegetables) and</p> <p>Texture – feel in mouth (beans) and prefer raw to cooked (carrots)</p> <p>Preparation – butternut not being peeled in school</p> <p>Enjoyment of how unhealthy food makes feel when eat it (full after FC yoghurt, cheese on pizza)</p> <p><b><i>Knowledge</i></b></p> <p>Lack of knowledge of foods effect on health</p> <p>Not knowing how to cook/prepare healthy food</p> <p><b><i>Psychological</i></b></p> <p>Comfort eating – eating sweets when sad</p> <p>Acceptance of one's self even if overweight</p> <p><b>Interpersonal</b></p> <p>Parental beliefs of children's need for sport (3x Powerades) and not being willing to be told otherwise</p> <p>Lack of knowledge of link between food and health</p> <p><b>Environment: Household (food security)</b></p> <p>Lack of adequate healthy food provided by home (tuck money instead of packed lunch, convenience foods like biscuits and two-minute noodles being given to eat because parents are too tired)</p> <p>Parents working and not being available to provide home-cooked meals meaning greater dependence on tuck-shop choices and takeaway foods</p> <p>Lack of knowledge of link between food and health</p> <p><b>Environment: Community</b></p> <p>Lack of healthy choices in tuck shop (pies, chips, donuts, fizzy cool drinks, <i>vetkoek</i>)</p> <p>Lack of enough food by school feeding schemes (food being shared out to cover numbers, apples being cut in half)</p> <p>Lack of healthy food choices by vendors</p> <p>Vending machines providing junk food/fizzy cool drinks</p> <p>Schools not wanting to apply for feeding schemes because of implications of paperwork and security – becomes safety issue if school known to have support and then prone to break-ins.</p> <p><b>Environment: Industry and shops</b></p> <p>Shops – layout in shop (healthy food at back) and healthy food going 'vrot'</p> <p>Malls – availability of fast food and takeaways</p> <p><b>Government</b></p> <p>Removal of support programmes because feeding need identified elsewhere</p>

## 4.5 OPPORTUNITIES WITHIN THE OBESOGENIC ENVIRONMENT

Participants of the FGs and IDIs were asked about what factors including, existing service/programmes and resources were available for adolescents in terms of nutrition and exercise to make healthy lifestyle choices. The perceptions that emerged from the data have been sub-divided into two categories: enablers of healthier eating and enablers of physical activity. These participant views are collated with other relevant information that emerged from the data. This is followed by a presentation of the resources available for nutrition services in schools.

### 4.5.1 Enablers of healthy eating

In contrast to the amount of data regarding participants' perceptions of barriers to making healthier food choices, there was much less in the way of data regarding participants' thoughts on the enablers of healthier eating, with no predominant factors emerging.

#### 4.5.1.1 Personal preference

Participants of the FGs described enjoyed a wide variety of foods, including those that are healthy, for example: fruit, vegetables and salad. Some of the fruits enjoyed included: grapes, apples, oranges and watermelon. Although there were strong perceptions shared of the dislike of certain vegetables (as described under barriers of healthy eating), other participants acknowledged their enjoyment of some, including: avocado, tomato and butternut.

*'I like salads.'* (Girl FG participant)

*'The fruit make me feel like I'm healthy again.'* (Girl FG participant)

#### 4.5.1.2 Availability

There were differences of opinion regarding the availability of healthy foods. Several participants of the FGs shared how vegetables were regularly provided in the home environment but disliked and not eaten despite being provided. In contrast to this an IDI participant felt that vegetables were not provided in the home environment on a regular basis

*'...if I ask them, whom of you had veggies last night, then it's only one or two or three that will put up their hands.'* (PTA participant)



An LO teacher described how, although there was a significant number of fast-food outlets in the community, there were also many fruit and vegetable sellers.

*'I do see a lot of fruit and vegetables in the area. INTERVIEWER: You do see it? FEMALE SPEAKER: I do see it in the area. INTERVIEWER: Okay, so as in people selling them? FEMALE SPEAKER: People selling them yes and you would see the people buying, buying as well...'* (LO teacher)

#### **4.5.1.3 Soup kitchens**

Some participants described soup kitchens that provided meals to the community.

*'Some of them put on like kitchens up, like soup they give them like on a Thursday or, but not everyone...'* (FS participant)

#### **4.5.1.4 Feeding schemes**

Others talked about the feeding schemes within the school. Some of the foods provided by these services, appear to be a source of nutrient-rich foods.

*'INTERVIEWER: Okay and what does that sort of meal kind of consist of? FEMALE SPEAKER: Okay, it is anything from, they normally have soya, canned fish ... rice samp... And lots of vegetables... Butternut, cabbage, carrots.'* (FS participant)

#### **4.5.1.5 Tuck shops**

Another FS participant explained how there were healthier food alternatives for example 'salad', available in the tuck shop.

*'..from the tuck shop's point of view... INTERVIEWER: Yes, ja. INTERVIEWEE: They know that they can get a salad there. INTERVIEWER: Okay. So providing salad options to them. INTERVIEWEE: Ja. The menu that I have is not, it's not that healthy but they have options where they can either buy a hot dog or you can have a salad...'* (FS participant)

#### **4.5.1.6 Vending machines**

Although not yet in place, a Principal explained how the student leaders at his school had requested a vending machine. This had been agreed to, with the proviso that it would only

offer healthy snacks and water. He went on to add, that they were aware of the need for healthier options, but that still more could be done.

#### **4.5.1.7 School functions**

One counsellor described how their school holds formal functions where a meal is provided. The school uses this opportunity to teach the children table manners as well as providing them with a healthy balanced meal.

*'The senior ball is for the Grade 10, 11 and 12s and the winter ball is for the small ones. Then we have a three-course meal and we teach them how to sit down, how to eat, and its healthy foods. Our home economic teachers, they do it. It's always healthy and different colours and, everything that must be there we try to teach them that's how you eat, ja.'* (Counsellor)

#### **4.5.1.8 Affordability**

The consensus across the FGs, was that fruit and vegetables and home-cooked meals were affordable, in comparison to fast food and luxury items. Some participants acknowledged the cost of fruit being mostly affordable but that these had the potential to be expensive, particularly if bought from certain supermarkets and out of season.

*'Affordable. INTERVIEWER: What are the affordable ones? Which would you say are affordable? MALE SPEAKER: The pap and the home-cooked meals. INTERVIEWER: Pap and home cooked meals are affordable, okay...'* (Boy FG participant)

#### **4.5.1.9 Knowledge of impact of food on health**

There were differences in the level of understanding of foods having an impact on health, with some misunderstanding regarding which foods are optimal for positive health and which are less so.

Table 4.6 provides a summary of participants perceived enablers of healthy eating.

**Table 4.6: Summary of participants' perceived enablers of healthy food options**

<p><b>Personal preference</b></p> <p>Enjoyment of healthy foods</p>
<p><b>Availability: sources of healthy food options</b></p> <p>Healthy foods being provided by the home</p> <p>Soup kitchens</p> <p>Feeding schemes</p> <p>Tuck shops</p> <p>Vending machines</p> <p>School functions</p>
<p><b>Affordability of healthy food options</b></p>
<p><b>Knowledge of healthy food options</b></p> <p>Knowledge of which foods are good for health (butternut, spinach, bread, milk)</p> <p>Knowledge of which foods bad for health (sweets, junk food, <i>vetkoek</i>, oil, sweets, lollipops, chips, food colouring, chips)</p>

#### **4.5.2 Enablers of physical activity (PA)**

There were a variety of perceptions offered as to the enablers and opportunities for physical activity available to learners. These ranged from intrapersonal motivating factors such as the enjoyment of physical activity and physical and emotional sense of wellbeing that it provided, as well as interpersonal, school and community factors.

##### **4.5.2.1 Intrapersonal factors**

The consensus across the FGDs was that most of the participants of the FGDs including both girls and boys, enjoyed some form of physical activity. The range of activities that learners listed as taking part in, included the more traditional and common school sports like: rugby, cricket, soccer, hockey, netball, tennis, athletics and cross-country; as well as the less common and traditional activities, including, for example: basketball, volleyball, figure skating and dancing (modern, tap).

Many learners described enjoying how exercise made them feel, including both the positive physical and psychological effect. Some of them explained how they felt it was fun, made them feel fit, comfortable, tired, relaxed, free and energized. Further to this, others added how it made them feel motivated, satisfied and *'gives them a good mindset'*.

*'And also like, you have fun but you're also exercising so it's like, it's a win situation.'* (Girl FG participant)

*'I like it because it keeps me going, and like keep you from getting lazy and it's fun also at the same time. I like sports.'* (Girl FG participant)

*'I do the sports because it, it motivates me and it, it motivates me to do better and it keeps me busy, because I don't want to sit at home all the time and you can't do something.'* (Girl FG participant)

#### **4.5.2.2 Interpersonal**

Together with intrapersonal reasons, interpersonal factors were a strong motivating factor for physical activity. Some FG participants described enjoying the feeling of working with other team mates and the team spirit built up through playing together, as well as making friends and meeting new people. This feeling was mutual across boy and girl focus groups.

*'It builds up like you team spirit.'* (Girl FG participant)

*'The feeling of playing in the team and winning as a team and losing as a team, that you're not alone.'* (Boy FG participant)

*'I like the team spirit and the way we play together.'* (Boy FG participant)

*'Yes, I'm meeting new people from like other places and schools and stuff.'* (Boy FG participant)

*'When you play matches you also like you make friends with other people and so you also, like you can make more friends and you like also learn to be more friendly and like have sportsmanship.'* (Girl FG participant)

#### **4.5.2.3 School: resources**

There were mixed perceptions regarding the adequacy of resources for sports including equipment and facilities. Although some participants acknowledged limited resources as a barrier to exercise, when prompted by the facilitator regarding the adequacy, both boy and girl FG participants felt that there was what they needed.

*'Okay and also, in terms of the schools and equipment and stuff like that, have you got, would you say there is equipment and facilities and stuff like that to do as much sport as you want? MALE SPEAKER: Yes.'* (Boy FG participant)

*'The coach does, okay so you've got everything like that you need to play the games? FEMALE SPEAKER: Yes.'* (Girl FG participant)

#### **4.5.2.4 School: extramural sport**

Most groups of the IDIs including LO teachers, principals, counsellors and FS participants, described a range of extramural sports available for learners to choose from, including winter and summer sports as well as team and individual activities. Some participants described how sport is compulsory and learners are required to choose both a winter and summer sport.

*'I think our sports that we do offer is quite adequate, I think there is something for everyone. If one want to do an individual sport or a team sport, you don't have to be good at it, I think that is the most important thing. The emphasis is on participating and not on excelling necessarily so I think our facilities and the structure that we do have is quite good.'* (Counsellor)

*'Also, the sports, there's so many different sports that's available, they must just take it.'* (FS participant)

*'Also, at our school we have to do a winter and summer sport so all of us will be doing sports.'* (Boy FG discussion)

#### **4.5.2.5 School: PE**

Further to this, learners described how PE within the school curriculum was compulsory, although variable how frequently it happened and whether learners took part. This was also described by an LO teacher.

*'It's compulsory to do sports and some of us actually struggle because we're unfit.'* (Girl FG participant)

*'So, the life orientation department we basically have the exercise covered because every learner has to participate.'* (LO teacher)

Further to it being compulsory, if learners do not want to take part they have the option of the school encouraging them to walk around the school instead with a facilitator.

*'We, we go that far that if they don't want to do the exercise then they walk around the school. We get someone that can walk with them few times around the school.'* (Counsellor)

#### **4.5.2.6 School: arranged events**

Participants described several events that had been organised by the school to promote and encourage physical activity by the learners, including: a 'cyclathon'; 'dad-and-son cricket social'; and a community walk.

*'What we strive with cricket, we'll have a sort of and it's sexist, we'll have a father/son game on a Saturday, like at the end of each month and they'll have a braai and stuff and get the dads active and you'll hear the dads, I can barely run, that sort of stuff. So, you get the fathers active but I mean that's a small group, that's the First-team boys, you're talking eleven fathers there and it's only dads. So maybe a situation like that where there's a mother/daughter race you know...'* (LO teacher)

*'And then last year I brought this idea where we asked this whole community to walk, but to do a park to park walk.'* (Principal)

#### **4.5.2.7 Community: Fun walk/run once a week**

One FG participant told of a regular weekly walk or run held in the community, like the Park Run concept. This was also mentioned by an IDI participant.

