



UNIVERSITY *of the*
WESTERN CAPE

**EXAMINING THE RELATIONSHIP BETWEEN SOCIOECONOMIC STATUS AND
OBESITY. A CASE STUDY OF KHAYELITSHA IN THE WESTERN CAPE PROVINCE OF
SOUTH AFRICA**

A full thesis submitted in fulfillment of the requirements for the degree of Master
in Public Administration at the School of Government, Faculty of Economic and
Management Sciences, University of the Western Cape.

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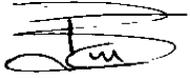
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Date: 8th November, 2018

DECLARATION

I hereby declare that this full thesis entitled “*Examining the relationship between socioeconomic status and obesity. A case study of Khayelitsha in the Western Cape province of South Africa*” is my own work and that it has not been submitted for any degree or examination in any other university. All the sources I have used or quoted have been indicated and duly acknowledged by means of referencing.

Alex Boakye

Signed: ...  ...

Date: 8th November, 2018



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First and foremost, I would like to express my utmost gratitude to God for granting me the strength, wisdom and protection to complete this study. *“For the horse is prepared against the day of battle, but safety is of the Lord” Proverbs 21:31.* There were turbulent times during which my faith was sorely tested but in all His faithfulness was assured.

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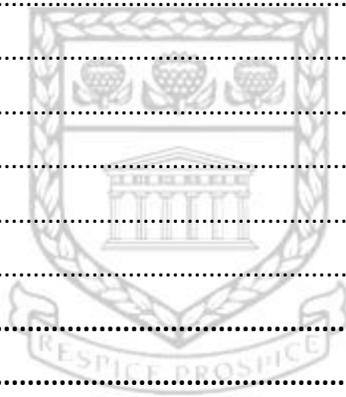
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DEDICATION

With all humility I dedicate this work to all those who are working towards a peaceful, united and better world.

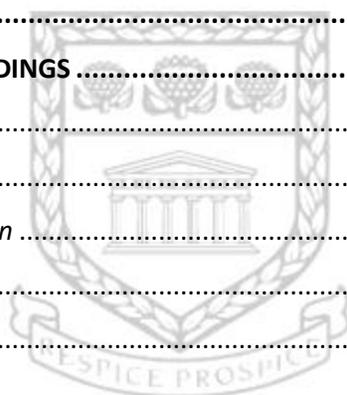


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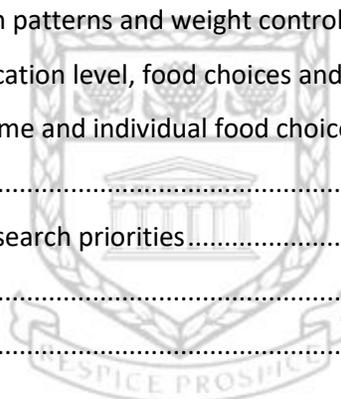


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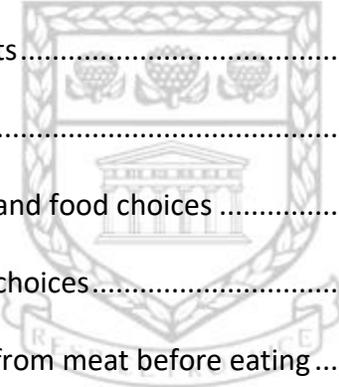


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ABSTRACT

Background: Obesity in South Africa is a critical public health issue. Previously considered a problem of the affluent, obesity is now reported among all populations in South Africa regardless of age, race, gender or geographical location. Although a body of literature suggests that sociocultural, environmental and behavioural factors are likely to explain the increasing levels of obesity in South Africa, few studies have examined the relationship between socioeconomic status and obesity. As such, there is dearth of evidence showing how socioeconomic status influences obesity in the country. Given the multiplicity of challenges associated with controlling obesity, understanding the link between socioeconomic status and obesity is critical for informing and developing effective prevention programmes. This study therefore examines the nexus between socioeconomic status and obesity by using Khayelitsha as a case study area.

Goal and objectives: Guided by the conceptual framework of the Theory of Planned Behaviour, the overall goal of this study is to determine how education status and income level influence dietary and weight control behaviours in relation to obesity. The objectives are to 1) examine the role of social factors on food consumption behaviour; 2) investigate the influence of income levels on food consumption; 3) explore the relationship between education levels and food choices and 4) provide recommendations for policy review.

Methods: This research is embedded within a larger study conducted by researchers from the Institute for Social Development on factors that influence food choices and eating habits of residents in Khayelitsha and Mitchells Plain. The epistemological position forming the basis of this research was guided by the concepts of positivist and interpretivist paradigms, as both perspectives were deemed relevant for achieving the study objectives. Moreover, the study combined both qualitative and quantitative research methodologies to analyze the gathered data.

Results: The study identified cereals, bread, pasta, milk products, processed meat, fried chicken, fish and oil fat, soft drinks, fruit and vegetables as the main kinds of food consumed by residents in Khayelitsha. However, among these food groups, fruit and vegetables consumption was found to be low. In general, cost was identified as the main barrier for the frequent consumption of fruit and vegetables. The study also discovered a positive relationship between education and eating habits, with most educated individuals' demonstrating high intentions to consume healthy foods compared to people with lower education. However, in contrast to the hypothesis of this study, the impact of education on dietary behaviour was found to be insignificant. Similarly, the impact of education on weight control behaviour was found to be insignificant although the relationship between these two variables was equally found to be positive. With regards to the association between income and food choices the study discovered an overall positive relationship between the two variables. However, the general effect of income on food choice was not statistically significant. Cost of food and low family income were found to be key barriers to the purchase and consumption of healthy foods.

Conclusion and recommendations: This study has demonstrated that education and income status correlate positively with dietary lifestyle as well as weight management practices. However, contrary to the hypotheses outlined in this study, neither education nor income status was found to significantly impact on dietary and weight control behaviours. In general, other factors such as culture, price of foods, television advertisement and perception of weight status were found to also contribute to respondent's dietary lifestyle and weight management practices. Given these findings, a multidisciplinary approach involving the promotion of proper dietary patterns as well as physical activity are recommended. Specifically, the strategies should focus on 1) the development of policy measures that regulate the high cost of healthy foods, 2) the roll-out of food voucher interventions that promote frequent consumption of fruit and vegetables and 3) the promotion of physical exercises in religious and health centers.

KEYWORDS

Food choices

Obesity

Socioeconomic status

Khayelitsha

Weight management practices



ABBREVIATIONS

BMI	Body Mass Index
BWS	Body Weight Status
COCT	City of Cape Town
CSG	Child Support Grant
DHS	Demographic and Health Survey
DOE	Department of Education
DOH	Department of Health
FCG	Foster Care Grant
HBP	High Blood Pressure
HIV/AIDS	Human immunodeficiency syndrome/Acquired immune deficiency Syndrome
HSRC	Human Sciences Research Council
IARC	International Agency for Research on Cancer
IDF	International Diabetes Foundation
ISD	Institute for Social Development
NSSA	Nutrition Society of South Africa
OG Old	Age Grant
S.A	South Africa
SSA	Sub-Saharan Africa
SSB	Sugar Sweetened Beverages
SANHANES	South African National Health and Nutrition Examination Survey
	SFPs School Feeding Programmes
TB	Tuberculosis
UWC	University of the Western Cape
WHO	World Health Organisation



CHAPTER ONE

BACKGROUND OF THE STUDY

1.0 Introduction

This chapter provides a general introduction to the overall study. The chapter commences with a brief outline of the study background and highlights the research problem. Thereafter, the study objectives, significance of the study as well as the main research questions are presented. The chapter concludes with a structural overview of the entire study.

1.1 Study background

The prevalence of obesity is increasing throughout the world, illustrating an alarming trend for people of all ages, racial/ethnic groups and genders (WHO, 2015). Worldwide, it is estimated that more than 1.9 billion adults are overweight and 650 million are obese (WHO, 2017). Among the most affected are people living in developed countries such as the United Kingdom, New Zealand, the United States of America, Australia and Canada (OECD, 2017). However, while in these countries, obesity is considered a condition that affects people of lower socioeconomic status (SES) than those of higher SES (Dinsa et al., 2012, OECD, 2017), in developing countries, the argument continues as to whether obesity primarily affects the poor or the rich (Dinsa et al., 2012). In most developing countries especially those in Africa, obesity until recently was considered a negligible problem, as the continent battled with under nutrition and the burden of communicable diseases such as HIV and TB (Mollentze, 1995; Agyeman et al., 2015). However, in recent years, the picture has changed. After decades of stagnation, much of Africa is now experiencing rapid economic transformation which has brought about increased urbanization, changing dietary patterns and rapid escalation of obesity rates. This is particularly true for South Africa which is reported to have one of the highest prevalence of obesity in Africa (Agyeman et al., 2015; Dinbabo et al., 2017; Stats SA, 2017).

Within South Africa differences in obesity prevalence is noted among gender, geographic area and race. For example, according to Stats SA (2015), about 48% of residents in Cape Town are overweight compared to Pretoria (68%), Johannesburg (59%) and Durban (52%). Women in all these provinces are generally more obese (64%) than men (40%). The most affected are black women with a prevalence of 31.8%, compared to 6% in black men, 22.7% in white women, 21.1% in Indian women and 26.3% in women of mixed ancestry (Ibid, 2015). It is however important to state that the causes of South Africa's rising obesity are still inconclusive, however scholars have linked it to declines in physical activity as well as increased intake of energy-dense foods (Micklesfield 2013; Ronquest-Ross et al., 2015; Dinbabo et al., 2017). For example, Ronquest-Ross et al. (2015) suggest that the globalization of trade has led to an increased consumption of sugar-sweetened beverages (SSB) and processed foodstuffs among most South Africans. This is particularly true for those with low incomes as processed foods with high caloric value are regarded as the most affordable (Ronquest-Ross et al., 2015). As the country undergoes a nutrition transition (shift in dietary consumption) it has become difficult to make healthy food choices owing to the availability and accessibility of energy-dense foods. Obese individuals are at both economic and health disadvantages and may be discriminated against in terms of social opportunities. Hence it is important to fully investigate the complexity of factors driving obesity in South Africa in order to offer policy recommendations to control this trend.