*'There's a fun walk or run once a week.'* (Boy FG participant)

*'I think this community is quite fortunate with that regard. There is a Park Run every Saturday, the school has a gym, there is two other gyms just down the road. There is a lot of extramural things that the school doesn't even... we don't offer it as a sport, but we have the Run/Walk*

*for Life that is also linked with the school. So, I think our community is very fortunate in that regard.’ (Counsellor)*

**Community: Gyms and sports clubs**

The access to gyms and sports clubs in the local community was described by some participants.

Table 4.7 provides a summary of participants’ perceived enablers of PA.

**Table 4.7: Summary of participants’ perceived enablers of PA**

<b>Summary of the enablers for physical activity</b>
<p><b>Intrapersonal</b></p> <p>Learners liking how the PA makes them feel: strong/fit/skills/fun and enjoyable                      Feel powerful, tired, relaxed, happy, free, fit</p>
<p><b>Interpersonal</b></p> <p>Meet new people, friends                      Team spirit                      Keeps away from drugs and all that sort of stuff                      Being part of a team                      Children recognising that if it is compulsory (like in the early grades) then they get used to it and it is easier to do</p>
<p><b>School</b></p> <p>PE – compulsory in school                      Extra-curricular sport offered (netball, rugby, cricket, tennis, skipping rope) and all welcome to join                      School motivated as keeps learners busy and reduces crime                      Other school-arranged opportunities                      Social dad-and-son game once a month                      Cyclathon and cycle tour arranged by school</p>
<p><b>Community</b></p> <p>Gym and fitness club – collaborative approach with Virgin to obtain little gym/bikes                      Club sport and recreation                      Club sport facilities</p>

## **4.6 OTHER INTERESTING INFORMATION: SUGGESTIONS OF WAYS TO ADDRESS THE OBESOGENIC ENVIRONMENT**

Boy and girl FG participants as well as the IDI participants, were asked about their perceptions of what they felt needed to change in school or the community to help adolescents be healthier. Overall, both boy and girl FGs came up with similar ideas focusing specifically on foods and sports available, with few differences. Participants of the IDIs focused more on the school curriculum and the availability of health information.

These ideas have been categorised according to those that are nutrition, physical-activity, safety or support related.

### **4.6.1 Nutrition**

#### **4.6.1.1 Tuck shops**

Across several boy and girl FGs, there was strong consensus regarding the need for tuck shops to provide healthier food options and for less access to 'junk' food. This sentiment was shared by one of the counsellors and LO teachers.

The foods that both boy and girl participants cited as wanting more of, included: fruit, vegetables, salads, bread and yoghurt. Boys added that they would like there to be more low-fat options, healthy bars, protein shakes, chicken wraps, Gatsby's and reduced-salt popcorn.

*'Miss, stop selling junk food at the tuck shop' (Girl FG participant)*

*'My Sir can sell like less junk food, like at the tuck shop and he can like introduce like yoghurt or like fruits, salad and people could like buy it from him. And like make the foods just like less junk food but still have junk food at school at tuck shop.'* (Girl FG participant)

*'And in the tuck shops they can also give the option of having... healthy stuff' (Girl FG participant)*

*'More health food in the tuck shop and less junk food.'* (Boy FG participant)



*'So it would be that as well as the tuck shop, and with the principal or any senior members for them to tell the tuck shop you know, I know it is your business and you want profit at the end of the day but let us try to have a health club.'* (LO teacher)

*'I think they must look at their tuck shops, number one, that must be really, it must be good and there must be healthy food.'* (Counsellor)

Further to this, boys mentioned increasing the cost of junk food, while girls suggested reducing the cost of healthy food.

*'I just want to say maybe they should increase the price of the junk food'* (Boy FG participant)

*'Make healthy things cheaper...'* (Girl FG participant)

Girls talked about the presentation of food in the tuck shop. One girl stated that the tuck shop should be split into two sections with the healthier section being more 'colourful' while the less healthy section being 'less colourful'.

One boy FG participant raised the issue of the unhealthy food being sold by the fence vendors and wanting it replaced by healthier alternatives.

#### **4.6.1.2 Nutrition: food gardens**

The idea of having food gardens in schools, was raised by one of the girl FG participants. This was also suggested by a counsellor as a change for the community. It was suggested that this could be a project that the learners could be responsible for taking care of as well as then being able to have access to the fruits for picking.

*'Also, like the school have to, have to like, get a garden where they can plant the things. My primary school has that, and like the Grade 1s and 2s go pick everything and they like, make food for themselves. So, it helps if this school also has the garden.'* (Girl FG participant)

#### **4.6.1.3 Nutrition: information**

Participants of the IDIs focused specifically on the structure of teaching health-related information rather than on food or exercise ideas. Both principals and LO teachers cited addressing the LO curriculum as well as having a specific health-related programme

implemented in schools. Other routes of health education described, included having access to workshops, talks and health-awareness weeks.

One boy FG participant described having videos informing one of the consequences of not exercising.

A counsellor, together with some of the girl FG participants, suggested having nutrition education/cooking ideas/cooking skills support. It was acknowledged that children and adults do not always have the knowledge and skills of what and how to cook. It was suggested that perhaps by way of a 'kookprogram' or cooking class, this information and these skills could be provided.

Another girl participant mentioned having a school-driven food/recipe-idea/challenge for trialling at home.

*'I think something where you can maybe have a cooking class for children whose parents come home late to teach them how to prepare food in a healthy way and what to look for because I think a lot of the times children don't have the skills or the knowledge how to make something a bit more healthier or see how easily it can be done because they would always choose for the quickest option.'* (Counsellor).

#### **4.6.1.4 Nutrition: feeding schemes**

One of the LO teachers described needing more feeding schemes with the provision of healthier food, through the churches or by the DOE.

*'the Department of Education so they have this feeding schemes that some of the schools, in our community here we have at most of the primary schools and our neighbour school, the high school they also have. We applied but for some bizarre reason they don't want to approve it. Yes, the churches, yes, the Department of Education in that way, more feeding schemes but healthy food...'* (LO teacher)

#### **4.6.2 Physical activity**

Overall there was general consensus that there was a desire for more sport by way of type and frequency. Both boy and girl FG participants described wanting more sport options in schools. Some participants of the boy FG groups cited wanting access to some of the traditional sports like: tennis, cricket, hockey, swimming as well as less traditional activities

like hiking, yoga and kickboxing. Some of the girls also mentioned wanting to have access to different activities like a colour run or fun runs, hiking and volleyball.

Consistent with these ideas, an LO teacher mentioned needing more PE periods to be able to increase exercise opportunities, while a counsellor mentioned increasing sport alternatives. The boys also described wanting to have an increase in the frequency of PE, including more seasonal accessibility, an increase in the intensity and an increase in the competitiveness of sport. Further to this, they wanted to have more compulsory sport and the option to be active if a teacher was absent for a lesson.

Some of the girl FG participants agreed with wanting more PE, however in contrast to the boys, some of them described not wanting to feel under pressure with sport. This sentiment of sport being fun and 'not forced' was shared by one of the PTA representatives.

*'I think that fitness should be a fun thing, it shouldn't be like a forced thing. Children should, they must want to actually be involved with that, it should be like oh my goodness I am going to do physical training now. It should be a fun thing...'* (PTA representative)

Boy participants also described wanting to have more resources for sport, including: coaches, equipment and a bigger gym, as well as a review of the distribution of financial resources available for extramural activities.

#### **4.6.3 Safety**

Participants raised the issue of crime and safety within schools and communities as a major concern affecting their ability to be physically active. They highlighted the issue of gang-related crime and the impact on safety, with the need for this to change in schools and neighbourhoods to assist learners in being able to exercise more.

One of the girl FG participants suggested establishing a 'safe study group' where the learners could 'walk together after school'.

*'We can start a safe study group and we can walk together after school.'* (Girl FG participant)

*'They must put more fences to exercise more ma'am.'* (Boy FG participant)

#### 4.6.4 Support

A strong message that came through from the suggestions of several girl and boy FG groups was of needing assistance with intrapersonal support, for example motivational support, to be able to be healthier. One girl FG participant described needing to motivate friends while another, having a programme that could help build up girls' self-esteem. This feeling of needing support was shared by both the counsellors, one of whom highlighted the benefit of having peer-support groups and further to this a support group specifically for focusing on healthy eating was suggested.

*'Trying to motivate them.'* (Boy FG participant)

*'Some parents like, have to motivate their kids to do exercise and eat healthier and also, like you have to motivate your friends.'* (Girl FG participant)

*'And if start programmes to also build up self-esteem because of that is also causing maybe why girls don't want to exercise in physical education.'* (Girl FG participant)

*'It's very difficult but it's always a good thing to have a support group, to have peers that is the support groups, but time is, is a big problem.'* (Counsellor)

*'Yes, I think that maybe focus groups or groups where children who have difficulties with healthy eating habits maybe can come together and work together so that they don't feel that they are the only ones struggling with their eating habits or their weights, so that they can feel a sense of belonging and fitting in and working together.'* (Counsellor)

## CHAPTER 5: DISCUSSION

### 5.1 MAIN FINDINGS

The findings of this study highlight shortfalls in the implementation of the nutritional aspect of the ISHP within schools. There are sporadic enablers of physical activity and nutrition for adolescents; however, the obesogenic barriers including individual safety, junk-food availability and healthy food insecurity, compound the adolescent health challenge in schools and communities.

As part of SA's commitment to addressing adolescent health needs, it is important to understand what is currently happening in terms of nutrition assessments, education, referrals and resources as well as the nutrition shortfalls and gaps of the ISHP. To develop a comprehensive model to explain the adolescent obesogenic environment and inform the design of effective and appropriate public-health (prevention and treatment) programmes, it is essential to collect adolescent opinions regarding the challenges and opportunities they experience from a nutrition- and physical-activity perspective, as well as the opinions of stakeholders involved in adolescents' health.

Results from this study have implications for the development of quantitative surveys aimed at further study of the factors associated with adolescent nutritional intake and physical-activity levels and for the design of adolescent obesity public-health programmes. The findings build on existing baseline assessments of the ISHP, supply information about what is happening from a nutritional perspective and improve understanding of the wide range of factors that have an impact on adolescent behaviour regarding dietary intake and physical-activity levels.

This chapter discusses the findings of this study in relation to the nutrition component of ISHP, the obesogenic barriers to, and enablers of, physical activity and nutrition in this environment and participants perceived causes of obesity in this population. Further to this, suggestions to address the obesogenic environment are discussed.

#### 5.1.2 Overview of the implementation ISHP in relation to nutrition

The general findings of this study in relation to the ISHP are consistent with those of the RMCH baseline assessment of the ISHP in which 'overall the respondents felt that school health and nutritional services were not well co-ordinated and that they had not yet seen the kind of prioritisation or resource allocation that would enable districts to deliver a comprehensive package of health and nutrition services to schools effectively'<sup>(119)</sup>.

According to the South African Government's proposal, the implementation of the ISHP was to run from 2012 to 2016 and therefore to be in effect in schools by 2017<sup>(28)</sup>. However, one of the most significant findings of this study was the irrefutable lack in knowledge of the ISHP, and, more specifically, the nutrition component thereof, as well as the even greater lack in implementation of the nutrition component within schools.

It became apparent when arranging the study logistics, that there were no official 'school health teams' from which to recruit participants. According to the second round of interviews conducted as part of RMCH baseline assessment of the ISHP, all districts at that stage, reported having at least one dedicated Department of Health-led school health team in place<sup>(119)</sup>. Unfortunately, according to the findings of this study, none of the schools visited had a dedicated 'school health team' in place yet. One of the potential reasons for this appears to be the stretched staff resources within schools and in the community.

Disappointingly, it became apparent that for most of the schools, there was no 'nutrition lead' and if there was, there seemed to be a vague acceptance and understanding of the role. This seemed partly because of a prioritisation of resources towards more pressing problems like crime and safety, together with lack of staff and lack of staff time.

There was a limited awareness of the ISHP by most principals; however, there was a stark lack in knowledge across other IDI participant groups of any form of nutrition policy as part of the ISHP. In other schools, there was a feeling of the policy being impractical, irrelevant or not being clear about what its implementation entailed. Several participants highlighted what they felt were other more urgent socio-economic issues, such as crime, violence, health and sexual offences. These were prioritised over nutrition for resources, in terms of time, funding and staff.