1.2 Problem Statement

The growing prevalence of obesity and overweight levels among South Africans in recent years has become a major public health concern (Dinbabo et al., 2017). Of considerable concern is the high prevalence noted among the youth especially those under 20 years of age of which 7% males and 9.6% females are reported to be obese (Fleming et al., 2013; Micklesfield 2013; Alaba, 2014; Ronquest-Ross et al., 2015). Earlier regional studies also indicate that approximately 10% of children in South Africa are relatively overweight for their age (Stats SA, 2013). Reasons for this increasing trend are manifold, yet behavioral and environmental factors seem to offer the greatest trigger (Sartorius et al., 2015). While studies on the relationship between socioeconomic status and obesity are limited, evidence suggests that there has been a shift in

food and beverage consumption among most South Africans over the past two decades (Puoane et al., 2008; Micklesfiel et al., 2013; Ronquest-Ross et al 2015). For example, in a study examining the food consumption changes in South Africa, Ronquest-Ross et al. (2015) found that the consumption of meat, fats and oils, sauces, sweet and soft drinks has been increased by more than 30% since 1994. On the contrary, vegetables consumption and physical activity are found to be on a decline (Ronquest-Ross et al., 2015). These changes in dietary patterns have been linked to globalization, rapid urbanization and industrialization which are known to be key features of the South African economic growth. Figure 1.1 for example illustrates how the growth of sugar-sweetened beverages (SSB) market contributes to obesity prevalence in South Africa.

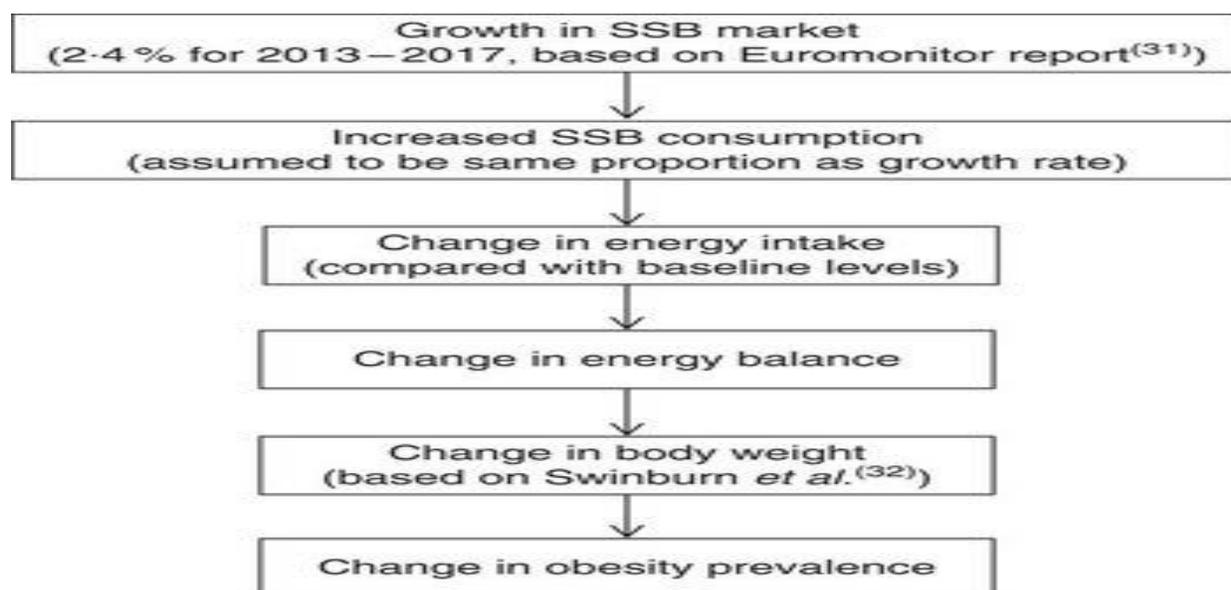


Figure 1. 1: Framework on the effect of sugar-sweetened beverages market growth (Tugendhaft et al., 2016:3)

Figure 1.1 demonstrates a connection between the growth of sugar-sweetened beverages (SSB) markets and obesity prevalence. The underlying assumption is that as SSB markets expand, consumption of soft drinks with high sugar content increases. This then leads to a change in energy intake compared with baseline levels. As energy intake changes, it alters the energy balance and consequently body weight. What this portrays is that once the consumption of sugar-sweetened beverages becomes prevalent among a large proportion of the population in a country, the tendency to record high levels of obesity becomes inevitable. This is a typical case

for South Africa. With a growing economy and globalization of trade, the growth of sugar-sweetened beverages and fast foods has become a prominent feature of the South African economy. This has resulted in the high consumption of unhealthy foods (Tugendhaft et al., 2016). Interestingly, given the low income status of most South Africans, one could argue that the increased market of fast foods and sugar sweetened beverages shouldn't have had any impact on the population, yet basic economic principle indicates that as commodity supply increases, price decreases and consequently demand rise. As such, the increased markets of SSB and fast foods drags down the prices of high content sugar drinks and fatty foods thereby allowing consumption to increase. This perhaps explains why the prevalence of obesity seems to be high not only among the wealthiest South Africans but also among those with lower incomes (Mapumulo, 2015).

In an effort to underscore the forces which drive obesity among the poor in South Africa, scholars have identified culture and religion as the main determinants (Kruger et al., 2005; Puoane, 2005; Micklesfield et al., 2013; Tugendhaft et al., 2016). However, less attention has been dedicated to examining the relationship between socioeconomic status and obesity (Tugendhaft et al., 2016). As such, there is limited evidence on how socioeconomic status influences the prevalence of obesity in South Africa. Given that rising levels of obesity have negative implications for economic growth (WHO, 2016), understanding the multiplicity of factors which drive the condition is critical for informing and developing effective policy interventions. The focus of this study therefore contextualises the nexus between socioeconomic status and obesity in South Africa.

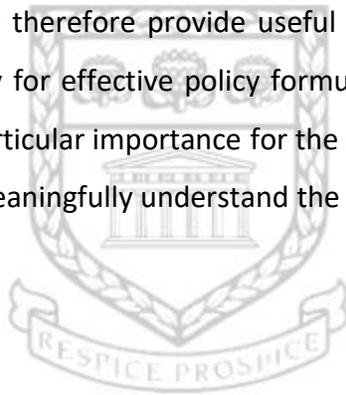
1.3 Objectives of the study

The overall goal of this study is to explore the relationship between measures of socioeconomic status and obesity. In more specific terms, the study intends to achieve the following objectives:

1. To examine the role of social factors on food consumption behavior.
2. To investigate the influence of income levels on food consumption.
3. To explore the relationship between education levels and food choices.
4. To provide recommendations for policy review.

1.4 Significance of the study

Despite being preventable, obesity accounts for nearly 5% of all deaths worldwide (WHO, 2017). Moreover, the cost implication of treating obesity and its associated health risks create major economic burdens for governments. For example, the McKinsey Global Institute estimates an annual 2.8% cost to global GDP to treat obesity (DOH, 2015). In South Africa, it is reported that the government spent nearly R9billion to address obesity and its comorbidities (Mapumulo, 2015). In an attempt to unravel the context of obesity in South Africa, many studies from diverse disciplinary bases have been conducted over the past two decades (Kruger et al., 2005; DoH 2007; Micklesfield et al., 2013; Sartorius et al., 2015). Yet, the majority of these studies have not contextualised the high impact factors such as socioeconomic influences on obesity (Micklesfield, 2013; Sartorius et al., 2015). As such, there is lack of understanding on how socioeconomic status relates to obesity. This study will therefore provide useful insights on the interplay between socioeconomic status and obesity for effective policy formulation. Evidence gleaned from the findings of this study will be of particular importance for the range of stakeholders in the health sector as it will enable them to meaningfully understand the extent of the problem and address the obesity threat.



1.5 Research questions

- What is the relationship between education level and individual's food choices?
- What is the relationship between education level and individual's weight control behaviour?
- What is the relationship between income and individual's food choices?

1.6 Chapter outline

Chapter one presents a general introduction to the study. It outlines the background and the context within which this study is launched. Following a review of current epidemiological and demographic trends, it highlights the problem of rising obesity levels among lower income groups in South Africa. The final section focuses on the objectives, significance of the study and the research questions.

Chapter Two explores literature on obesity and identifies the major factors implicated in its development. In particular, it provides more detailed discussions on the role that individual, biological, environmental and sociocultural factors play in obesity prevalence. This chapter also spells out the links between income/education and obesity. Finally, it highlights the risks factors of obesity as well as the interventions available for the prevention and treatment of obesity.

Chapter Three focuses on the theoretical and conceptual underpinnings guiding this study. The early part of the chapter examines the concept of the Theory of Planned Behaviour and shows how attitude, subjective norms and perceived behaviour control connect with behaviour intention and actual behaviour. It then goes on to review literatures that have applied the Theory of Planned Behaviour in obesity studies. The final part of the chapter sets out the framework within which the TPB is applied in this study.

Chapter Four elaborates on the delineation of the study area as well as the research design and methodology employed in the study. Specifically, the chapter gives a broad overview of Khayelitsha, with regards to its settlement history and location, demographic profile and socio-economic characteristics. This chapter also highlights the type of research design and methods applied in this study. In particular, it outlines the processes for gathering and analyzing the data used in this study.

Chapter Five presents the empirical results and a thorough discussion of the research findings. It responds to the research questions as posed in the first chapter of this study. The chapter commences with a summary of the quantitative results. Specifically, it presents findings relating to respondents' demographic characteristics, eating habits, perception of health as well as weight management practices. The chapter also provides results emanating from the correlation of education and income level with dietary behaviour/weight control practices. The chapter concludes with qualitative findings on respondents' dietary behaviour and weight management practices.

Chapter Six focuses on the relevant conclusion and recommendations derived from the research findings. It begins by summarizing key findings of the research. This is followed with a discussion of some of the limitations of this study and presents priority areas for further research. The chapter also outlines a number of policy recommendations to stakeholders interested in strengthening health systems to address obesity in South Africa. The chapter concludes with a brief summary of the overall study.



CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter examines the literature on obesity and identifies the major factors implicated in its development. The chapter begins by defining this complex disease and explores the mechanism for determining weight status. Thereafter, attention shifts to providing an overview of the prevalence of obesity by looking at the globally context as well as South Africa context. This discussion is followed by an examination of the various factors that are considered determinants of a person's susceptibility to obesity. The implications of gaining excess weight is then presented and followed by a discussion of interventions for the prevention and treatment of obesity. The chapter concludes by highlighting some of gaps in the current literature on the topic of obesity.

2.1 Definition of obesity

According to the World Health Organization (WHO) obesity is defined as abnormal or excessive body fat accumulation that may impair health (WHO, 2016). Body fat is an important part of an individual's body composition and is essential for life, yet there is a required range within which this fat should be maintained in order to present the most favorable conditions for health. An excess of body fat therefore creates potential health complications (Liu et al., 2011; McCarthy et al., 2006; Craig, 2013). It is further reported that obese individuals differ not only according to the degree of excess body fat, which they store, but also in the regional distribution of the fat within the body (WHO, 1998; Shaw et al., 2007; Taylor et al., 2010).

Several techniques exist in measuring body fat. Previously, *skinfold thickness* measurements were used to rank individuals in terms of relative "fatness" or to assess the size of specific fat depots (Wells & Fewtrell, 2006:612). Thereafter, the use of *Waist circumference* (WC) provided a simple measurement of central fatness (Ibid, 2006). However issues about accuracy in these techniques led to the use of more complex ones such as magnetic resonance imaging (MRI) and dual energy x-ray absorptiometry (DEXA) (Craig, 2013:3). These methods are however considered

extremely expensive and therefore impractical for frequent clinical and field use and hence gave way to the use of BMI for clinical measurement (Wells & Fewtrell, 2006:612).

2.1.1 Body Mass Index

The WHO defines body mass index (BMI), simply as the weight in kilograms divided by the square of the height in meters (kg/m^2). Although originally not intended as an index of obesity, BMI has recently become a commonly employed measurement tool in epidemiological studies to predict obesity-related morbidity and mortality (WHO, 2000; Deurenberg, 2001; Zhou, 2002; Shea, 2012). It is now used as a global index of nutritional status, for example, to categorize both overweight/obesity and eating disorders in combination with psychological criteria. According to the World Health Organization (2000), BMI-defined adiposity status is classified as follows: underweight ($>18.5 \text{ kg}/\text{m}^2$), normal weight ($18.5 - 24.9 \text{ kg}/\text{m}^2$), overweight ($25.0 - 29.9 \text{ kg}/\text{m}^2$) and obese ($>30.0 \text{ kg}/\text{m}^2$). A BMI of $30 \text{ kg}/\text{m}^2$ is considered the threshold of obesity (Ibid, 2000). In addition, the obese category is further divided into class I ($30.0 - 34.9 \text{ kg}/\text{m}^2$), class II ($35.0 - 39.9 \text{ kg}/\text{m}^2$) and class III ($>40.0 \text{ kg}/\text{m}^2$).

These classifications provide common benchmarks for assessment. However, the World Health Organization cautions that BMI may not correspond to the same degree of weight measure in different individuals. For example in determining the appropriate fatness among children, consideration must be given to age as their body development cycle changes as they transition into adulthood (WHO, 1988). BMI is also criticized for its inability to differentiate between weight associated with muscle and weight associated with fat (Shea, 2012:5; Craig, 2013). In the view of Craig (2013:5), a “body builder” may have a high BMI but have much less fat than an unfit person whose BMI is lower. As a result, the relationship between BMI and body fat content varies across individuals and populations. As such, recent work has focused on identifying tools that are better able to predict obesity risk (Ibid, 2013).

2.2 Global prevalence and trends in obesity

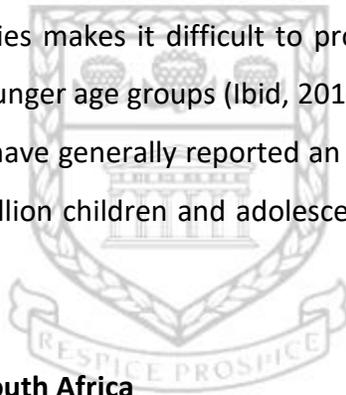
Historical records indicate that height and weight increased progressively, particularly during the 19th century (Harlan, 1988; Stevens et al., 2004; Weng, 2006). During the 20th century, as populations from better-off countries began to approach their genetic potential for longitudinal growth, they began to gain proportionally more weight than height, with the resulting increase in average BMI (Caballero, 2007). Although obesity did not attract the attention of the mass media until recent decades, its prevalence in industrialized countries began to increase progressively early in the last century (Ibid, 2007). In 1995, there were nearly 200 million obese adults worldwide and 18 million under-five children classified as overweight (WHO, 1998). By the year 2000, the human race reached a sort of historical landmark, when for the first time in human evolution the number of adults with excess weight surpassed the number of those who were underweight (Gardner & Halweil, 2000). The number of obese adults increased from 200 million in 1995 to over 300 million in the year 2000 (Caballero, 2007). Today it is estimated that more than 1.9 billion and 650 million adults are overweight and obese respectively (WHO, 2016).

Although the high prevalence of obesity is evident in every part of the world, disparities are reported within and across continents. Recent data suggest a plateauing of obesity prevalence in some developed countries, such as Hungary, New Zealand, Korea, Mexico, Australia, the United Kingdom and the United States. For instance in 2015, it was reported that 19.5% of the adult population in the Organization for Economic Co-operation and Development (OECD) countries were obese (OECD, 2017). This rate ranged from less than 6% in Korea and Japan to more than 30% in Mexico and the United States. Moreover, one in four adults were found to be obese in Australia, Canada, Chile and the United Kingdom. In the United States, Mexico and England, obesity levels has been projected to rise to a prevalence of 47%, 39% and 35% respectively by 2030 (OECD, 2017).

These observations and projections have however not been peculiar to OECD countries as similar trends have been observed in sub-Saharan Africa since the past two decades. For instance, in 1990, only 7.5% of the adult population was found to be overweight in Northern Africa, 6.4% in Southern Africa, 4.5% in Eastern Africa, 3.7% in Middle Africa and 2.6% in Western Africa

(Agyeman et al., 2016). However, recent data has shown a staggering increase of overweight in the Africa sub-region. In 2016 for example, countries such as Libya (33%), Egypt (28.9%), Tunisia (27.1%) and South Africa (26.8%) recorded the highest obesity population, while Burundi (2.6%), Rwanda (4.0%), Ethiopia (4.0%) and Eritrea (4.1%) had the lowest obesity population (WHO, 2017). Moving further, it is important to state that the inequalities in obesity prevalence as presented above is not only evident in regional distribution but also in gender proportion. While in most countries, particularly those in SSA, women are reported to be far more obese than men (Kruger et al., 2005; Ng et al., 2014; Agyeman et al., 2016), the reverse is reported in some OECD countries (OECD, 2017).

Despite the regional and gender differences in the prevalence of obesity, when it comes to determining obesity prevalence among children and adolescents, mixed results are reported (Ogden, 2016). Such inconsistencies makes it difficult to provide an accurate overview of the global prevalence of obesity in younger age groups (Ibid, 2016). Nevertheless, studies of obesity among children and adolescents have generally reported an increased prevalence. In 2017, the WHO estimated that over 340 million children and adolescents aged 5-19 were overweight or obese in 2016 (WHO, 2017).



2.3 Secular trends of obesity in South Africa

South Africa, a country undergoing a rapid epidemiological and nutritional transition is reported to have one of the highest obese populations in Africa (WHO, 2017). Obesity prevalence increased from 23.5% in 2008 to 27.2% in 2012 (Sartorius et al., 2015). In South Africa, obese and overweight people are found among all populations, yet in terms of proportion, there exist significant difference among gender, race, age and provinces. In a study to ascertain the anthropometric profile and determinants of obesity among South Africans who participated in the 1998 Demographic and Health Survey, Puoane et al. (2002) reported a 30% obesity prevalence among women over the age of 15 years. By comparison, the prevalence among men of the same age category was 7.5%, a figure found to be thrice as lower than the prevalence among women (Puoane et al., 2002). This imbalance proportion has equally been confirmed by the latest health and demographic survey which revealed that two-thirds (68%) of women in

South Africa are overweight or obese as compared to just under one third of men (31%) (Stats SA, 2017:45).

Aligned to gender disparities, significant variability is equally observed among racial groups. South Africa is a multiracial country encompassing a wide variety of cultures, languages and religions with evidence of observable inequalities between racial groups (Fiske, 2005; Ayo-Yusuf et al., 2013). The racial distribution of obesity prevalence (≥ 30 kg/m²) is reported to be 40.9% among black/Africa, 30.6% in white, 45.9% among coloured and 49.2% among Indian/Asian (StatsSA, 2017:45). Age differences are also well documented with strong age-dependent trends observed. A previous study by Rossouw et al. (2012) highlights obesity in infancy as a significant issue, particularly in poor communities, with overweight prevalence of approximately 20% in infants under 1 year old in rural areas of the Eastern Cape and KwaZulu-Natal as well as evidence of obesity rates as high as 50% for children aged 3 years old in rural Limpopo.

In a more recent study conducted in Khayelitsha and Mitchells Plain, Dinbabo et al. (2017) found that amongst 2 to 5 year-olds, 18.9% and 4.9% girls are overweight and obese respectively, whilst 17.5% and 4.4% of boys were overweight and obese, respectively. Interestingly, other studies have reported the co-existence of underweight and overweight within the same household (Rossouw, 2012; Kimani-Murage, 2013). In other words, what has been found to be risk factor for obesity is also considered a risk factor for underweight (Ibid, 2013). As such, it has been difficult for some scholars to agree on the generality of factors that precipitate excess weight gain. Nevertheless, many epidemiological and clinical studies have related the causes of obesity to certain factors some of which are presented in the subsequent section.

2.4 Aetiology of overweight and obesity

Body weight regulation involves a set of complex factors, such as environmental, demographic and behavioural influences that ultimately control the balance between energy intake and expenditure (Styen, 2006; Kruger et al., 2012; Ronquest-Ross et al., 2015). Obesity occurs as a result of imbalance between energy intake and energy expenditure. Shifts in food and beverage consumption coupled with low levels of physical activities are thought to be major contributors

of this energy imbalance that lead to the rise in average body weight of an individual (Parsons et al., 1999; Rauner et al., 2013; Wareham et al., 2005). However, the difficulty in body weight regulation creates a considerable challenge to clinical studies in understanding the aetiology of this disease. This position notwithstanding, environmental, demographic and behavioural factors have been identified to be key drivers of energy imbalance both in western and developing societies (Agyeman et al., 2015; Sartorius et al., 2015; Tugendhaft et al., 2016). Figure 2 provides a conceptual framework of factors that influence changes in body weight.