There seemed to be almost nothing happening in the way of nutrition assessment, monitoring and referral. When participants were asked about nutrition services within the schools, if anything was mentioned, it was generally regarding the provision of meals and facilities in connection with meal provision, or about nutrition education offered as part of the curriculum. No participants talked about other nutrition services such as anthropometric assessments or resources, for example, in the form of weighing scales. These findings are consistent with the RMCH findings in 2013, in which the nurses interviewed, drew attention to the fact then, that the lack of suitable equipment like scales impaired their ability to carry out a quality service<sup>(119)</sup>. Further to this, they acknowledged a shortage of staff and therefore time per learner in order to address their needs, similar to concerns highlighted in this study, four years later.

In Shung-King's 2013 (South Africa) assessment of whether or not the shortcomings of the 2003 school health policy had been addressed in the 2012 policy, it was highlighted that a major concern was the 'absence and inaccessibility of referral services'<sup>(114)</sup>. A gap in the referral system from a nutritional perspective, unfortunately remains a concern from the results of this study.

Following on from the baseline assessment by the RMCH, the RMCH School Health Project Team produced the RMCH School Health Manual. This was designed as a specific guide to the processes involved in the implementation of the ISHP and in increasing and generating demand for the ISH in schools. Sadly, and worryingly, many of the findings in this study are consistent with those of the RMCH baseline assessment of the ISHP. This indicates that, despite the design of the RMCH School Health Manual in 2015, there has been slow progress in implementing the ISHP since the baseline assessment. There appears to be very little development in terms of strengthening the links between school, community and service providers as well as capacity for schools to deliver the ISHP.

There appears to have been erratic support in the form of nutrition services from NGOs and parents. This has been related more to meal provision on a perceived-need basis. Some participants described parents and churches who were keen and available. This may indicate the potential for more collaboration with these sectors in nutrition service delivery and support.

In terms of nutrition programmes for obesity and physical activity, some participants did admit to having tried to lose weight at some point, however this was mostly through their own personal efforts of making dietary changes in the form of eating less, reducing sugary or high-fat foods or exercising more. None of the participants talked about a specific obesity programme in order to lose weight or any form of exercise programme other than boxing at the gym. If in place, there was little if no mention of obesity programmes within the community, potentially indicating a lack thereof, little awareness of any in place, or a difficulty in access to them.

Perhaps the most worrying of all, is the lack in awareness of the ISHP and specifically the nutrition component. This points to the importance of informing the DOE and DOH of the findings of this study as well as future research to determine this lack of awareness and how to address it.

## 5.2 OBESOGENIC BARRIERS TO AND ENABLERS OF PHYSICAL ACTIVITY (PA)

Extensive research has been conducted to investigate the barriers to, and enablers of, physical activity in both healthy weight and overweight individuals at the individual, home and environmental level<sup>(85, 104–106, 108, 110, 122)</sup>. This study adds to some of the existing evidence regarding PA facilitators, such as achieving goals and family support as well as community and culturally specific PA challenges like poor safety and security and cultural shifts towards a lack of sports culture.

### 5.2.1 Intrapersonal PA barriers and enablers

Intrapersonal factors affecting PA were observed in this study. Girl participants, more so than boys, cited intrapersonal factors as barriers to physical activity, whereas boys and participants of the IDIs cited more environmental factors. We found that the girls described factors such as not liking exercise, not liking the feeling of being sweaty, not being interested in PA, feeling lazy and not having enough time as physical barriers. The lack of motivation as a barrier to PA observed in this study population, is in line with findings in the literature<sup>(59, 89, 105)</sup>. In the study by Porter *et al.*<sup>(59)</sup> looking at psycho-social factors and barriers to weight loss among adolescents, 16% of participants cited lack of motivation and energy to participate in exercise, putting this as one of the most frequently cited barriers. In the qualitative study by Lindelof *et al.*<sup>(89)</sup>, exploring obese individuals and their parent's views on the former's obesity, participants cited lacking the motivation to 'pull themselves together' in order to pursue regular exercise. As part of the randomised controlled trial, HEARTY (Healthy Eating and Aerobic and Resistance Exercise in Youth) a qualitative assessment looking at the experiences of obese adolescents (14–18 years), at three time points: three weeks, three months and six months was conducted<sup>(105)</sup>. They found that at three weeks, 27% of the participants cited 'not in the mood/low motivation' as a barrier to physical exercise, the second highest barrier after 'school work'. At six months this remained high as a barrier in 25% of the participants, together with 'conflict with social obligation' (25%) superseded by 'conflict with school work' (29%) and 'transportation' (38%).

Few boys described the positive physical feelings associated with exercise as motivating factors to exercise apart from one who described enjoying the feeling of being energised. Similarly, for the girls, 'positive physical feelings' associated with exercise were not a strong motivating factor for girls either, apart from a few who described enjoying the feeling of getting strong, fit or active. Another girl described liking being able to demonstrate achieving set targets in exercise. This enabling factor of a desire to achieve goals is a strong finding by Peeters *et al.*<sup>(105)</sup> where 57% of participants (boy and girl participant views grouped together)



stated that achieving results/goals was a perceived facilitator to exercise at three weeks, 48% at three months and 42% at six months.

The lack of motivation observed in our study is synonymous with 'amotivation' in the self-determination theory, which has been shown to be significantly related to negative health outcomes<sup>(123,124)</sup>. Self-motivation is an important concept when looking at PA commitment, as motivation in psychology is at the core of biological, cognitive and social regulation<sup>(125)</sup>. Further to this, autonomous motives have been linked with positive behavioural and psychological health indices, in that the motives stem from a true self, which is integral to optimal functioning<sup>(123)</sup>. This concept of lack of self-motivation, observed in our study of adolescents warrants further exploration, with our data pointing to the importance of looking at girls and boys separately.

One of the reasons girls gave for not doing more PA was not having enough time. Further to this, boys described very little allocated time within school to do PA, particularly from a PE perspective. Many expressed a strong wish to have more time as part of the school curriculum for physical education. They also described not having enough time on actual gym equipment. In the longitudinal qualitative study by Peeters *et al.*<sup>(105)</sup>, insufficient time for PA is one of the main reasons given by participants for not exercising. This percentage of participants goes from 18% at three weeks, to 12% at three months and 21% of participants at six months. Ferreira *et al.*<sup>(104)</sup> highlight the importance of access to free play and time spent outdoors, by demonstrating a positive association of these with children's physical activity, with 60% of cases showing a positive association with children PA levels. This therefore points towards the importance of considering more flexibility in schools in allowing youth to have more access to outside sports fields and resources during break and free/flexible periods during the school day, in order to assist in increasing their available time for PA and access to PA resources.

### **5.2.2 Interpersonal PA barriers and enablers**

The role of family members as well as relationships with peers and professionals and the impact these have in terms of nutrition and exercise choices, and subsequently obesity is complex. In this study several FG participants, including girls and boys, highlighted camaraderie, teamwork and fun with friends as aspects of PA that they enjoyed, hence they are enabling factors. These findings are similar to those in the qualitative study based in New York by Alm *et al.*<sup>(109)</sup>, who find that in looking at the barriers and enablers for adolescents in achieving their physical-activity goals as part of a weight-loss programme, the successful participants are those who report 'active participation by family and friends' as improving their physical-activity habits. The study by Smith *et al.*<sup>(111)</sup> finds that having 'fun' and 'family involvement' is an enabler for retention of adolescents to healthy lifestyle programmes.

In addition to this it is well documented that adolescents look to parents and professionals for multi-faceted support of a healthy lifestyle<sup>(85, 106, 111)</sup>. This includes, among others, setting an example by taking part in the exercise themselves<sup>(111)</sup> and by providing their children with transport to the sport<sup>(83, 102)</sup>. Our study supported these earlier findings. Although the adolescents themselves did not raise this as a barrier, both an LO teacher and a principal supported the importance of exercise role models in parents. From a transport perspective, they highlighted that some children felt that they were inconveniencing their parents by having a sports commitment at the school on weekends. In some instances, parents even withheld permission to play a sport, because of not wanting the weekend commitment. In the DEDIPAC study<sup>(102)</sup>, there was a positive association reported in more than or equal to 75% of the studies they examined between overall physical activity and parents providing support through transportation. Kebbe *et al.*<sup>(85)</sup> concur with these findings<sup>(85)</sup>, highlighting two studies looking at transport support from parents as an enabler of PA and lack thereof as a barrier to PA<sup>(90,105)</sup>. In the randomised study by Peeters *et al.*<sup>(105)</sup>, 16% of participants cite transport by parents as a barrier to exercise at three weeks (placing it fifth highest after conflict with school work, not in the mood, fatigue, not enough time). By six months, 38% participants cite transport by parents as a barrier to exercise, placing it as the highest cited barrier to PA. In another qualitative study looking at obese African-American adolescent females enrolled in a residential healthy lifestyle programme, the participants raised the issue of not being able to drive and 'needing help with transport to get to a place where they can exercise'<sup>(90)</sup>. This strong theme of adolescents recognising transport as a barrier to physical activity in international studies as well as our study, highlights the importance of the role of schools and local structures close to schools in supporting adolescents to have access to PA to eliminate the need for transport.

The perception by one participant that there was a lack of staff 'willingness' to support physical activity is a concern, in light of the evidence in our study and the literature<sup>(109, 111)</sup> of adolescents looking to parental and professional support. In the study by Smith *et al.*<sup>(111)</sup>, the researchers find that having 'good facilitators' is one of the key themes that emerge as an enabler of retention in health lifestyle programmes. The qualitative study by Alm *et al.*, (109), looking at urban, obese adolescents and barriers and facilitator to a weight-management programme, finds that those with a coach are more likely to achieve behaviour change (50%) than those without a coach (37%). Possible explanations for the lack professional support of PA, could be a lack of awareness of the importance of adolescent health and limited staff resources to support this.

### 5.2.3 Environmental PA barriers and enablers

In this study, environmental reasons were one of the major factors described as affecting physical activity. These included: school and community resources, economics, time and safety.

#### 5.2.3.1 School resources

In general, there was a wide discrepancy in terms of the physical-activity resources including sports facilities and equipment available to adolescents. While most schools had numerous sports facilities at their disposal, including for example, sports fields, tennis courts and equipment such as balls, other schools were visibly financially disadvantaged with sometimes little in the way of sports facilities and equipment. Some schools described having very few sport resources in the form of facilities (pool and tennis courts) and sports equipment (gym equipment, hockey sticks). Hence this environmental factor appeared to be both a facilitator and a barrier to PA, depending on the school and socio-economic circumstances. These findings are synonymous with those of the DEDIPAC study<sup>(106)</sup>. In this systematic review, looking at the environmental determinants of diet and PA during the life course, the 'access/provision of school facilities/resources' is found to be a strong PA enabler by being positively associated with overall PA in adolescents in all eligible studies examined.

It also emerged from our data that some participants felt that sports facilities were not being used to their fullest potential and that the use could be optimised further to make sport more accessible more of the time. Making better use of sports fields year-round or even being put to better use throughout a day, in free or flexible periods were highlighted, as was the option of sharing sports facilities between schools.

In terms of school policy regarding PE and extramural activities, findings in our study were also mixed and came across as both a barrier to and enabler of PA, depending on the school. In some schools, taking part in a winter and summer sport was compulsory, whereas in others this was not the case. A similar situation was found with PE, in that in some schools, it was compulsory to do PE whereas in another school, participants talked about not yet having started PE classes.

The general feeling expressed particularly by the boy FG participants, was that there were not enough PE sessions for PA and that they would like to see more of these in order to be able to exercise more. However, it was clear that some girls do not like to do the exercise that is available in PE. This raises the issue of gender differences with regards to PA. A cross-sectional study by Fernandez *et al.*<sup>(107)</sup> looks at differences in physical-activity levels and barriers to PA and stratifies the results according to gender. They find significant differences

between the frequency of PA between boys and girls, with boys having a higher average of PA frequency per week than girls of 1.51 vs 1.41 ( $p=0.001$ ). The percentage of boys who exercised >6 times per week was higher at 12.3% while in girls it was 3.1% ( $p = 0.037$ )<sup>(107)</sup>. In this study there are also significant gender differences with regards to barriers to PA. The barriers to PA that scored the highest were life demands and lack of time (2.9) followed by tiredness and laziness, body image (1.8) and the environment (1.5). However, the gender difference for PA barrier of body image in girls vs boys was significantly higher at 2.6 vs 2.1 ( $p=0.001$ ) and significantly higher for PA barrier of tiredness and laziness of 2.9 vs 1.9 ( $p=0.001$ ). Although this was a cross-sectional study, the systematic review and pooled analysis by Dumith *et al.*, also observes gender differences in PA over a 3–5-year period, with a greater decline in PA seen in younger girls (9–12 years at baseline) and a greater decline in PA seen in adolescent boys (13–16 years at baseline)<sup>(50)</sup>. These gender differences need to be explored more and perhaps addressed and resourced differently in the ISHP and DOE, PE curriculum.