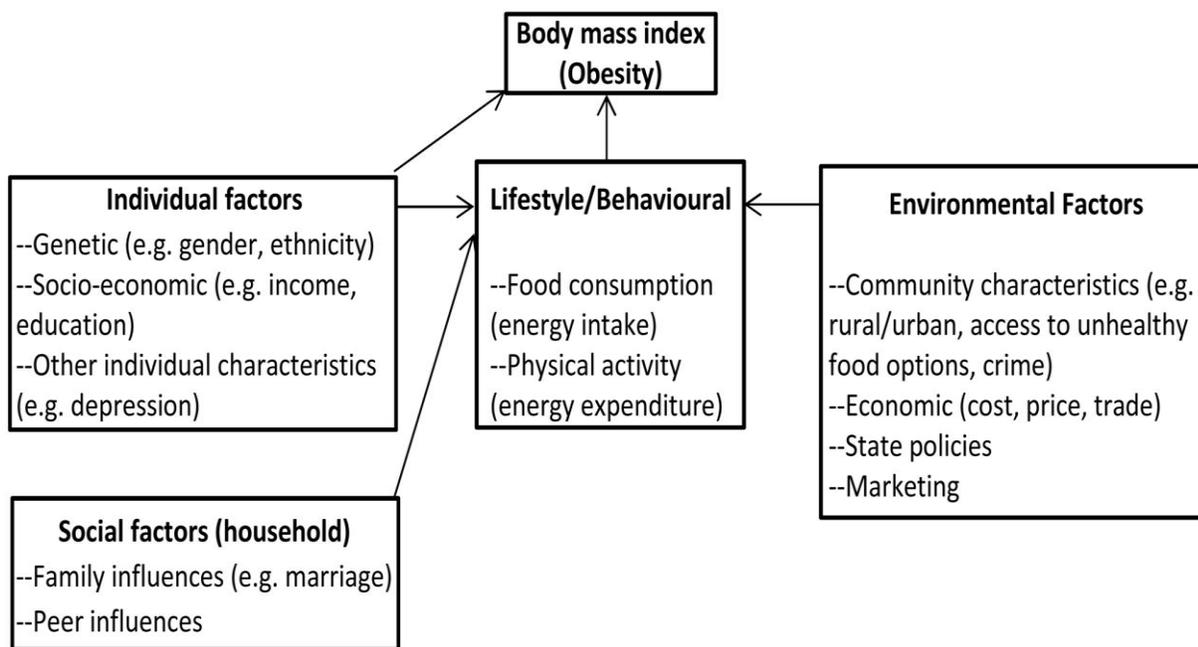


Figure 2. 1: Theoretical framework of factors driving obesity (Sartorius et al, 2015:4).

The framework (Figure 2) summarizes the multifaceted factors which drives excess weight gain. It shows that obesity is a problem arising from a complex system of individual, social-cultural and environmental factors that influence individual behaviors on food consumption and choice (energy intake) and physical activity (exercise and sedentary patterns). The interplay among the various factors and its nexus with obesity is further presented below.

2.4.1 Individual/biological factors

Demographics, epidemiological and genetic studies of populations across the world suggest that some people are more susceptible than others in gaining excess weight (Bell et al., 2005; Farooqi & O'Rahilly, 2005; Shea, 2011). Obesity is commonly seen as a complex multifactorial disease which may result from lifestyle changes, yet it is also found to be more evident in people who have an inherited susceptibility to be in positive energy balance. It is well established that mutations in genes that encode proteins involved in appetite regulation are responsible for many disorders in which obesity is a major phenotype (WHO, 1998; Shea, 2011; Scott, 2013). However, considerable uncertainty remains as to the genes and mutations involved and how they operate and interact to enhance the susceptibility of some individuals to obesity (WHO 1998; Idemyor, 2010). Beyond gene mutation, age has frequently been observed as a predictive factor of obesity in both men and women (Idemyor, 2010). Age effects on body weight are attributed to physiological changes that occur with ageing such as decreased energy requirements (Taylor et al., 2010). As such the age-related decline of energy is mainly attributed to the reduction in fat-free mass quantity which leads to increased weight (Rauner, 2013).

Disparities in age-related weight gain has also been observed among gender. A number of studies have suggested that changes in physical features in relation to growth tends to contribute to an increased fat storage among females than males (Yoon et al., 2006; Giskes et al., 2007). Whereas fat deposits are considered to be essential in ensuring female reproductive capacity, males tend to use it more for protein synthesis (Craig, 2013:211). This pattern of usage contributes to the increased fat deposition found among females than males. Available evidence indicates that obesity prevalence increases for women from age 35 to 64 and declines after 64 years of age (Sallis, 2000; Taylor, 2003; Agyeman et al., 2015). For men, obesity increases until age 45 and usually remains constant (Ibid, 2015). Similar studies in Africa have also reported a positive association between age and obesity (Muhihi et al., 2012; Masibo et al., 2013). It is however important to state that, there is dearth of longitudinal studies to justify the contribution of age to the prevalence of obesity.

2.4.2 Environmental factors

Although susceptibility towards obesity is partly driven by biological and physiological factors, environmental forces are equally implicated in excess weight gain. These forces include economic development, urbanisation and globalization. The trend towards urbanisation, industrialization and an economy based on trade within a global market has not only created avenues for improved living standards but also increased the consumption of energy-dense foods that contribute to the development of obesity (Kruger et al., 2005; Ronquest-Ross et al., 2015; Agyeman et al., 2015). Exposure to global markets for instance has been linked to a shift from traditional food consumption (low in fat and rich in fibre) towards meat and food products containing high levels of saturated fats and sugar. It has been illustrated that for many countries undergoing economic transition, credit arrangements between them and international corporate institutions often results in the importation of cheap-fatty western foods which are linked to enhancing weight gain (Sartorius et al, 2015; Ronquest-Ross et al., 2015).

On the other hand, today's technological advancements have resulted in an easier way of life for most people including pre-packaged and fast food, a reduction in daily physical labour and increased time for leisure activities. For instance modernization has given rise to a more sedentary lifestyle among the younger generation (Micklesfied, 2013). This is particularly observed in the long hours spent on television, social media and playing video games all linked to a reduction in physical activity and hence contributing to weight gain. As a country undergoing economic transition, South Africa has not been spared from the implications of urbanisation (Puoane et al., 2002; Micklesfied, 2013). Urbanisation in South Africa has been shown to be linked to an increase in dietary fat intake (Puoane et al., 2002; Kruger 2005; Satorious, 2015).

2.4.3 Lifestyle factors

Studies have produced ample evidence on the relationship between smoking, alcohol intake and BMI (Chiolero et al., 2008; Dare et al., 2015; Watanabe et al., 2016). Researchers have shown much interest in the estimation of the causal effect of smoking and weight gain. In a cross-sectional study conducted among middle-aged adults in the UK general population, Dare et al. (2015) discovered that smokers were less likely to be obese than non-smokers. Their findings

further revealed that smokers frequently gain weight when they give up the habit. According to Chiolero et al. (2008), it is possible that overweight individuals, who are trying to lose weight, are more likely to start smoking. This position has been confirmed by a survey among Japanese adults of which Watanabe et al. (2016) revealed that an inverse relationship exists between smoking and weight gain. However, by looking at differences between genders in the survey, they observed that whilst female smokers recorded no significant difference in weight gain, male smokers reported significant weight loss. Despite these findings, others have suggested a positive association between smoking and BMI index. For example, Munaf et al. (2009) have shown that smoking has the tendency to increased BMI. Evidence backing this claim is however limited, yet it is generally believed that compared to non-smokers, smokers tend to crave for high-fat foods and often have reduced ability to detect food flavor. These cravings combined with the inability to detect food flavor may explain why smokers are likely to eat more than non-smokers.

When it comes to the association between alcohol and obesity, it is unclear whether alcohol consumption is a risk factor for weight gain because studies performed to date have found positive, negative or no association (Traversy & Jean-Philippe, 2015). Whilst some report a positive association (Sung et al., 2007; Alcácer et al., 2008; Croezen et al., 2009), others have revealed a negative relationship (Liangpunsakul, 2010; Rohrer et al., 2005). Moreover, where positive association is reported, disparities are found among men and women (Bendsen et al., 2013; Sayon-Orea, 2011; Yeomans, 2010). These controversies call for further research because whether or not a person gains weight from drinking alcohol depends on behavior factors such as what one drinks, how often and how much he/she drinks as well as unique body features such as genetics.

2.4.4 Cultural factors

Culture is defined as the set of shared attitudes, values, goals and practices that characterizes a group of people. Cultural contexts are found to shape values and norms about body weight. The culture within which a person lives can have a powerful influence on their eating patterns, activity levels and body weight. However cultural values and norms about body weight vary considerably.

Whilst in some western societies, thinness is associated with being attractive and elegant (Metcalfe et al., 2000), the reverse is true in most developing countries (Howard et al., 2008; Simkhada et al., 2009; Appiah et al., 2014). For example a study conducted by Maruf et al. (2012) among 21-year-olds in Nigeria, showed that 40% of overweight females perceived overweight as the ideal body image. Similarly in North Africa, female fatness is viewed as a sign of social status and is a cultural symbol of beauty, fertility and prosperity. Overweight and obesity have also been shown to have many positive connotations in the African community in South Africa (Pouane et al., 2005; Kruger, 2005). For example, Pouane et al. (2005) reports that a number of overweight and obese black South African women do not want to lose weight although they may be aware of the health consequences of being overweight.

Despite this evidence, it is worth noting that the misperception of 'benign obesity' is being rectified by the increasing number of recent studies that spell out the reality of obesity (Tlili et al., 2008; Appiah et al., 2014; Pouane et al., 2012). For example, Tlili et al. (2008), have shown that in Tunisia, women associate obesity with greediness and the likelihood to develop chronic diseases such as diabetes, heart disease and cancer. As such, many overweight and obese women in Tunisia, according to Tlili et al. (2008) are "working out" to reduce weight. A study among women in Ghana by Agbeko et al. (2013), also revealed the desire for a moderate or healthy weight among Ghanaian women. Pouane et al. (2013), have also observed a contradictory opinion of body size preference among South African adolescent girls.

2.4.5 Socioeconomic factors

Socioeconomic status (SES) is defined as a measure of one's combined economic and social standing (Ziraba, 2009; Baker, 2014). SES is commonly measured by education level, income and occupation. More recently, examining the association between socioeconomic status and the prevalence of obesity has become an area of interest to many researchers. The evidence available generally shows a strong link between high socioeconomic status and increased BMI. However this association differs by levels of economic development, gender, age and the measurement index. While some studies report positive correlation (Dinsa et al., 2012; Bradshaw et al., 2011;

Sobal & Stunkard, 1989), others report mixed associations (Alaba & Chola, 2014; Anyanwu et al., 2010).

In a review of studies examining the connection between socioeconomic status and obesity in low and middle-income countries, Dinsa et al. (2012) discovered that in low income countries, obesity was more prevalent among people in high income brackets than those in low income brackets. Their findings however revealed a mixed pattern of inequalities in obesity prevalence in middle income countries, apparently more profound among men than women (Dinsa et al., 2012).

Despite these results, it has been reported that different socioeconomic measures appear to have different relationships with weight change and obesity (Parsons et al., 1999; Miech & Hauser, 2001; Ball & Crawford, 2005). For example, studies that used per capita income as a measurement indicator of SES in relation to weight gain consistently revealed higher prevalence of obesity in poor households than rich households (Case & Menendez, 2009). On the other hand, those who used level of education as a measure of socioeconomic in relation to obesity reported mixed results (Alaba & Chola, 2014; Amoah, 2003). The subsequent section examines the literature on studies exploring the association between obesity and levels of SES.

2.4.5.1 Relationship between education and obesity

Education is defined as the process of learning, or the acquisition of knowledge, skills, values and beliefs to shape behavior. Since the early 1970s, the relationship of health and education has generated a substantial literature (Devaux et al., 2011). The interest in this relationship is explained by number of reasons, however key among them is the notion that education improves a sense of control and empowerment of individuals (Kenkel et al., 2006). Similar to most health variables, obesity has been shown to strongly correlate with education in many studies (Baum & Ruhm, 2009; Rashad et al., 2006). It is believed that adults with higher levels of education are less likely to engage in risky behavior such as excessive drinking and are more likely to have healthy behaviors related to diet and exercise (Cutler & Lleras -Muney, 2006).

In this regard, Cutler and Lleras-Muney (2006) found that people with higher education are less likely to engage in unhealthy lifestyles such as taking drugs or eating unhealthy foods that are linked to gaining excess weight. In their study, they found that individuals with longer years of schooling appreciate the need for physical activity to maintain a healthy life. This position has been confirmed by related studies. For instance, in a study to investigate the link between high school completion and weight gain, Kentel et al. (2006) found that years of schooling correlated negatively with excess weight gain, especially for females in developed countries. By using similar approach, Webbink et al. (2008) confirmed this inverse relationship. In the US, a study conducted by Maclnnis (2008) showed that college completion reduces the probability of being obese by 70% and saves about \$44,000 in reduced medical costs per person. In Asia, Zhang (2008) analyses on the effects of early school entry on youth obesity and revealed that delayed school entrance increases the probability of being overweight among boys and girls. A study among Ibos in Nigeria by Anyanwu et al. (2010) also observed a negative relationship between education and obesity.

Notwithstanding the above evidences, the direct causality of education on reducing obesity prevalence has been proven by other scholars to be inconclusive. For example, Arendt (2005) who used changes in education laws in Denmark to measure its impacts on obese prevalence discovered inconsistent results regarding the effect of education on BMI levels. Likewise, Clark and Royer (2008) whose study focused on exploring the effects of increased minimum school leaving age from 14 to 15 in the UK on mortality and some health risks like obesity also reported inconclusive relationship. These findings have not been different from studies conducted in the Africa region. For example, Ziraba et al. (2009) who review studies on obesity in urban Africa, using education as proxy measure, reported that women with secondary or higher education were about 60% more likely to be obese than those with no formal education. In Ghana, Agbeko et al. (2013) study showed that women with higher education were about two times more likely to be overweight or obese compared to those with no formal education. In their systematic review of obesity in developed and developing countries, Dinsa et al. (2012) also found that in low-income countries those with higher educational attainment are more likely to be obese.

From the above literature, it can be concluded that the association between education and health variables such as obesity reflect two possible outcomes: *a)* a causal link suggesting that increased education leads to an improvement in health status, *b)* an absence of a causal relationship or even negative relationship between education and obesity. More studies examining the link between education and obesity are therefore required for better understanding as well as to guide a review and development of appropriate education policies aimed at reducing obesity rates. The next section explores literature on the association between overweight and income.

2.4.5.2 Relationship between income and obesity

Income refers to wages and other benefits provided through employment, as well as from other sources such as investments, inheritance and government assistance programs (Sobal, 2001). Income provides resources that can influence energy intake and expenditure, which in turn shape body weight. Until recently, the role of income on obesity rates was found to be more profound in developed countries than developing countries. However, recent data suggest otherwise (Mason, 2012; Kim & Knesebeck, 2018). In their meta-analysis on the relationship between income and obesity in developed countries, Kim and Knesebeck (2018) concluded that lower income is associated with obesity among people in the United Kingdom, United States and Canada. In other epidemiological studies, income has been found to be inversely associated with obesity (Dinsa et al., 2012; McLaren, 2007; Sobal, 1989). More recently, studies in some African countries have reported similar results. For example, Fezue et al. (2006) found that increased in household income contribute to prevalence of obesity in urban Cameroon. Steyn et al. (2013) also reported similar result among Kenyan women. In South Africa, Sartorius et al. (2015) noted that females living in formal or informal urban areas with high household income were significantly more likely to be obese. In Ghana, Agbeko et al. (2013) noted that changes in income level among some Ghanaian women influences their body weight.

To explain why people with lower income are more vulnerable to obesity, the theory of social determinants of health explains that economic conditions often influences one's eating behavior (Marmot, 2002). According to Sobal (2001), low income levels produce stress, which sometimes

cause people to eat more and thus store more body fat. Although Sobal's (2001) position provides reasonable understanding of the causal effect between low income and weight gain, there has been debate about where the direction of causality operates (whether income influence weight gain, or vice versa). One important argument for the reverse causality is stigma. Studies suggest that obese people are more likely to be perceived as lazy, unsuccessful, weak-willed and undisciplined (Tlili et al., 2008; Puhl & Heuer, 2010). Based on these negative stereotypes, the obese face various weight penalties in the labour market, which include higher job insecurity, lower chances for a job and general discrimination (Nowrouzi et al., 2015). In other instances, the stress of being obese causes the afflicted to self-stigmatize themselves against engaging in active work to earn income (Nowrouzi et al., 2015; Kim & Knesebeck, 2017). In such circumstances, one can conclude that obesity can cause people to earn low incomes. By following these two frameworks, there are various pathways in which income relates to obesity and vice versa. In respect of the perspective of causality, it is well noted that high income does not only allow access to healthy food, but is also linked to higher health literacy which in turn is positively related to health-promoting behaviors (i.e. healthy nutrition, physical activity).

2.5 Health implications of obesity and overweight

The health implications of obesity and overweight are diverse, ranging from an increased risk of premature death to several non-fatal but debilitating complaints that have an adverse effect on quality of life. Obesity is also a major risk factor for non-communicable disease (NCDs) such as cardiovascular disease and cancer. In many industrialized countries obesity is associated with various psychosocial problems (Tugendhaft & Hofman, 2014; WHO, 2015). Details of the health consequences of overweight and obesity in both adults and children are provided in the next section.

2.5.1 Obesity as a risk factor for cardiovascular disease

Obesity and excess abdominal fat are reported to have a casual effect on cardiovascular risk factors, including high levels of total cholesterol, blood pressure and insulin (WHO, 1998; Msyamboza et al., 2013). The WHO (2016) suggests that overweight and obesity lead to adverse

metabolic effects on cholesterol and insulin resistance. Other cross-sectional studies have also reported direct and independent association between blood pressure and BMI (Malaza et al., 2012; DoH, 2013). Compared to persons of normal weight, people with excess body weight are found to show higher blood pressure (Msyamboza et al., 2013). The factors underlying this situation is explained by the high sodium retention, increased blood volume and cardiac output associated with obesity (DoH, 2004; Freudenberg, 2014).

Being a health condition associated with economic growth and development, cardiovascular disease such as hypertension and stroke were in the past linked to industrialised countries. However in recent times these conditions have also become predominant in developing countries (Kruger et al., 2005; Appiah et al., 2014; WHO, 2016). For example in 2008, Tanzania reported a 10% increase in hypertension cases as a result of rising obese population (Njelekela et al., 2009). In Nigeria, Okpechi et al. (2013) has revealed that obesity contributes to 12% of all hypertension cases. In South Africa, obesity is reported to be the leading cause of increasing cancer and heart failure diseases (Kruger, 2005; SADHS, 2015). Despite this evidence, it is important to state that differences in obesity-related cardiovascular diseases are observed among gender, race and ethnicity. For example, in a study conducted among South African women, Puoane et al. (2013) reported that the prevalence of hypertension was high among urban black women who have a westernised diet and lifestyle than white women. In addition, rising levels of stroke cases were reported more among women than men (Puoane et al., 2013). Given these empirical findings, although one can conclude the existence of a direct connection between weight gain and elevated blood pressure, it is worth noting that such association has not been extensively explored. The single explanation provided for this association is the higher circulating levels of insulin caused by insulin resistance and enhanced renal retention of sodium, resulting in increased blood pressure. Given the lack of extensive data, there is an urgent need for further studies in this direction.

2.5.2 Obesity as a risk factor for diabetes

Diabetes is described as a combination of low amounts of insulin production from pancreatic β -cells and peripheral insulin resistance (Kanda et al., 2006). According to the WHO (2016), insulin resistance leads to elevated fatty acids in the plasma, causing decreased glucose transport into the muscle cells, as well as increased fat breakdown, subsequently leading to elevated hepatic glucose production. Insulin resistance and pancreatic β -cell dysfunction must occur simultaneously for type 2 diabetes to develop (Ibid, 2006). While it is reported that anyone who is overweight and/or obese has some kind of insulin resistance, diabetes only develops in those individuals who lack sufficient insulin secretion (Malik et al., 2010). The likelihood of developing type 2 diabetes and hypertension rises steeply with increasing body fatness (Ibid, 2010).

According to the WHO (2016), approximately 85% of people with diabetes are type 2 and of these, 90% are obese or overweight. Commonly found in affluent societies for most of the 20th century, diabetes is now found to be prevalent among people with low incomes. This has been confirmed by a number of studies conducted in South Africa (Nthangeni et al., 2002; De Wit, 2008; Black et al., 2013; Assah et al., 2011). For instance, Nthangeni et al. (2002) reported that among black South Africans with type 2 diabetes attending primary healthcare services in urban and rural areas, obesity was prevalent in 15–16% of men compared with 35–47% of women. Likewise severe obesity was found to be present in 36.5% of diabetics under care in the public health sector in a district in rural KwaZulu-Natal (Rotchford, 2002; Swinburn et al., 2004). However, the exact mechanism and relationship between type 2 diabetes and obesity remains inconclusive and needs further explanation.