### **5.2.3.2 Community resources**

In the community, although the boy participants did not mention an issue with inadequate resources, they did highlight that it would be helpful to lower gym fees in order to make them more accessible. This cost concern was shared by the girls. One girl also described insufficient play areas in the rural communities as a barrier to PA. This was similar to a finding of the DEDIPAC study where there was a positive association in more than or equal to 75% of the studies that they looked at the association between access/availability/proximity to recreational facilities and PA<sup>(102)</sup>.

### **5.2.3.3 Economics**

In this study, finance and lack thereof, was widely described across the participant groups as a barrier to exercise. The socio-economic status of the general community, poverty, lack of jobs and lack of income, were described as strong limiting factors of PA. Some IDI participants described the lack of personal finances available for sports kit and gym fees as an issue, which is consistent with the findings by Alm *et al.* (2008)<sup>(109)</sup> where one participant explains that a reason for not joining the gym is because ‘we don’t have much money’. Other participants describe the lack of funding for school sports facilities and sports equipment. It is likely that finance is a barrier to PA in other economically disadvantaged populations but there is limited evidence regarding this association.

### **5.2.3.4 Safety**

In this study, safety was described as a strong barrier to PA across a variety of participant groups, including: both boy and girl adolescents, principals, FS participants and LO teachers. Some of the reasons described by adolescents for feeling nervous to spend time outdoors were issues of gangsterism, drugs and violence. The presence of gangs in neighbourhoods appears to have a direct impact on parents and schools not permitting children to be outside for fear of being exposed to drugs, violence and even kidnapping. Of significant concern, was the fear one adolescent described of being killed by gangsters at school. Our findings are synonymous with the review by Ferreira *et al.*<sup>(104)</sup>, who demonstrate an inverse relationship between objectively measured crime incidence and physical-activity levels in adolescents. Further to this, the 2017 meta-analysis by Rees-Punia *et al.* shows a reduced-odds ratio of achieving a higher physical-activity level in neighbourhoods with objectively measured levels of crime as well as a significant positive association between perceived crime and reduced physical activity<sup>(122)</sup>. 'Those reporting feeling safe from crime had a 27% greater odds of achieving a higher level of physical activity (OR 1.27, [1.28, 1.49]); those living in areas with higher objectively measured crime had a 28% reduced odds of achieving higher levels of physical activity (OR 0.72, [0.61, 0.83])<sup>(122)</sup>. The impact of these serious safety issues, means that these adolescents have fewer opportunities formally at school and informally in the community, to be outside taking part in physical activity. 'Safety' appears to have a further impact not only on reducing time spent outside on games but also influences choices regarding transport between school and home and subsequently has an impact on choices regarding extramurals. In some situations, participants chose not to take part in extramural activities for fear of safety issues when coming home on their own or later, after the extramural activity. In our study, crime at school, in the form of theft/stealing was also described as a factor leading to loss of sports equipment and was also linked to the presence of park or equipment facilities or sadly, the lack thereof in neighbourhoods.

### **5.2.4 Cultural PA barriers and enablers**

#### **5.2.4.1 Lack of sports culture**

It was interesting to note from this study, that one of the apparent gaps emerging from the raw data was the lack of discussion around PA as a 'culture' in society. In the literature there appears to be little evidence regarding the 'culture of sport' and its impact. One possible reason may be that the culture of sport trends have not yet been measured and therefore monitored. One of the IDI participants in this study raised the point about a 'culture of sport' when the issue regarding safety of taking part in sport 'in the road' was discussed. It was highlighted that, unlike when the participant was a child, it is no longer the culture in the neighbourhoods to play sport in the road. From the PA barriers highlighted, possible reasons for this change in

culture point towards complex socio-economic issues and changes like the development of technology, working parents, long working long hours and community safety. This means, that working around these barriers in order to make PA the cultural norm in society again is of paramount importance if we are to achieve adolescent physical-activity levels in line with the WHO recommendations (an accumulation of 60 minutes of moderate to vigorous intensity per day)<sup>(126)</sup>. In order to do so, further research needs to be conducted to establish the best way forward. It could include looking at addressing issues such the culture of flexibility and opportunity for PA in the school and workplace. Further to this, issues such as crime, which cannot be remedied overnight, need to be circumvented by doing further research into how communities can increase safety around PA, for example by doing it in groups, or dedicating times or days in the community for PA in order to reduce safety risks. South Africa can learn lessons from other countries that have implemented temporary road closures to increase suitable space for play and PA, for example in the UK (<http://playingout.net/>) and others that have made 'Bike to Work days' such as in Washington DC, USA ([www.biketoworkmetrodc.org](http://www.biketoworkmetrodc.org)), Canada ([www.biketowork.ca](http://www.biketowork.ca)) and Australia ([www.bicyclenetwork.com.au](http://www.bicyclenetwork.com.au)). These initiatives help to increase access to more physical activity and assist in moving towards PA becoming the cultural norm.

#### **5.2.4.2 Changes in sporting preferences**

Another cultural observation from the data in this study was that the sports available to adolescents in schools are mostly traditional sports such as rugby, cricket, netball, tennis, hockey and swimming (where facilities are available). However, what emerged from some of the FG participant's ideas, was that there is an interest to pursue other forms of exercise like hiking, fun runs, yoga and dance. This, therefore, highlights the need to review local adolescent interests regarding types of physical activity and emphasises the importance of considering adolescents' points of view when designing PE/PA programmes, in order for them to be appealing to adolescents.

### **5.3 OBESOGENIC BARRIERS TO AND ENABLERS OF NUTRITION**

The positive and negative impact on nutritional intake of many factors at most levels of the SEM, was observed in our study. Of particular concern is the availability of unhealthy junk and fast food, both within the school environment and in close proximity to schools.

#### **5.3.1 Intrapersonal barriers and enablers of nutrition**

**Taste preferences:** In this study, adolescents' preferences are strong determinants of the food choices that they make. There was a relatively even distribution of liked and disliked healthy and unhealthy foods. Participants described an enjoyment of fast food like pizza, however, there was also an expression of enjoyment for eating fruit, salads, vegetables and

cooked foods. Others did express their distaste for bitter, cruciferous vegetables. They also described not enjoying the texture of certain foods. Synonymous with these findings, taste preferences appear to be a determinant of food choices in the literature<sup>(100, 127, 128)</sup> as well as texture<sup>(127)</sup>. In the qualitative study by Watts *et al.*<sup>(100)</sup>, looking at adolescents and ‘navigating their home food environment’ healthy meals are described as needing to ‘taste good’. Further to this, in the study by Fitzgerald *et al.*<sup>(127)</sup>, in Irish children and adolescents, food preferences are also consistently identified as a major influence on the food choices of young people. They find that ‘taste, texture and appearance of food were three factors that emerged to be crucial when making decisions about food’. In another study, although conducted in elementary school children, Slusser *et al.*, find that, after cost, their food preferences for unhealthy foods compared to healthy foods, are one of the most commonly cited barriers to eating healthier foods<sup>(128)</sup>.

**Psycho-social factors:** In this study, ‘emotion’ was described as a trigger to eating unhealthy foods like sweets, for comfort. The psycho-social facilitators and barriers to nutritional choices have been researched internationally<sup>(58, 78, 87, 129)</sup> and locally<sup>(95, 130)</sup>. Our finding was consistent with the review by Kebbe *et al.*<sup>(85)</sup>, who identify several studies<sup>(89, 131)</sup> where ‘sadness’ is an emotional state with a negative impact on quality and quantity of food in adolescents. In the qualitative study by Lindelof *et al.*<sup>(89)</sup>, participants describe feeling ‘sad’ as one of the reasons that they make unhealthy food choices when eating alone. Similarly in the qualitative study by Reece *et al.*, looking at obese young people’s perceptions of life they find that ‘upsetting events’ and ‘feeling sad’ are triggers for eating<sup>(131)</sup>.

Although expressed as a factor having a negative impact on food choices, ‘emotional state’ was not a strong theme that emerged, in contrast with evidence in the international literature. Consistent with our findings, there was little evidence in South African studies of emotional state on impact of food choices. One SA qualitative study<sup>(135)</sup> looking at urban female adolescents, explores dietary practices in an obesogenic environment. Although many other factors were described, no mention of the impact of emotional states on food choices is made. One possible reason may be that this is a sensitive issue and participants do not feel comfortable discussing psycho-social factors in a group setting. Another possible reason may be that there are other overriding factors in this population that have a stronger impact on food choices. Further to this, it may be that this issue has yet to be explored thoroughly in SA.

**Time:** Lack of time was described by participants in this study as a strong factor negatively affecting food choices similar to the results by Porter *et al.*<sup>(59)</sup>. In many instances participants

described not having enough time to prepare food or wanting something to prepare and eat quickly. Lack of time seemed to influence the decision to opt for readily available junk food/fast-food options. Several participants described the time impact of parents working and choosing to bring fast food to school after school sport as well as bringing fast food to school for breakfast. In the Los Angeles-based qualitative study by Slusser *et al.*<sup>(128)</sup>, the researchers held focus group interviews with parents of low-income children in order to try and identify the barriers and promoters of healthy eating habits. They found, similarly to the findings of this study, that two of the most commonly cited barriers to eating healthy foods were: cost and lack of time for preparing meals, leading to the purchase of foods from fast-food outlets. If time is consistently being demonstrated as one of the main barriers to healthy eating that families of today experience, further research needs to be conducted to explore possibilities for parents to make healthy food options accessible in the home and school environment given these time constraints.

### **5.3.2 Interpersonal barriers and enablers of nutrition**

The impact of friends and family on nutrition choices is clearly complex. In general, many adolescents described the sources of healthy food options like salads and vegetables to be 'from the home'. This view was supported by that of the participants of the IDIs acknowledging that healthy food options are often available to children in the home environment. This was also affirmed by many participants in response to the question of whether healthy foods like fruit and vegetables are affordable, meaning that healthy food accessibility from a cost perspective and availability in the home is not a concern.

What does appear to be a significant obesogenic challenge in this study population, is the socio-economic complexity of working families, which is consistent with findings in the literature<sup>(132)</sup> in which one participant states is the case for '99% of the community'. This seems to have a negative impact on energy levels for parents, who, in the evening after coming home late from work, were too tired to prepare food. Further to parents working late, has a negative effect on the food choices adolescents make in the afternoons after school. Since parents are not available to help with the provision of meals in the afternoon, adolescents were responsible for making their own nutrition choices, which seems to lead to easily available and less healthy choices being made.

### **5.3.3 Environmental barriers and enablers of nutrition**

One of the major nutrition concerns and challenges that emerged from the discussions and interviews was the availability of junk food in schools and in the community together with the lack of healthy food options available to adolescents. This is consistent with other findings <sup>(128,</sup>



<sup>133, 134</sup>). In our study, the close proximity of schools to takeaway shops and street vendors were widely described across the participant groups as a major challenge. In a recent study looking at food sold by street-food vendors in Cape Town, the majority of foods sold included crisps, sweets, biscuits and chocolates, fruit, baked foods and soft drinks. The accessibility of these fast foods may pose a serious public-health risk by virtue of the vast majority of these items being energy dense, high in saturated fat, sugar and salt<sup>(133)</sup>. Further to this, unhealthy food options in tuck shops and at informal fence vendors were of great concern across the participant groups. If healthy food was available, many adolescents described the healthy food as being too expensive. Participants of the IDIs described an observation that fewer children brought lunchboxes to school and that many children bought cheap junk food as their source of nutrition during the day. This fits with the quantitative findings by Temple *et al.* (2006), who look at the food items consumed by Cape Town students attending school in different socio-economic areas<sup>(134)</sup>. They find that 69.3% of students purchase food at school from the tuck shop with 70% of these students purchasing no healthy items and 73.2% of these students purchasing two or more unhealthy items. Of the children who do bring lunches to school, the predefined 'unhealthy' items outnumbered the predefined healthy items by 2:1, indicating that most of the food eaten by adolescent students is unhealthy whether brought to school or purchased at school. Being the same Cape Town population to the study, which we conducted, these quantitative statistics are of a concern.