2.5.3 Obesity as a risk factor for cancer

There are a number of evidences that support the connection between overweight and incidence of cancers including colon, breast, prostate rectal and kidney (Vainio, 2002). The increased incidence of these cancers are found to be more prevalent among obese adults than those with excess abdominal fat (Fleming et al., 2013; WHO, 2015; Kengne & Mayosi, 2014). Recently, the International Agency for Research on Cancer (IARC) concluded that nearly 500,000 new cancer

cases per annum can be attributed to high BMI and that overweight and obesity were responsible (IARC, 2014). Moreover, obesity-related cancer mortality has been proven by a majority of clinical and scientific studies (Lew et al., 1979; Kengne & Mayosi, 2014; Bradshaw et al., 2011). For example in one major study, in which 750, 000 men and women were studied for a period of 12 years, it was discovered that cancer accounted for 1.33 and 1.55 mortality ratios for obese men and women respectively (Lew et al., 1979). In 2002, the International Agency for Research on Cancer (IARC) in their research to examine the link between obesity and various cancers found that obesity led to 39% of endometrial cancer cases, 37% of oesophageal cancer cases, 25% of kidney cancer cases, 11% of colon cancer cases and 9% of postmenopausal cancer (IARC, 2002).

Other previous evidences have also indicated that obesity causes approximately 14% of cancer deaths amongst males and 20% of cancer deaths amongst females (Calle et al., 2003). A more recent meta-analysis based on the 57 prospective studies from Europe and North America involving 900,000 men and women reported that the mortality rate was found to be low among those with normal BMI and high among those with BMI over 25kg/m² (Cancer Research UK, 2016). Stefan (2015) asserts that cancer is the second most frequent cause of death in South Africa. Yet this significant risk factor has not been given attention in line with the magnitude of its potential impact and its prevention and management has largely been marginalized (Wallace & Pentz-Kluyts, 2016).

2.6 Socioeconomic consequences of obesity

It is reported that society's negative attitude towards obese persons adversely affects their educational, economic and occupational prospects (DiBonaventura et al., 2015; Kristensen et al., 2017). Previous studies in different areas have shown an inverse relationship between obesity and social class, which is more evident in women (Noppa & Bengtsson 1980; Sonne-Holm & Sorensen, 1986). Obesity is a well-known risk factor for sick leave, disability pension and premature death and is therefore presumably related to lower productivity. In a study to explore the association between body mass index and health and economic outcomes in the United States, DiBonaventura et al. (2015) noted a decrease in work productivity with increasing BMI.

The study further revealed that health problems among obese individuals resulted in an overall work impairment of 20%. This finding is a confirmation of a previous study by Trogdon et al. (2008) who in their systematic review discovered that obese workers miss more workdays than non-obese workers because of illness or disability.

In other instances, several surveys have reported that obese persons have poorer opportunities in seeking employment than normal-weight individuals, despite similar abilities (Sonne-Holm & Sorensen, 1986; Clough & Destremau, 2015). Obese persons, particularly women, are highly discriminated against in some occupational settings (Clough & Destremau, 2015:20). More recently, Kristensen et al. (2017) in their systematic review of the socioeconomic impact of obesity in Denmark, observed that an increase in BMI above 30 kg/m² was associated with a 2% decrease in income, a 3% increase in social transfer payments and a 4% increase in healthcare costs. Their study further revealed that income contributed to most of the total economic burden among the study population. In addition, obesity has been found to limit ones prospects of education and marriage because of stigma and discrimination (Kruger, 2012; Wallace & Pentz-Kluyts, 2016; DiBonaventura et al., 2015).

2.7 Interventions for addressing obesity

Researchers have suggested that addressing the problem of obesity requires the application of multiple approaches involving stakeholders from all sectors (Vorste, 2013; Ronquest-Ross, 2015; Manyema et al., 2014). Emphasis is particularly placed on developing interventions which respond to changes in diet and levels of physical activity. In more specific terms, interventions are expected to address lifestyle, environmental and societal factors. The US National Institute of Health for example recommended that safe weight-loss diets combined with physical activity should not provide less than 5020 kJ for women and 6300 kJ for men (Manyema et al., 2014). A combination of unhealthy food restrictions as well as aerobic exercise of 45–60 min on most days, is needed to optimise the reduction in visceral adiposity, decrease the percentage body fat (Schrauwen et al., 1998).

The world health organization (WHO) also favours the use of regulations to manage obesity prevalence. In line with this recommendation, the Nutrition Society of South Africa (NSSA) and South African government have initiated several processes of designing food-based dietary guidelines (FBDGs) as a way of managing the obesity scare in the country (Vorste, 2013; DoH, 2015). This initiative is developed specifically to address dietary inadequacy and change the populations' eating behavior towards a more optimal and healthy diet that meet energy and nutrient requirements. The intervention is developed on the basis of ensuring a full implementation of nutrition label standards and regulations (Bradshaw, 2011). Additionally, it established nutrition counselling units to provide education and awareness around the importance of healthy eating and exercise through various platforms including mass media.

Another recommended measure is the use of fiscal policies to regulate the consumption of sugar-sweetened beverages (Ronquest-Ross, 2015). Many studies have shown positive associations between increased consumption of sugar-sweetened beverages and obesity (Manyema et al., 2014; Malik et al., 2010). As such, countries like Mexico have adopted fiscal policy instruments such as taxes to reduce sugar intake (Frongillo et al., 2017). Recently, the South African National Department of Health in its strategic plan to prevent and control non-communicable disease and obesity also proposed 20% tax on sugar-sweetened beverages (Ronquest-Ross, 2015). Although there has been many criticisms about the effectiveness of this policy, it is reported that the introduction of sugar tax in Mexico in 2014, contributed to a 12% drop in the purchase of sugary drinks within its first year of implementation (Blecher, 2015). Despite the evidence from Mexico, the full effect of sugar tax is yet to be experienced in South Africa. Beyond the fiscal policy measure, the South African government has also set guidelines for food labelling and advertisement to control overweight and obesity (DoH, 2015). The move aims at reducing the impact of advertising unhealthy products on children.

2.8 Chapter summary

In conclusion, this chapter has reviewed relevant literature and provided a comprehensive discussion on the subject matter of this study. The cause and impact of obesity as well as its correlation with socioeconomic status has been conceptualized from a multi-dimensional perspective from both developed and developing countries. The discussion demonstrated mixed evidence regarding the nexus between socioeconomic status and obesity. The chapter further revealed the paucity of evidence about the association between socioeconomic status and weight gain especially in poor urban communities in South Africa. In the view of the researcher, this evidence gap allows for more research to increase understanding of current knowledge on the topic of obesity. The next chapter examines the theoretical and conceptual foundations upon which the study is launched.



CHAPTER THREE

THEORETICAL AND CONCEPTUAL FRAMEWORK

3.0 Introduction

The Theory of Planned Behaviour has been applied in a number of health related research to predict behaviour such as food choices, the frequency of family meals and physical exercise (Abamecha et al., 2013; Griva et al., 2013; Lohse et al., 2011). Likewise, this research will use the Theory of Planned Behaviour to examine the relationship between socio-economic status and eating behaviour as well as weight management practices. The chapter commences with an examination of the concept of the Theory of Planned Behaviour and how attitude, subjective norms and perceived behaviour control links to intention which influences dietary behaviour. Attention then turns to the efficacy of the theory to predict behaviour and presents evidence on how the theory has been used in food choice and weight management studies. The chapter concludes with a discussion on the relevance of the Theory of Planned Behaviour to this investigation and provides the hypothesis of the research as well as the operationalization of key variables.

3.1 Evolution of the Theory of Planned Behaviour

Developed by Fishbein in 1967, the Theory of Reasoned Action (TRA) serves as the foundation for the Theory of Planned Behaviour (TPB). The TRA asserts that individuals evaluate the consequences of their actions before deciding to enact the behaviour- an assumption which inspired the name of the theory, the Theory of Reasoned Action.

In forwarding the Theory of Reasoned Action, Ajzen and Fishbein's (1975) primary goal was to predict and understand individual behaviour. However, intent to engage in behaviour plays a critical role in the theory. Ajzen and Fishbein (1975) provided that the simplest way to predict one's behaviour is to assess their intent to engage in the behaviour. According to them, an individual's intent is a function of his/her positive or negative evaluation of the behaviour and the social pressures he/she perceives to enact (or not enact) a behaviour. These factors are termed attitudes and subjective norms respectively. The Theory of Reasoned Action assumes

individuals are rational in considering their actions and decisions to engage in behaviours. The TRA has explained the antecedents of a variety of behaviours but the theory does not account for perceived behavioural control (Conner & Sparks, 2005). This shortcoming motivated Ajzen (1991) to update and extend the model in the Theory of Planned Behaviour.

3.2 The Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) is an extended form of the Theory of Reasoned Action (TRA) developed to predict behavioural change on the basis of cognitive components (Ajzen & Fishbein, 1975; Ajzen, 1991). While the Theory of Reasoned Action (TRA) asserts that behaviour is solely dependent upon intentions (Ajzen & Fishbein, 1975), the TPB presents a rational view of behaviour and asserts that behaviour can be adequately predicted by two variables: intention and perceived behavioural control (PBC). The Theory of Planned Behaviour reveals the underlying actions and motivations for behavioural change by emphasizing the value of establishing strong intentions through attitudes, normative beliefs and perceived control (Ajzen, 1991; Abamecha et al., 2013). The theory posits that determinants of changes in attitude, subjective norms and perceived control predict intention and thereby promote health-related behaviour (Armitage & Conner, 2001; Godin & Kok, 1996).

Although both TPB and TRA assume intention as a result of rational evaluations of a particular action, unlike the TRA, the TPB considers volitional control. Volitional control means an individual must have the support, resources and opportunity to perform a specific behaviour (Ajzen, 1991). As such, there are many internal and external factors which can facilitate or impede the enactment of a behaviour such as mental and physical abilities, social support, external barriers and compulsions (Ajzen, 2012). To allow for the prediction of volitional behaviours, a construct that describes perceptions of control over performance of a behaviour, known as “perceived behavioural control”, was added to the TPB model. This addition was deemed important because it extends the applicability of the theory beyond volitional behaviours to those complex goals and outcomes which are dependent upon performance of a complex series of other behaviours (Conner & Armitage, 1998:1430). The conceptual framework of the TPB model is illustrated in

Figure 3. Ajzen's (1991) Theory of Planned Behaviour further posits that one's attitudes, subjective norms and perceived behavioural control lead to one's behavioural intention and one's behavioural intention and perceived behavioural control leads to one's actual behaviour.