The tuck shops appear in many instances to be independently run businesses. This makes the issue of what is available for sale more complex. Although one school did describe trying to make healthy options available in the school tuck shop these food and drink items were withdrawn by the tuck-shop manager because the children did not purchase the healthy food and drink options. Because of these poor sales compromising business, the tuck-shop owner had reverted to making the less healthy food options available again. In the literature, a study by Sedibe *et al.*<sup>(135)</sup> looking at the dietary practices by female adolescents in Soweto supports our findings. They found that more than 80% of participants bought food from the tuck shop<sup>(135)</sup>. Further to this, the five most popular foods for all ages were: sweets, crisps, cold drinks, fried chips and white bread. These unhealthy foods accounted for 62% of all purchases. The participants stated 'We combine money and buy snacks most of the time. We buy them because they are cheap.'<sup>(135)</sup>

Participants also went on to describe the inaccessibility of healthy food in community supermarkets. They explained that one had to walk through the 'unhealthy foods' in order to access the healthy options. Clearly, the proximity, low-cost and ready-to eat convenience of these food options fuels the ease in availability of junk food while the less accessible, higher

cost and greater-preparation required of healthier options further adds to their inaccessibility for the economically disadvantaged and further compromises food-security issues.

From an availability perspective, participants in this study did describe healthy food options being accessible at home, and through feeding schemes and other smaller initiatives like the lunchbox initiative. They also described fruit being available through informal vendors in the community. It appears in this study, that it is not that healthy food seems expensive and unavailable but more that certain unhealthy food items are even cheaper and more readily available.

### **5.3.4 Societal barriers and enablers – nutrition**

In this study, societal beliefs were seen to have a concerning negative impact on nutrition choices that to our knowledge has not been seen in other SA studies. Participants in the FG discussions described the perception of feeding schemes and the choice by some individuals not to accept meals but rather to go hungry for fear of being seen as ‘poor’ (economically disadvantaged) if they accepted food from a feeding scheme. The validity of this finding was substantiated by the shared view of some participants of the IDIs.

Further to this, another participant described the view of the family being seen to be doing ‘quite well’ with family members being overweight/obese; hence not having a desire to change nutritional choices to lose weight for fear of this having a negative impact on perceived socio-economic status in the community.

## **5.4 PERCEIVED AETIOLOGY OF OBESITY**

In this study the overwhelming response from across the participant groups to the question of what causes obesity in adolescents in this community, was their unhealthy eating habits and sedentary lifestyle. This indicates that there is generally a level of understanding regarding the importance of energy balance through exercise and nutritious food choices to achieve and maintain a healthy weight.

### **5.4.1 Nutrition**

Participants in this study unanimously agreed that the availability and consumption of junk food both within the school environment and in the community, were major contributory factors to obesity in this population. Available research on the influence of the food environment on dietary intake and adiposity has increased over the last 10 years with contradictory results<sup>(136–139)</sup>. This has partly been explained by the cross-sectional design of the studies and variations in interpretation of the definition of the ‘food environment’<sup>(136)</sup>. Results from the systematic

review by Rosenheck (2008), have 'begun to elucidate a positive link between fast food consumption and risk of weight gain or obesity'<sup>(137)</sup>. Three out of six cross-sectional studies looked at children and whether there was an association between fast food intake and BMI<sup>(129, 140, 141)</sup>. In the study by Bowman *et al.*<sup>(140)</sup>, there is a statistically significant association between fast-food consumption and increased energy intake of 187 calories per day in those children who regularly consumed fast food compared to those who did not. A cross-sectional study by Boutelle *et al.*<sup>(141)</sup> looking at middle and high school adolescents and their parents, finds that the parents who reported purchasing fast food for the family at least three times per week, had higher mean BMI than parents who reported less frequent fast-food purchases, while in contrast the children did not. Although French *et al.*<sup>(129)</sup> also finds a significantly positive relationship between fast-food consumption and energy and fat intake among 4344 US students, there is no association between fast-food intake and BMI in females. Interestingly, males who consumed fast food more than three times per week had a lower BMI compared with males who consumed fast food two or fewer times per week. In experimental studies considered by Rosenheck<sup>(137)</sup>, two were conducted in adolescent participants, and found a positive association between fast-food intake and increased energy intake<sup>(142, 143)</sup>.

Although this systematic review<sup>(137)</sup> was unable to find a causal relationship between fast-food consumption and weight gain, there was undoubtedly an association between increased fast-food consumption and increased calorie intake, thereby increasing the risk of these individuals to gain weight or become obese.

In addition to these aforementioned international findings, evidence in SA<sup>(119, 144)</sup> supports the views of participants in this study that the consumption of junk food, both within the school environment and in the community, were major contributory factors to obesity in this population. Respondents in the RMCH baseline assessment of the ISHP conducted in 2012/2013 felt that there was a link between the growing obesity problem and the consumption of 'cheap, unhealthy snacks at schools'<sup>(119)</sup>. This view is supported by evidence from the study by Feeley *et al.*<sup>(144)</sup> who look at changes in dietary habits and eating practice in adolescents in urban SA as part of the birth-to-20 cohort study. They find that fast-food consumption increased by half a portion per week over a five-year period and that lunchbox usage decreased with age and that tuck-shop purchases increased. They also find that 85% of the participants purchased items from the school tuck shop with girls of 13 years of age purchasing statistically significantly more items than boys of 13 years of age.

Participants in our study also acknowledged the lack of home-prepared lunches and the link with the lack of these home prepared meals and the growing obesity issue. They described

previously observing many more children bringing packed lunches to school, where now there seemed to be more of a dependency on junk food from the tuck shop or fence vendors.

Given the established risks adolescents face of increased weight gain as highlighted in Chapter 2, the evidence that exposure to fast food leads to a positive association with increased calorie intake as seen in these studies, together with the SA evidence of adolescents dietary habits and the views of participants in this study regarding junk food, there is cause for serious adolescent health concern.

In term of types of foods that cause obesity there appeared to be a general awareness of foods that are high in calories and those that are perceived to contribute to obesity. Participants cited foods such as pies, Gatsby's<sup>3</sup>, chips, pizza, chocolate, KFC<sup>4</sup>, cool drinks like Coke and Jive, sweets, cakes, ice-cream, doughnuts and foods with 'too much fat', as those that cause adolescents to be overweight. Some participants also acknowledged the perception that there are adolescents who eat too much, indicating a basic level of knowledge regarding portion sizes and the role of correct quantity of food in maintaining a healthy weight. In addition to this, the frequency of eating was described as a contributing factor as well as the lack of intake of healthy foods like vegetables.

It is important to note that some participants described lifestyle choices like 'giving adolescents R100' in order to be able to purchase food for the day from the tuck shop, as a cause of obesity. This indicates that, although poverty was described as a nutritional barrier to healthy lifestyle choices, that this is not always the case. Giving adolescents money to access food during the day, appears to be a symptom of parents working long hours and not having the time or possibly being less inclined to organise school meals. These changes in family dynamics with work-life balance, working women and subsequent changes in eating patterns/habits were also seen in the study by Pradeillas *et al.*, (2016)<sup>(132)</sup>. In this SA qualitative study exploring community readiness for adolescent overweight and obesity prevention, the potential for faith-based organisations to be involved was assessed. One of the views that emerged from the leaders in this community was that a cause of obesity at the household level was a societal change regarding family dynamics (e.g., work-life balance, working women)'. Leaders described observing family dynamics where both parents are working and there is a lack of time to prepare healthy food for the family.

If these family dynamic changes are becoming the societal or cultural norm, with subsequent impact regarding food decisions, it indicates the importance of adolescents having nutrient-

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<sup>3</sup> A long bread roll with a variety of fillings and cut into four pieces; usually eaten by hand

<sup>4</sup> Kentucky Fried Chicken

rich foods available in the school environment and making 'unhealthy' foods unavailable and inaccessible through cost both within school and in the nearby community.

#### 5.4.2 Physical activity

Participants described the other major reason for obesity being a lack of exercise, as well as too much time spent on sedentary activities, including: playing video games, watching TV and sleeping. This perception is synonymous with evidence in the literature of the importance of physical activity in achieving a healthy weight<sup>(79, 101, 145)</sup>. In the systematic review conducted by Steyn *et al.*<sup>(145)</sup>, as part of their research for 'Healthkick' (a school-based health intervention in the Western Cape) the researchers reviewed international school interventions with a nutrition component. Those that also focused on nutrition together with PA were associated with most of the best practice clinical and behavioural outcomes. The 'Know Your Body School Health Promotion Programme' in Crete, which targeted children from 5.5 to 11.5 years of age showed best practice improvements in knowledge, behaviour and clinical outcomes including BMI and lipid profile<sup>(146)</sup>. The 'Pathways' programme looking at children 8-11 years of age, showed knowledge and behaviour best-practice outcomes, including a 265kcal reduction in energy<sup>(147)</sup>. In the 'Eat Well Keep Moving' programme, although there was no change in physical-activity levels, the programme showed best-practice outcome with regards to behaviour change, including a decreased intake in energy from fat (1.4%) and an increase intake of fibre and Vitamin C<sup>(148)</sup>.

The systematic review by Janssen *et al.*<sup>(101)</sup> looks at the health benefits of physical activity in school-aged children and youth. In four studies that addressed objective measures of activity, including pedometers<sup>(149)</sup> and accelerometers<sup>(150–152)</sup> there were significant relations found between physical activity and overweight/obesity with a median odds ratio of 3.79 in eight of the cross-sectional data points examined.

Further to this, the perception in our study, of activity-related factors causing obesity, is synonymous with the conceptual model created by Lytle (2009)<sup>(79)</sup> outlining the link between behavioural factors such as type and amount of certain activities and sleep as factors influencing the development of obesity. The fact that the evidence exists regarding the importance of physical activity in achieving a healthy weight, together with the fact that participants in our study are aware of this, highlights that the potential challenge in this population is behaviour change, not a knowledge concern.

In contrast to our findings, the review paper by Swinburn *et al.*<sup>(153)</sup> looking at TV time and sedentary pursuits, concludes that TV viewing cannot be implicated as a cause of the rise in obesity prevalence over the last three decades because of the lack in increasing TV trends

over time. They highlight potential mediators of the effect on higher TV viewing on higher BMI as: less time for PA; reduced resting metabolic rate; increased energy intake from increased eating while watching TV; and greater exposure to the marketing of energy-dense foods.

#### **5.4.3 Psycho-social causes**

Psycho-social factors and their impact on weight, have been observed extensively in the literature<sup>(59, 79, 132, 154)</sup>. Lytle's conceptual model<sup>(79)</sup> describes individual or psycho-social factors under 'Contextual' causes of obesity. The model outlines how the relationship between immutable factors like family history and demographics may be influenced by psycho-social factors, which then have an impact on behavioural factors like nutrition and activity choices. This link was observed in our study, where emotional states appeared to be a strong perceived contributing factor of what causes obesity in this adolescent population, including: stress, boredom and depression, which were described as factors affecting food and physical-activity levels.

A qualitative study in a SA population looking at community readiness to address adolescent overweight and obesity, finds similar perceived emotional causes of obesity<sup>(132)</sup>. One of the Roman Catholic Church leaders in this Soweto population, describes a perception of individual causes of obesity, for example stress, depression and emotions, highlighting the importance for the need to take these factors into account in the design of adolescent health programmes.

In the study by Stok *et al.*<sup>(154)</sup>, the researchers conducted a survey in more than 11 000 adolescents to measure 'psychological sensitivity to the food environment, self-regulatory competence and self-reported unhealthy snack intake'. They found that a 'higher food environment sensitivity and lower self-regulatory competence were associated with unhealthier snacking'. They also observed an interaction between the two with 'better self-regulatory competence attenuating the influence of high food environment sensitivity'.

In the descriptive study by Porter *et al.*<sup>(59)</sup>, history of trauma is the only psycho-social factor in adolescents enrolled in a weight-loss obesity programme associated with compliance. However, 38% of the participants had reported receiving previous mental health treatment and 22% had reported experiencing past suicidal thoughts.

These studies highlight the importance of considering adolescent psycho-social wellbeing in promoting and supporting a healthy lifestyle and weight-management programmes.

#### **5.4.4 Other causes of obesity**

Further to these reasons, the participants described a range of other factors including: genetics, ignorance and lack of education, grandparents, parents spoiling children, lack of role

models and poverty causing obesity in this community. This demonstrates an understanding of the complex interplay of intrapersonal, interpersonal, community and cultural factors observed in this study. These perceived causes of obesity, aptly fit with the SEM that describes the socio-economic layers that contribute to childhood obesity<sup>(77)</sup> as well as Lytle's conceptual model of the aetiology of obesity<sup>(79)</sup>, discussed in further detail in Chapter 2. The remit of this study did not allow us to explore this phenomenon further. However, the impact of these factors at various levels of the SEM warrants further investigation to provide further information to address adolescent health needs more satisfactorily.

## **5.5 OBESOGENIC ENVIRONMENT SUGGESTIONS**

### **5.5.1 Knowledge**

In this study, knowledge of what constitutes a healthy lifestyle, together with the importance of it, was mixed. There were some participants who appeared to understand the link between diet and health; however, for the most part knowledge was quite elementary and the lack of knowledge of what constitutes a healthy lifestyle was described as a cause of obesity by some participants. This finding is similar to that in the study by Ramukumba *et al.*<sup>(93)</sup>. This was conducted as a situational analysis of a SA community in the Limpopo region, where the researchers sought to investigate perceptions of obesity through quantitative and qualitative methods. In this predominantly Venda and Tsonga cultural population, there was little knowledge of the health consequences of obesity despite an 83% level of obesity in their study. Worryingly, some participants did not understand the 'concept of obesity' and there is no word for the concept of obesity in the Tshivenda or Xitsonga languages. This study together with ours, highlight the importance of the need for further research to be conducted in order to determine levels of understanding of obesity and the value placed on health and healthy lifestyle choices in different communities and cultures. This will help to better inform the design of public-health obesity management and prevention programmes and to substantiate the rationale behind public-health obesity prevention and management programmes for adolescents.

### **5.5.2 Tailored adolescent obesity initiatives**

Due to the changes that adolescents undergo physiologically, emotionally and psychologically, together with the personal and community obesogenic barriers facing them, it is important to tailor healthy lifestyle programmes to better suit adolescent needs. It is important to consider evidence in the literature and this study regarding motivating factors and educate and highlight long-term and immediate health consequences of good nutrition and exercise. What further appears to motivate adolescents in this study, are trends, having fun with friends and having fun in PA. The adolescents in this study group described needing to

re-examine what is offered to adolescents in schools in terms of nutrition and physical activity and to look more specifically at gender differences. Clearly, the health movement needs to become a 'trend' with suitable, respected role models. There was an expression of wanting to make exercise compulsory, but a need to keep it fun, enjoyable and something you can do with friends (for example, activity camps, walks, a Colour Run, dance activities and hikes).

### **5.5.3 Food security: decrease accessibility to unhealthy food and increase accessibility to healthy food**

There is an overwhelmingly strong need to make unhealthy food more inaccessible and healthy food more available and affordable, particularly in schools (tuck shops) and in the communities. In this study, participants expressed a strong desire for healthier food to be more accessible (available and affordable), including fruit, vegetables and dairy; for healthier food to be cheaper; and for junk food in tuck shops to be less available.

When participants were asked what the government could do more of, some raised the issue of needing greater health awareness and others addressed food choices in the tuck shops. Some participants were reluctant to answer, potentially indicating the sensitive nature of this subject or the lack of understanding of the topic. From the scarce resource provision for nutrition and obesity services observed, this study points towards the need for further research regarding the government resource allocation for the support of nutrition services. In addition to this, legislation around types of food sold in tuck shops, reviewing the tax policy regarding junk food and healthy food items, as well as the proximity of fast-food outlets to schools need to be addressed.

### **5.5.4 Support and collaboration with other organisations**

In this study, adolescents, particularly the girls, described wanting and needing a variety of support structures in order to support a healthy lifestyle in terms of psychological, nutritional and physical-activity support. There was acknowledgement by some that motivation to make healthy lifestyle choices needs to come from within (intrapersonal); however, there was certainly the recognition of assistance required in order to do so, particularly by the girls. Further to this, the vast majority of the adolescents expressed their view that it is family and school staff who are responsible for helping adolescents achieve a healthy weight. These individuals include: parents, extended family, peers, teachers and coaches.

This fits with the responses of whence the adolescents receive their health messages, as well as what they would like to see changed in the school. Although many of the youth of today have access to the internet and are getting mobile phones at younger ages, in this population most participants still get their health messages predominantly from parents and the school,



followed by TV and radio, with the minority getting health messages from the internet. This highlights the importance, as recognised internationally, of the school environment in facilitating and promoting a healthy adolescent lifestyle by way of supporting healthy nutrition and physical-activity choices and in facilitating access to psychological and peer support<sup>(113)</sup>. In addition to this, it stresses the importance of finding ways to support families further in their role as health promoters and facilitators to their children, as acknowledged in the EU Action Plan on Childhood Obesity 2014–2020<sup>(24)</sup> and the NICE guideline for weight management in overweight or obese children and young people<sup>(24)</sup>.

The overwhelming response to what support parents need in order to help adolescents be healthier, was information, knowledge, education and skills (e.g. cooking skills). There were mixed responses in terms of what participants felt would be the best way in which to deliver these messages, including literature, workshops, support groups or networks and media, probably in light of the complex and different socio-economic circumstances.

There was also acknowledgement by the participants of the collaborative efforts required with other sectors including: Government (DOH and DSS) and the retail industry (suppliers and fast-food outlets) in order to support adolescents to achieve a healthy lifestyle. This concurs with the recognition nationally and internationally, of the complexity of adolescent health and the important role that each of these different sectors plays in trying to combat the adolescent obesity epidemic.

## 5.6 STUDY STRENGTHS

**Participants as experts:** An important strength of this study, with its focus on adolescents, is its recognition of the participants being the experts. A significant amount of data was collected directly from adolescents themselves. This provided valuable and rich insight, into specific youth experiences, thoughts and feelings regarding the challenges and opportunities relating to the adolescent obesogenic environment.

**Two methods of data collection with layers of participants:** A further valuable strength, includes the use of two methods of data collection: focus-group discussions and individual interviews as well as the fact that each method incorporated 'layers' of participants. The focus groups were separated (and analysed) according to boys and girls and allowed for idea generation through group interaction. The individual interviews included a variety of stakeholders with different roles to provide private and personal thoughts and feelings. This design allowed the interviewer to explore individual thoughts in greater detail.

**Diversity of the study population:** The diversity of the study population means data from a wide range of stakeholders in adolescent health was collated including adolescents, a range of professionals and levels of experience. This adds to the richness and depth of the data.

**Validity and reliability of the findings:** The study protocol and data analysis procedures ensured validity of the findings. The items of the interview schedule and focus-group discussion guide were based on the literature. The items were proposed by the investigator and reviewed and edited by the study supervisors in order to ensure content validity. The principal supervisor observed the study investigator during co-ordinating and facilitating a focus-group discussion in order to ensure that appropriate data-collection procedures were followed. Checks of the data transcription were implemented to ensure accuracy and credibility in the transcription process.

## 5.7 STUDY LIMITATIONS

The main limitation of the study was that it was exclusively qualitative in study design. The participants responses were not measured, and it therefore lacks statistical representation. However, this is in effect a Phase-2 study of which Phase-1 did include quantitative data. Although time did not permit the study investigator to examine the Phase-1 quantitative data, the information is available for further study purposes.

Another potential limitation of the study was that all the focus groups were conducted in English. First-language Xhosa or Afrikaans focus-group participants may have felt more comfortable or opened-up further, if there had been a Xhosa or Afrikaans investigator. However, the option of a Xhosa or Afrikaans interpreter was offered to all schools. All the school coordinators felt that the participants would understand an English-conducted discussion or interview and that an interpreter was not necessary. Further to this, there were few instances where a participant did not understand what the facilitator said. If this did happen, one of the other participants translated and relevant answers were given.

The focus-group method of data collection may have hindered the study participants from being willing to share their thoughts and views in a group setting, because of the sensitive nature of obesity, peer pressure and social desirability. However, a concerted effort was made to make the participants feel comfortable and relaxed, establish a good rapport and remind the participants that all opinions were valuable, and none would be judged. More importantly this did not seem to influence the results as findings across the adolescent focus groups were similar. Further to this, the benefits of using focus groups include that some individuals may be prompted to share their ideas when they hear others do so and that the views of others may jog their memory.

## CHAPTER 6: CONCLUSION

In conclusion to the study research question, as to what the nature of the obesogenic environment is for adolescents in the Cape Town Metropole of the Western Cape and what the potential opportunities and barriers are affecting adolescents, it appears that there are shortcomings in the implementation of the nutrition component of the ISHP and in addressing adolescent obesity. Socio-economic challenges like safety and food-security issues in the school environment and community present the main barriers to healthy lifestyle choices while support of family and resources in the school environment provide opportunities.

### 6.1 SUMMARY OF FINDINGS

Gaps in the implementation of the nutrition component of the ISHP, mean much more progress is yet to be made in terms of nutrition assessments, monitoring and referral processes as well as collaboration with other sectors in this regard. Possible reasons for these shortcomings may be a lack of awareness of the ISHP, priority being given to other more pressing socio-economic issues like health campaigns and/or crime issues, together with limited resources.

Further to this, there is clearly a gap in the ISHP in tackling the adolescent obesogenic environment. This study provides richer insight into the physical-activity and nutrition barriers to, and enablers of, adolescents and offers a greater understanding of the complexity of this obesogenic issue. The socio-economic challenges of working parents, and food-security issues like the availability and proximity of fast-food outlets, unhealthy tuck-shop food options, combined with community safety issues are but a few of the challenges that adolescents face. However, there are nutrition and physical-activity opportunities, including family support, and access to sport resources in schools and the community that present as enablers. With further research in relation to adolescent obesity, the ISHP, nutrition and sports resources and accessing community and NGO support, public-health interventions could be better tailored to address adolescent obesity and optimise the use of these resources further.

### 6.2 RECOMMENDATIONS

#### 6.2.1 Home and family

- The study showed that adolescents would like to have assistance with motivational support of a healthy lifestyle. Provision of positive motivational support (verbal) of adolescents being involved in a healthy lifestyle needs to be provided by families in the home environment.

- There is a necessity for greater family involvement in support of adolescent healthy lifestyle, through role modelling. To achieve this, families require further access to information and support groups in order to provide them with the knowledge, skills and emotional support needed to do so.
- Families need to accept responsibility and a duty to their adolescent children to provide or arrange transport to physical activities (if not in walking distance to facilities).
- Since the study indicated that there is a gap in parental knowledge and limited learner knowledge of the link between diet and health, there needs to be an increase in parental awareness of the impact of nutrition choices on health outcomes, with further research to determine the best mediums to do so.

### **6.2.2 School environment**

- The study showed that adolescents would like to have assistance with motivational support of a healthy lifestyle from their peers. Learners, particularly girls, expressed a strong need for peer support for healthy lifestyle choices. Establishment and opportunity of healthy lifestyle peer-support groups for learners within schools is required.
- There needs to be optimisation of access to the existing and available resources in schools e.g. sports fields and sports facilities, through a review of options of flexible and shared use for reciprocal benefits within schools and organisations in the community.
- The study indicated there is a gap in the implementation of the ISHP in schools with regards to assessment, education and referral systems. There needs to be a review of how schools can better support the implementation of the ISHP through collaboration with academic institutions, local NGOs and other local support systems to rekindle and embrace the Health Promoting Schools concept.
- Schools need further guidance and legislation for tuck-shop and vendor services with regards to types of foods being sold and the costs thereof.