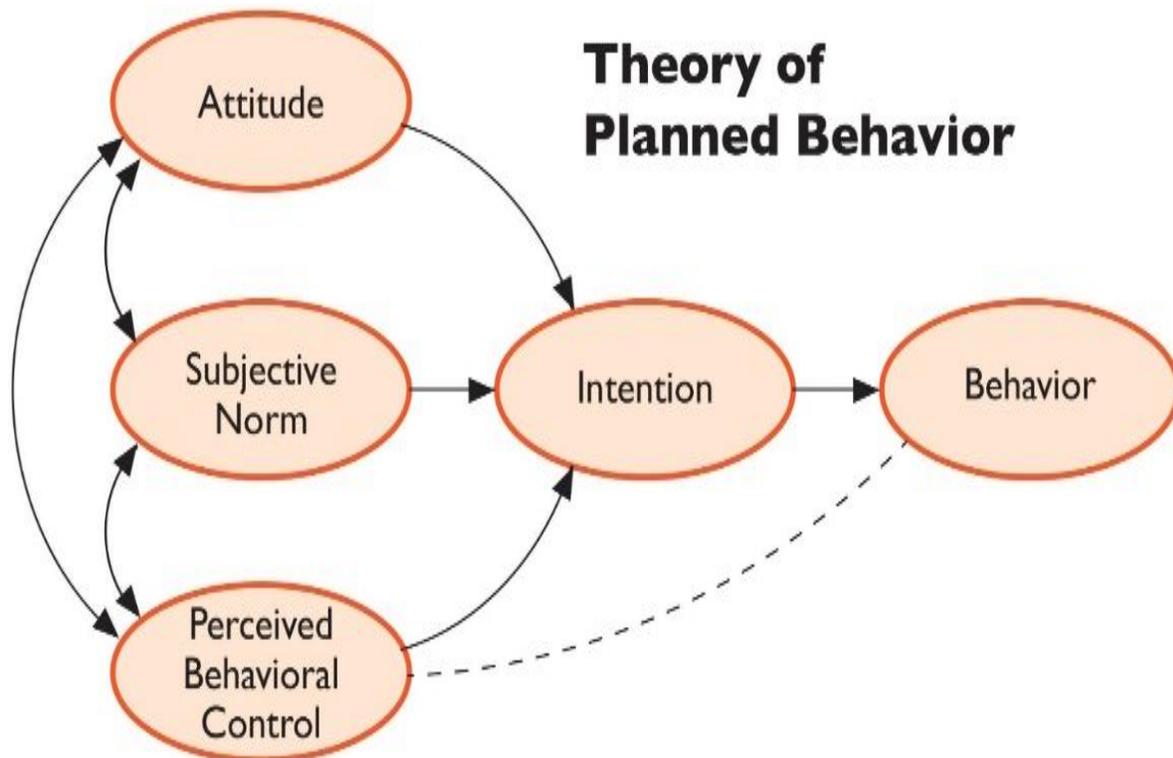


Figure 3. 1: Theory of Planned Behaviour (Ajzen, 1991)

By referring to Figure 3, Ajzen (1991) provides that salient beliefs are the basis for the formation of attitudes, subjective norms and perceptions of behavioural control (these constructs are discussed further in the subsequent section). Salient beliefs are specific set of beliefs that people attend to when deciding whether to engage in a behaviour or not and it is these beliefs that ultimately determine intentions and actions (Ajzen, 1991). In the opinion of McEachan et al. (2011), salient beliefs that influence attitudes, subjective norms and perceived behavioural control are normative and control beliefs. For Conner and Norman (2005), attitudes are determined by salient behavioural beliefs about outcomes of performing the behaviours weighted by evaluations of those outcomes. Glanz et al. (2008) also provide that subjective norms are determined by normative beliefs weighted by motivation to comply. On the other

hand, perceived behavioural control is determined by control beliefs weighted by perceived power (Ibid, 2008). Ajzen (1991) goes further to explain each construct (as shown in Figure 3) and demonstrate how it interconnects.

3.2.1 The meaning and relationship between the Theory of Planned Behaviour's constructs

3.2.1.1 Attitude

An attitude is an individual's personal evaluation of the positive and negative aspects of performing a behaviour (Ajzen, 1991). Ajzen and Fishbein (1975) conceptualized attitudes based on the expectancy-value model which states that the overall evaluation or the attitude towards an object is a function of the beliefs people have about the object in question (Fishbein & Ajzen, 2009). Behaviours with outcomes evaluated as positive are favoured and this subjective evaluation is directly proportional to the strength of the belief (Ibid, 2009). An important point to note in regard to the TPB is that an individual's attitude toward a behaviour (e.g., reducing fatty-foods consumption) is a better predictor of his or her intention to engage in the behaviour as compared to an attitude toward the object at which the behaviour is directed (e.g., avoiding weight gain or improving general health) (Fishbein & Ajzen, 1975; Montano & Kasprzyk, 2015). For example, "what could be a possible outcome of reducing a fat intake?" A possible answer is to achieve health improvement. Given that good health is important in everyone's life, people will form positive attitudes toward maintain good health because it is believed it would produce other desirable outcomes (e.g., ability to go to work). On the other hand individuals will form negative attitudes toward behaviours they believe will have undesirable outcomes.

Scholars have classified different types of attitudes in relation to the TPB model. For example, Katz and Stotland (1959) proposed that attitudes encompass affective and cognitive behavioural components. Affective attitude is used to describe the positive and negative feelings that one holds towards an object (Rosenberg & Hovland, 1960). Cognitive attitudes refer to beliefs that one holds about the object and behaviour used to describe overt actions and responses to the object (Ibid, 1960). According to Rosenberg and Hovland (1960), these components are types of possible responses to a stimulus. However, contemporary scholars have noted that an attitude

is a general evaluative summary of the information derived from affection, cognition and behaviour, thus it does not consist of two components (Cacioppo et al., 1989; Zanna & Rempel, 1988). This shift has resulted in a fair amount of research that addresses attitudes based primarily on affect or cognition (Fabrigar & Wegener, 2005).

3.2.1.2 Subjective Norm

A subjective norm is the degree to which an individual perceives the values and norms shared by other people close to him/her. According to Ajzen (1991), subjective norm is quantified as the product of normative beliefs. Conner and Norman (2005) refer to normative beliefs as perception of other peoples' opinion about whether a behaviour is acceptable or not. According to Ball et al. (2010:1) normative beliefs are influenced by social norms which are formed as result of frequent interactions between and among individuals (Ibid, 2010).

Two conceptualized social norms are "injunctive norms" and "descriptive norms". Injunctive norms are one's perception that people such as friends and family, approve or disapprove of a behaviour and the relative weight the individual assigns to this approval or disapproval. Injunctive norms have two components. First, injunctive norms include normative beliefs which determine whether salient individuals would support or oppose one's behaviour. Second, injunctive norms include motivation to comply. Motivation to comply reflects the extent to which individuals are compelled to act in accordance with the wishes of the salient individuals or groups of individuals. Descriptive norm refers to people's beliefs about how families and friends or society in general commonly practice healthy behaviour and the latter refers to people's beliefs about what other people expect others to do with regard to healthy behaviours (Ball et al., 2010).

3.2.1.3 Perceived behavioural control

Perceived behavioural control (PBC) is defined as the perceived ease or difficulty of completing a particular behaviour (Ajzen, 1991). Perceived behavioural control is the function of the beliefs about the accessibility of resources and opportunities to perform the behaviour, multiplied by the perceived power of each of those factors (Conner & Norman, 2005). PBC reflects both

external factors (social support, environment and socio-economic status) and internal factors (skills, knowledge and information) (Ibid, 2005). According to Ajzen (1991), the usefulness of the perceived behavioural control construct will increase as the volitional control over the behaviour decreases. Perceived behavioural control is similar to the construct of self-efficacy in that both constructs are measurements of one's confidence in his or her ability to complete tasks and reach goals (Ajzen, 1991).

Ajzen (1991) conceptualized perceived behavioural control into two parts: control beliefs, which are one's evaluation of whether or not barriers will hinder or facilitators will help performance of the behaviour and perceived power which relates to how easy or difficult it will be to engage in the behaviour. When the performance of the behaviour is limited by volitional control, perceived behavioural control has the potential to directly predict the behaviour moderating the relationship between intention and behaviour (Conner & Norman, 2005). In instances where attitudes are strong, or where subjective norms are powerful, perceived behavioural control may be less predictive of goal intentions (Conner & Armitage, 1998:1430). Yet, when these factors are reduced, perceived behavioural control may play a more powerful role on intention formation and performance of behaviour (Ibid, 1998).

A meta-analytic review of literature by Armitage and Conner (2001) on the application of the TPB, strongly support the ability of perceived behavioural control to predict intentions when controlling for other TPB constructs (attitudes and subjective norms). The issue with perceived behavioural control, which is commonly raised, is the difficulty to establish how well the construct reflects the actual vs. perceived control (Armitage & Conner, 2001). For example, one can perceive the ability to exercise, but might not have access to exercise equipment (controllability). With regards to this study, perceived behavioural control is characterized by one's perception of their ability to engage in physical activity within their community.

In summary, the first three constructs (attitude, subjective norm and perceived behavioural control) are all hypothesized to predict behavioural intentions. The TPB proposes that a more positive attitude towards a behaviour, together with a supportive subjective norm and higher

perceived behavioural control, will result in a stronger intention to perform the behaviour and subsequently more likelihood of the behaviour being performed. These three constructs are also influenced by certain established factors. For example, whereas behavioural beliefs and outcome evaluation are bases for predicting attitude, normative beliefs and the motivation to comply are the foundations for projecting subjective norms and perceived behavioural control.

3.2.1.4 Behavioural Intention

The TPB assumes that the most important determinant of actual behaviour is one's intention to engage in the behaviour (Ajzen, 1991; Montano & Kasprzyk, 2015). Intentions are assumed to capture one's motivation to engage in a particular behaviour and serve to indicate how hard someone is willing to work to enact a certain behaviour (Ajzen, 1991). Intent to perform a behaviour results from the combined influence of attitudes, subjective norms and perceived behavioural control (Ajzen, 1991). Ajzen states that when an individual is capable of performing a behaviour in question, the likelihood of performing that behaviour increases as intent to perform the behaviour increases.

3.2.1.5 Behaviour

Ajzen defines behaviour as an individual's observable response in a particular situation with a particular target. Behavior is a function of one's intention to engage in the behavior and perceptions of behavioral control. TPB forwards that perceived behavioural control moderates the effect between intentions and actual behavior. Ajzen (1991) forwards that the TPB works best when predicting behaviors that are mainly under one's volitional control. When individuals enact a behavior that is not completely under their volitional control, the TPB performs less effectively (Godin & Kok, 1996). Nonetheless, Ajzen (1991) notes that nearly all behaviors can be positioned on a continuum that extends from complete lack of control to total control. A person has total control when there are no practical constraints that inhibit the inaction of the behavior.