### **6.2.3 Community**

- Safety is a major concern and clearly has a negative impact on physical-activity levels. Improving perceived neighbourhood safety through local and national initiatives needs to be addressed.
- Community initiatives to promote and support access to free and safe exercise (e.g. walks and runs) need to be explored further

#### **6.2.4 Government**

- Public-health programmes for adolescents need to be tailored to their needs and preferences. This study demonstrated that there are gender differences in adolescents, for example in terms of physical-activity preferences. Therefore, weight management programmes need to be tailored to sex-specific adolescents needs (e.g. to be a 'trend' with suitable role models).
- This study demonstrated that there is limited knowledge by learners of the obesity consequences in the short-, medium- and long-term for adolescents. Therefore, intervention is required in order to raise the awareness of these obesity concerns through an interdepartmental collaborate approach between the DOE and DOH.
- There needs to be greater awareness made of the nutrition component of the ISHP in schools, accountability if not implemented, and incentives if put into place.
- A review of the nutrition package in terms of funding for feeding and distribution of nutrition resources is required in order to make nutrition access to all instead of only for the 'hungry' and 'disadvantaged'.
- Better collaboration with other sectors including NGOs, industry, the private sector and academic institutions is required in order to support the implementation of the ISHP and address adolescent obesity.
- Although there is the perception that some healthy foods are affordable, consideration needs to be given by Government to tax relief for healthy food and higher taxes on junk food in order to make unhealthy foods more inaccessible
- Further to this, there needs to be a review of legislation regarding allowed food to be sold in tuck shops and proximity of fast-food outlets and vendors to schools

These steps require a collaborative approach between individuals, the family environment, schools, industry, NGOs and Government.

#### **6.3 FUTURE RESEARCH**

- Further research needs to be conducted to explore adolescent preferences and implementation strategies regarding physical activity, focusing on gender differences.
- Further research that would assist to establish local and national options to circumvent the crime challenges, to increase PA is required.
- An exploration of the possibility of changes in legislation regarding tax on healthy and junk food, proximity of fast-food outlets to schools and vendor and tuck-shop menus is essential.

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## Addendum 1

### Ethics approval letter



UNIVERSITEIT-STELLENBOSCH-UNIVERSITY  
JOU KENNISVERMOEC - your knowledge partner

### Approved with Stipulations New Application

13-Sep-2016  
Blaauw, Renee R.

**Ethics Reference #: N16/08/100**

**Title: Investigating Nutrition and Physical Activity Behaviour of Adolescents in the School Environment**

Dear Prof Renee Blaauw,

The **New Application** received on 31-Aug-2016, was reviewed by members of **Health Research Ethics Committee 2** via Expedited review procedures on 13-Sep-2016.

Please note the following information about your approved research protocol:

Protocol Approval Period: 13-Sep-2016 -12-Sep-2017

The Stipulations of your ethics approval are as follows:

**1. Please submit Investigators' Declarations for all investigators involved in this study - i.e. for each of the undergraduate students who will be involved.**

Please remember to use your **protocol number (N16/08/100)** on any documents or correspondence with the HREC concerning your research protocol.

Please note that the HREC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

#### **After Ethical Review:**

Please note a template of the progress report is obtainable on [www.sun.ac.za/rds](http://www.sun.ac.za/rds) and should be submitted to the Committee before the year has expired. The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit.

Translation of the consent document to the language applicable to the study participants should be submitted.

Federal Wide Assurance Number: 00001372

Institutional Review Board (IRB) Number: IRB0005239

The Health Research Ethics Committee complies with the SA National Health Act No.61 2003 as it pertains to health research and the United States Code of Federal Regulations Title 45 Part 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health).

## Addendum 2



Directorate: Research

[Audrey.wyngaard@westerncape.gov.za](mailto:Audrey.wyngaard@westerncape.gov.za)  
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**REFERENCE:** 20161103 –5834  
**ENQUIRIES:** Dr A T Wyngaard

Prof Renee Blaauw  
PO Box 241  
Cape Town  
8000

**Dear Prof Renee Blaauw**

**RESEARCH PROPOSAL: INVESTIGATING NUTRITION AND PHYSICAL ACTIVITY BEHAVIOUR OF ADOLESCENTS IN THE SCHOOL ENVIRONMENT**

Your application to conduct the above-mentioned research in schools in the Western Cape has been approved subject to the following conditions:

1. Principals, educators and learners are under no obligation to assist you in your investigation.
2. Principals, educators, learners and schools should not be identifiable in any way from the results of the investigation.
3. You make all the arrangements concerning your investigation.
4. Educators' programmes are not to be interrupted.
5. The Study is to be conducted from **27 February 2017 till 30 June 2017**
6. No research can be conducted during the fourth term as schools are preparing and finalizing syllabi for examinations (October to December).
7. Should you wish to extend the period of your survey, please contact Dr A.T Wyngaard at the contact numbers above quoting the reference number?
8. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
9. Your research will be limited to the list of schools as forwarded to the Western Cape Education Department.
10. A brief summary of the content, findings and recommendations is provided to the Director: Research Services.
11. The Department receives a copy of the completed report/dissertation/thesis addressed to:  
**The Director: Research Services  
Western Cape Education Department  
Private Bag X9114  
CAPE TOWN  
8000**

We wish you success in your research.

Kind regards.  
Signed: Dr Audrey T Wyngaard  
Directorate: Research  
**DATE: 02 November 2016**

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Lower Parliament Street, Cape Town, 8001  
tel: +27 21 467 9272 fax: 0865902282  
Safe Schools: 0800 45 46 47

Private Bag X9114, Cape Town, 8000  
Employment and salary enquiries: 0861 92 33 22  
[www.westerncape.gov.za](http://www.westerncape.gov.za)



## Addendum 3



UNIVERSITEIT • STELLENBOSCH • UNIVERSITY  
Jou kennisvenoot • your knowledge partner

Mr

Dear Mr ,

### RE: PERMISSION TO CONDUCT A RESEARCH STUDY

The Division of Human Nutrition, Stellenbosch University, is planning to embark on a research study titled: ***Investigating Nutrition and Physical Activity Behaviour of Adolescents in the School Environment*** (Ethics numbers: N16/08/100).

Literature indicates that there are some research data on lifestyle and obesity prevalence in adolescents in South Africa (SA) and Africa, however major gaps still exist. In SA, overweight and obesity in adolescent boys and girls as well as low levels of physical activity raise public health concern for the current and future health of this group. Addressing obesity in adolescent boys and girls requires a multidisciplinary focus on the individual, environment and policy dimensions of this nutritional problem.

The aim of this study is to assess the nutritional profile, obesogenic environment and physical activity behaviour of adolescent boys and girls in secondary schools in the Western Cape Province, South Africa. The study will be conducted at 20 randomly selected secondary schools in the Cape Town Metropole District. Your school is one of the selected schools and we hereby request your permission to conduct the research at your school.

The study participants will include all **Grade 8** learners who agree to take part in the study. The study will be conducted in two phases. The data collection period is planned for **27 February – 17 March 2017**. Phase 1 involves assessment of the school and surrounding environment with regards to nutrition and physical activity and assessment of learner's (i.e. determining the learners' body measurement profile, dietary intake and eating patterns, assessing food availability and learners' engagement in physical activity). Phase 2 includes will engage learners, policy makers and school principles of the selected schools in order to assess barriers and enablers, impacting the obesogenic environment.

The researchers envisaged to spend two days at each selected school. Contact with the learners will be restricted to 1 day and the balance of the time will be used to engage with the relevant staff members (life skills teacher, school principal, tuck-shop manager) and to perform the observational checklist. It is estimated that the total contact time per learner will not exceed 60–90 minutes. To ensure minimal disruption of school programmes, logistical details will be arranged with each school and we will adapt our programme according to your schedule.



Fakulteit Geneeskunde en Gesondheidswetenskappe  
Faculty of Medicine and Health Sciences



Human Nutrition • Menslike Voeding  
Posbus/PO Box 241 • Kaapstad / Cape Town 7505 • Suid-Afrika/South Africa  
Tel.: +27 21 938 9690 • Faks/Fax: +27 21 933 2991  
Webblad / Web page: [www.sun.ac.za/nutrition](http://www.sun.ac.za/nutrition); [www.sun.ac.za/nicus](http://www.sun.ac.za/nicus)



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Once we have received your permission, we will make contact with your school to arrange suitable dates for the research. It will be appreciated if you could identify the contact person we should liaise with for all the logistical arrangements and also if you could provide us with the total number of Grade 8 learners enrolled for 2017.

We have received the approval to conduct the study from the Department of Education, Western Cape Government. Please see attached letter. A full report of the study findings will be submitted to the Department of Education and each participating school upon completion of the study.

You can reply to me to confirm receipt of this letter and to provide permission to conduct the research at your school.

I trust that this request will receive your favorable consideration. Please feel free to contact me for any further clarification. Thank you for your time and consideration in this matter.

Yours Sincerely,

**PROF R BLAAUW**  
Division Human Nutrition



Fakulteit Geneeskunde en Gesondheidswetenskappe  
•  
Faculty of Medicine and Health Sciences



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Tel.: +27 21 938 9690 • Faks/Fax: +27 21 933 2991  
Wabblad / Web page: [www.sun.ac.za/nutrition](http://www.sun.ac.za/nutrition); [www.sun.ac.za/nicus](http://www.sun.ac.za/nicus)

#### Addendum 4

### **TITLE OF THE RESEARCH PROJECT: Investigating Nutrition and Physical Activity Behaviour of Adolescents in the School Environment**

**REFERENCE NUMBER:** N16/08/100

**PRINCIPAL INVESTIGATOR:** Prof R Blaauw

**ADDRESS:** Tygerberg Medical Campus, Francie van Zijl Drive, Parow 7500

**CONTACT NUMBER:** 021 938 9259

Your child is being invited to take part in a research project. As legal guardian of the learner the researcher needs your consent for him/her to take part in the study. Please take some time to read the information presented here, which will explain the details of this project. Please ask the researcher any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how you could be involved. Also the learner's participation is entirely voluntary. As the legal guardian you are free to decline that your child participate in this study. If you say no, this will not affect you or your child negatively in any way whatsoever. You are also free to withdraw your child from the study at any point, even if you give consent to participate.

This study has been approved by the Health Research Ethics Committee at Stellenbosch University and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.

#### **What is this research study all about?**

The study will be conducted on the school premises during school hours with the Grade 8 learners. The goal is to obtain data from at least 183 learners per school. We will be conducting research in secondary schools in the Cape Metropole.

The researcher's aim to investigate factors related to obesity such as nutrition, physical activity and the environment.

Measurements such as weight and height will be taken. In addition, your child will be required to complete a questionnaire relating to nutrition behaviour and physical activity. An assent form will be given to the learners on the day of data collection. Their participation is entirely voluntary.

All activities will be conducted on the school premises during school hours. Total contact time per learner should not exceed 60-90 minutes.

In addition, your child may also be asked to participate in focus-group discussions. These are small groups of 6–10 learners who sit together to discuss various aspects on nutrition and physical activity based on questions posed by the researchers.

**Why has your child been invited to participate?**

Your child is a Grade 8 learner in one of the selected schools and therefore meets the criteria for participation.

**What will your responsibilities be?**

Your responsibilities as a parent is to provide consent by handing in a signed consent form on the due date.

**Will your child benefit from taking part in this research?**

Your child will not benefit directly but the results of the study can have an impact on policies and programmes to combat obesity in secondary school children.

**Are there any risks involved in your child taking part in this research?**

There are no risks involved in the study.

**If you do not agree to take part, what alternatives do you have?**

The study is completely voluntary and learners will not face any adverse consequences if they do not agree to participate.

**Who will have access to the information?**

Only the researchers will have access to the information. All information collected will be treated as confidential and protected. If it is used in a publication, the identity of the participant will remain anonymous.

What will happen in the unlikely event of some form of injury occurring as a direct result of your taking part in this research study?

The study is of low risk and no experimental procedures will be performed on your child.

**Will you be paid to take part in this study and are there any costs involved?**

No, you will not be paid to take part in the study. There will also be no costs involved for you or your child, if you do take part.

**Is there anything else that you should know or do?**

You can contact the Health Research Ethics Committee at 021 938 9207 if you have any concerns or complaints that have not been adequately addressed by the research team.

You will receive a copy of this information and consent form for your own records.

**Declaration by parent**

By signing below, I ..... agree that my child  
.....(write out full name) may take part in a research  
study entitled: **Investigating Nutrition and Physical Activity Behaviour of  
Adolescents in the School Environment**

I declare that:

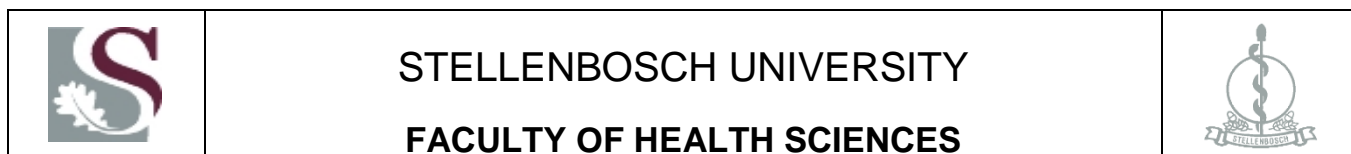
- I have read or had read to me this information and consent form and it is written in a language with which I am fluent and comfortable.
- I understand that my child's participation in this study is voluntary and I have not been pressurised to give consent.
- I may choose to withdraw my child from the study at any time and will not be penalised or prejudiced in any way.

Signed at (*place*) ..... on (*date*) ..... 2017.

.....  
**Signature of parent**

.....  
**Signature of witness**

## Addendum 5



### PARTICIPANT INFORMATION LEAFLET AND ASSENT FORM



**TITLE OF THE RESEARCH PROJECT:** Investigating Nutrition and Physical Activity Behaviour of Adolescents in the School Environment

**RESEARCHERS NAME(S):** Prof R Blaauw, Dr du Plessis, Dr van Niekerk, Mrs Daniels, Mrs Smit

**ADDRESS:** Tygerberg Medical Campus, Francie van Zijl Drive, Parow, 7500

**CONTACT NUMBER:** 021 938 9259

#### What is RESEARCH?

Research is something we do to find new knowledge about the way things (and people) work. We use research projects or studies to help us find out more about disease or illness. Research also helps us to find better ways of helping, or treating children who are sick.

#### What is this research project all about?

This project wants to find out more about the behaviour of teenagers e.g. what they eat, how they exercise and how their school and surrounding environment look.

#### Why have I been invited to take part in this research project?

You are a Grade 8 learner and meet the inclusion criteria of the study.

#### Who is doing the research?

The researchers are lecturers and final year dietetic students from Stellenbosch University.

#### What will happen to me in this study?

If you agree, you will take part in a group discussion of 8–12 learners. We will be asking you some questions about yourself, what you eat and how you exercise. This should not take longer than 60–90 minutes and will be conducted during school hours. We also need your permission to audio record the discussion.

**Can anything bad happen to me?**

No nothing bad can happen to you.

**Can anything good happen to me?**

There is no direct benefit to you and you will not be paid to take part in the study.

**Will anyone know I am in the study?**

The scholars at your school will know that you are taking part in the study but all information will be kept confidential. You will not be asked to write your name on any form only a code will be used.



**Who can I talk to about the study?**

You can contact any of the researcher at the number given above.

**What if I do not want to do this?**

If you do not want to participate you can withdraw at any time. Nothing will happen to you.

Do you understand this research study and are you willing to take part in it?

 YES NO

Has the researcher answered all your questions?

 YES NO

Do you understand that you can pull out of the study at any time?

 YES NO

\_\_\_\_\_  
Signature of Learner

\_\_\_\_\_  
Date

**Addendum 6**

<b>DISCUSSION GUIDE – Focus-Group Discussion</b>	
Date: ___/___/___ ID #: _____	
<b>Introduction and Background. Explanation and signing of consent forms</b>	
What are your favourite foods?	
Why do you like these kinds of foods? / How does eating these foods make you feel?	
How often do you eat the foods that you have described?	
Where do you get it/what is the source of these foods?	
Would you describe these foods as affordable/expensive?	
What are your least favourite foods?	
Why do you dislike these kinds of foods? / How does eating these foods make you feel?	
How often do you eat the disliked foods that you have described?	
Where do you get it/what is the source of these foods?	
Would you describe these foods as affordable/expensive?	
Do you think there is a link between the food you eat and your health? Describe the link.	
Have you ever tried to lose weight? What did you do?	
Do you take part in physical activity? OR What kind of activities/sports do you do/enjoy? When? OR why not?	
Do you enjoy physical activity? Why or why not? How does it make you feel?	
What do you think causes/leads adolescents to become overweight/obese in this school/community?	
What do you think needs to change to help adolescents be healthier?	
Who do you think needs to help adolescents be healthier?	
Where do you get your health messages from? Where would you like to get them from?	
How can the schools help adolescents be a healthy weight?	
How can the community help adolescents be a healthy weight?	
Is there anything else that you would like to state or share?	
<b>Thank-you for taking part. Close FGD</b>	



**Addendum 7**

**PHASE-2: IN-DEPTH INDIVIDUAL INTERVIEW SCHEDULE**

<p><b>DISCUSSION GUIDE – In-depth interviews</b></p> <p><b>Date:</b> ____ / ____ / ____</p> <p><b>Participant Code #:</b> _____ <b>School/Dpt Code #</b> _____</p>
<p><b>Introduction and Background. Explanation and signing of consent forms</b></p>
<p>What is the nutrition profile of learners in your school / secondary school/s in the district/region? (mostly undernutrition /over nutrition / combination?)</p>
<p>What do you think causes/leads adolescents to become overweight/obese? <i>Prompt: diet, snacks, drinks, tuck shops, school meals, food preparation, portion sizes, exercise, money, safety, food vendors, advertising</i></p>
<p>What is your understanding of the consequences of an adolescent being overweight or obese? <i>Prompt: short-term problems, long-term problems, heart health, psycho-social</i></p>
<p>Who do you think is responsible for helping adolescents achieve a healthy weight? <i>Prompt: Parents, themselves, school, community, nurses, school, Government</i></p>
<p>What support do you think parents need to support their adolescents to achieve and maintain a healthy weight? <i>Prompt: education, literature, workshops, cooking classes, support groups, food options</i></p>
<p>How do you think the greater community could better facilitate promoting a healthy weight in adolescents? <i>Prompt: assessments, programmes, referrals, education, support groups</i></p>
<p>How do you think schools could facilitate promoting a healthy weight in adolescents? <i>Prompt: assessments, education programmes, exercise programmes, referrals, education, support groups, gyms, sports clubs</i></p>
<p>What do you think are some of the support structures/systems that help adolescents achieve a healthy weight? <i>Prompt: education, diet, exercise, support, mentoring, school health team, policies, sport facilities, doctors, nurses, GP's</i></p>
<p>What do you think are some of the barriers in this community to helping adolescents achieve and maintain a healthy weight? <i>Prompt: Food choices, resources, exercise, tuck-shop choices, advertising, sport facilities, safety</i></p>
<p>Do you have knowledge about the Integrated School Health Policy (ISHP)? Yes (continue) No (provide a synopsis about the policy)</p>
<p>(How) do you implement the ISHP? OR... Which health and nutrition policies and programmes are in place in your school/district/region?</p>

Who implements the programmes/policy? (School's own initiative or externally)
Who is responsible for administering the nutrition services in schools specifically?
What structures/resources are in place to deliver the nutrition services in schools?
How often do the health workers visit the school/s for nutrition-related services AND which services are provided?
Are there any NGOs, community-based projects or faith-based projects that are working with the school with regards to nutrition issues?
How do you think the government could help promoting a healthy weight in adolescents in this community? <i>Prompt: Advertising, tax, education, education programmes, exercise programmes, parks, gym, facilities</i>
Does the/your department (DOH, DOE, DCAS) have a system in place to monitor intersectoral co-ordination with regard to school health and nutrition issues?
Is there anything else that you would like to state or share?
<b>Thank-you for participating. Close interview</b>

## Addendum 8

# **PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM: Informal interviews with Key Informant people.**

### **TITLE OF THE RESEARCH PROJECT:**

Investigating Nutrition and Physical Activity Behaviour of Adolescents in the School Environment

### **REFERENCE NUMBER: N16/08/100**

### **PRINCIPAL INVESTIGATOR: Prof R Blaauw**

**ADDRESS: Division of Human Nutrition, Tygerberg Medical Campus, Francie van Zijl Drive, Parow 7500**

### **CONTACT NUMBER: 021 938 9256**

You are being invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the researchers any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how you could be involved. Also, your participation is **entirely voluntary** and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part.

This study has been approved by the **Health Research Ethics Committee at Stellenbosch University** and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.

### **What is this research study all about?**

The study will take place across selected secondary schools in the Western Cape Metropole district. The study aims to investigate factors related to obesity such as nutrition, physical activity and the environment. At the school, the School principal, Life Orientation educator, and /or the tuckshop manager will be approached to partake in the study.

### **Why have you been invited to participate?**

You are invited as a member of the School Health Team, Life Orientation educator, tuckshop manager, Member of the PTA or school Principal at one of the selected schools of the study or as a representative from one of the Departments of Health, Education, Culture, Art and Sport or local Municipality.

### **What will your responsibilities be?**

If you agree, you will take part in an individual interview to share your views regarding nutrition and physical activity for adolescents in and around your school environment. All information that you provide will remain anonymous and confidential. The interview should not take more than 20-25 minutes to complete. You are also required to give your permission to audio record the interview.

**Will you benefit from taking part in this research?**

You will not benefit directly but the results of the study can impact on policies and programmes to combat obesity in secondary school children. Therefore, by participating your school may indirectly benefit from the results.

**Are there any risks involved in your taking part in this research?**

There are no risks to your health and wellbeing. You would simply have to give up some of your time to complete the questionnaire.

**If you do not agree to take part, what alternatives do you have?**

Participating in this study is completely voluntary and therefore, if you do not want to participate, you do not have to.

**Who will have access to your information?**

Only the researchers will have access to the information.

All information collected will be treated as confidential and protected. If it is used in a publication, the identity of the participant will remain anonymous.

**Will you be paid to take part in this study and are there any costs involved?**

You will not be paid if you participate in this research study. There will also be no cost to you if you do decide to participate in this research study.

**Is there anything else that you should know or do?**

You can contact the Health Research Ethics Committee at 021-938 9207 if you have any concerns or complaints that have not been adequately addressed by your study doctor.

You will receive a copy of this information and consent form for your own records.

**Declaration by participant**

By signing below, I ..... agree to take part in a research study entitled ***“Investigating Nutrition and Physical Activity Behaviour of Adolescents in the School Environment”***

I declare that:

- I have read or had read to me this information and consent form and it is written in a language with which I am fluent and comfortable.
- I have had a chance to ask questions and all my questions have been adequately answered.

- I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.
- I may choose to leave the study at any time and will not be penalised or prejudiced in any way.

Signed at (*place*) ..... on (*date*) ..... 2017.

.....  
**Signature of participant**

.....  
**Signature of witness**

### **Declaration by investigator**

I (*name*) ..... declare that:

- I explained the information in this document to .....
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above

Signed at (*place*) ..... on (*date*)..... 2017.

.....  
**Signature of investigator**

.....  
**Signature of witness**

## Addendum 9

## Phase-2 – Socio-demographic questionnaire for stakeholder participants (individual in-depth interviews)

<b>DATE</b>	
<b>SCHOOL/DEPARTMENT CODE</b>	
<b>PARTICIPANT CODE</b>	

**Thank you for agreeing to participate in this research study.**

**Instructions:**

- Please answer the questions honestly. Remember your identity is kept completely confidential.
- The researcher will ask you each question individually. Please indicate your answer clearly.
- If you are unsure of the meaning of any question, you may ask the researcher for assistance.

**Socio-Demographic Information**

1. Please indicate **your** gender.

		Tick (v)
A	Male	
B	Female	

2. Please indicate your **date of birth**

Day		Month		Year			

3. Make a tick next to the block that is the most accurate

		Tick (v)
A	Principal	
B	Life orientation teacher	
C	School nurse	
D	Tuck-shop manager	
E	Other member of school health team	
F	PTA chairperson/member	
G	Member of Department of Health	
H	Member of Department of Education	
I	Member of Department of Arts & Culture	
J	Member of Department of Sport	

## Addendum 10

### SCHOOL CHECKLIST

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#### 1. FORMS

- a. Learner information sheet and assent forms x24
- b. Focus-group discussion guide x2
- c. Individual information sheet and consent forms x3
- d. Individual socio-demographic form x3
- e. Interview schedule
- f. Information sheets for on completion
  - i. x24 learner
  - ii. x3 participant

#### 2. EQUIPMENT

- a. Pens
- b. Dictaphone
- c. Batteries
- d. Labels
- e. Coding book

#### 3. OTHER

- a. Directions
- b. Thank-you snack
  - i. Apples