In conclusion, attitude, subjective norms and perceived behavioural control are positively related to behavioural intention which result in actual behaviour. For example, if one has a positive attitude towards eating healthy menu items in restaurants, if one's friends or family members think it is a good idea to eat healthy meals in restaurants and if one thinks that he or she has control over whether he or she can eat these menu items, then, the likelihood of selecting healthy menu items in restaurants is high. The subsequent section presents a discussion on the effectiveness of the TPB to predict behaviour.

3.3 The efficacy of the Theory of Planned Behaviour to predict behaviour

The TPB has been cited frequently and widely adopted to predict health-related behaviour such as smoking, mammography screening, voluntary HIV counselling and testing, exercise, food choices, family meal frequency and fruit and vegetable intake (Abamecha et al., 2013; Griva et al., 2013; Lohse et al., 2011). A review of literature on dietary behaviour conducted by Abamecha et al. (2013) showed that behavioural intention typically explains 20-40% of the variance in behaviour, whereas attitude, subjective norms and perceived behavioural control explain 40-50% of the variance in intention. Ajzen (1991) also reviewed 16 studies to examine TPB variables, ability to predict behavioural intentions. The study concluded that attitude, subjective norm and perceived behavioural control accounted for 18% to 88% of the variance in behavioural intentions (Ibid, 1991).

In a review of 56 health-related studies in eating and exercise behaviour, Godin and Kok (1996) found intention to be the best predictor of the behaviour, explaining 66.2% of the variance. Attitudes, subjective norms and perceived behavioural control explained 46%, 34% and 46% of the variance in intention, respectively. For both eating and exercise behaviours, attitude was the strongest predictor of intentions (34% and 51%) followed by perceived behavioural control (32% and 50%) (Godin & Kok, 1996). Likewise, a meta-analysis of 185 independently published research studies related to physical activity and exercise showed that TPB related variables account for approximately 27% of the variance in behaviour and 39% of the variance in behavioural intentions (Armitage & Conner, 2001).

More recently, McEachan et al. (2011) conducted a meta-analysis of 206 published research studies utilizing TPB to predict a wide range of behaviours. They found that TPB variables accounted for 19.3% of the variance in behaviour. Their study further revealed that attitude, subjective norms and perceived behavioural control accounted for 44.3% of the variance in behavioural intention. Attitudes were the strongest predictor ($\beta = 0.35$), followed by perceived behavioural control ($\beta = 0.34$) and subjective norms ($\beta = 0.15$). However when it comes to prediction of behaviour itself, the efficiency of the TPB was not consistent. It was found to be low for clinical and screening behaviours and much higher for addictive and HIV/AIDS related behaviours (McEachan et al., 2011). Notwithstanding this critique, the TPB model has been shown to have good predictive value when used to explain numerous health behaviours, including dietary behaviours and physical activity and has often been used as a theoretical framework in interventions targeting these behaviours. The use of the TPB model in dietary and physical activity research is presented next.

3.4 Application of the Theory of Planned Behaviour in food choices studies

3.4.1 Review of studies applying the theory of planned behaviour to examine dietary behaviours

The TPB has been used to study numerous dietary behaviours including fat intake, fruit and vegetable intake, vitamin supplementation and overall healthy diet consumption (Zoellner et al., 2012; de Bruijn & van den Putte, 2009; McEachan et al., 2011). Earlier studies examining the association between Ajzen's theory of planned behaviour and dietary patterns have demonstrated the capacity of the theory to explain eating habits (Dennison, 1995; Godin & Kok, 1996). For example, Dennison (1995) applied the conceptual framework of the TBP to examine the factors which influence adolescents' food choice in the United Kingdom. The study which explored students' intentions to consume certain foods, revealed that attitudes and perception of control (both concepts of the TPB model) accounted for variance in the students' eating behaviour.

Building on Dennison's (1995) findings, Povey et al. (2000) also applied the TPB to predict an individual's decision of whether or not to eat healthy foods. The results showed that attitude, perceived norms and perceived behavioural control explained 42% of the variance for intentions, which can be interpreted that the TPB has a good ability to explain healthy eating intentions. Moreover, Paisley and Sparks (1998) found the TPB variables to explain 30% of intention to reduce fat intake.

In two related TPB studies conducted by Armitage and Conner (1999a and 1999b), intention was found to be the best predictor of healthy food choice and low-fat diet behaviours explaining 57% and 21% of variance in behaviour, respectively. TPB variables explained 57% of the variance in intention to make healthy food choice and 60% of the variance to eat a low-fat diet. Lautenschlager and Smith (2007) explored the influence of a garden program, a newly developed nutrition curriculum, on fruit and vegetable consumption of youths (age 8–15), using the TPB. They found that attitude was the most significant construct to predict intention. They also found that there were differences between male and female youth in terms of the relationship between antecedents and intention. Finally, the authors concluded that the gardening program is a good intervening variable to improve healthy eating behaviour in this age group. In a study done by Pawlak et al. (2009), TPB constructs explained as much as 72% in behavioural intentions to eat a healthful diet among college baseball players. In the opinion of Murnaghan et al. (2010), individuals will have a strong intention to consume a healthy diet, if they perceived that adopting such behaviour will not create any negative social and economic implications. This position has also been confirmed by other researchers who have investigated nutritional behaviour of individuals (Diaz et al., 2009; Bazillier et al., 2011; Grønhøj et al., 2012).

Despite the opinion shared by Murnaghan et al. (2010) and others (Diaz et al., 2009; Bazillier et al., 2011; Chan & Tsang, 2011; Grønhøj et al., 2013), Tugendhaft and Hofman (2014) believe that adopting a healthy eating behaviour can be difficult to achieve in countries where food supply or the advertisement of unhealthy food is widely available. Individuals in countries with over supply of unhealthy foods are mostly faced with the difficult task of choosing from a wide range of food

and beverages in order to meet nutritional requirements without contributing to excess weight (Tugendhaft & Hofman, 2014).

Other scholars have also challenged the predictive capacity of the TPB model to explain healthy eating. For example, Whitehead et al. (2014) argue that positive dietary patterns are not adequately reflected through a single factor. The view shared by Whitehead et al. (2014), suggest that consumption of foods, such as oats which is generally recommended for weight management is regarded by some individuals as a means for reducing cholesterol and not necessarily reducing weight. Others have suggested that the association between the TPB model and eating behaviour may differ among populations (Povey et al., 2000). To date, no comprehensive review of literature exists on healthy eating (Riebl et al., 2015). Further studies are therefore required to enhance understanding of the TPBs capacity to predict eating habits. The next section focuses on the application of the TPB model in weight control studies.

3.4.2 Review of studies applying the theory of planned behaviour to examine sugary drinks consumption behaviour

Moving further, the TPB has also been applied to cross-sectional studies regarding sugar-sweetened beverages (SSB) consumption among adults. For example, in a formative cross-sectional study among low-income earners in the United States, TPB constructs were found to explained variability in their behavioural intentions (Zoellner et al., 2012). Attitudes were discovered to have had the strongest influence on behaviour, followed by perceived behavioural control, intentions and subjective norms (Zoellne et al., 2012). For instance attitudes independently explained 63% of the variance in the SSB behaviour, perceived behavioural control was estimated at 54%, intentions explaining 51% and subjective norms 36% of the variance in intentions (Zoellner et al., 2012). In another study examining the application of TPB to sugar-sweetened beverages consumption behaviour among 312 Dutch adolescents, stronger habits towards soft drink consumption was found to be significantly associated with higher consumption, supporting previous studies in which the habit strength has an important mediating effect in the context of health behaviours (De Bruijn & Van den Putte, 2009). Higher

perceived behavioural control was in turn associated with stronger intentions to limit the consumption of soft drinks (De Bruijn & Van den Putte, 2009).

It is worth noting that not only have TPB constructs been used in quantitative studies but also in qualitative research. For example, in a study that sought to qualitatively explore sugary drinks consumption among Spanish women using semi-structured interviews, it was found that cultural beliefs lead to more positive intentions to consume sugary beverages (Barberia et al., 2008). Higher perceived behavioural control was also found to be associated with the perception of social support (Barberia et al., 2008). Another study applied TPB to qualitatively investigate beliefs underlying SSB consumption (Zoellner et al., 2012). In this regard cultural perspectives and target population's specific beliefs regarding the attitudes, subjective norms and perceived behavioural control in the context of sugar-sweetened beverages and water consumption were explored. Zoellner et al's. (2012) study which qualitatively explored beverage consumption among adults using the TPB, attitudes, subjective norms and perceived behaviour control provided deeper understanding of underlying cultural beliefs that guide beverage choices. Other scholars who have applied Azjen's theory to conduct studies similar to Zoellner et al. (2012) concluded that making healthy choices of food is influenced by subjective norms, perceived behaviour control and attitudes (Seo et al., 2011; Sharifirad et al., 2013; Riebl et al., 2015).

3.5 Application of the Theory of Planned Behaviour in weight control studies

3.5.1 Review of studies applying the theory of planned behaviour to examine physical activity behaviour among adolescents and children

Apart from providing a framework to explain food choices, the TPB model has also been applied to a range of weight management practices such as reducing fat intake (de Bruijn et al., 2008), consuming more fruits and vegetables (Kellar & Abraham, 2005) and engaging in frequent physical activity (Palmeira et al., 2007). Previous studies have provided evidence in support of using the TBP model to explain weight control decisions. For example, in a literature review examining the use of attitudinal and personality variables as predictors of weight reduction, De

Bruijn et al. (2008) discovered that intentions to lose weight were accurately predicted on the basis of attitudes, subjective norms and perceived control.

Moreover, in a review of 23 studies examining the ability of behavioural intention to predict the engagement in exercise, the TPB was found to be more useful when compared to the TRA mainly due to the inclusion of the perceived behavioural control construct which significantly added to the variance explained by intention (Blue, 1995). Mummery et al. (2000) also investigated the efficacy of TPB in explaining the physical activity intention of Canadian children and adolescents. Their results showed that all the three constructs of TPB explained 47% of the variability in measuring physical activity intention (Mummery et al., 2000).

By examining the efficacy of TPB to predict different types of physical activity among 233 participants, Eves et al. (2003) found that intention was determined by attitudes and perceived behavioural control, with perceived behavioural control having a unique contribution to all types of physical activity behaviours. Similar to these findings, Martin et al. (2007) found attitudes, subjective norms and perceived behavioural control to contribute 45% to the variance in intentions in a study of physical activity behaviour of 475 Mexican American children. TPB as a whole added 8-9% of the variance in the behaviour, which is consistent with what is typically seen in TPB studies of physical activity (Martin et al., 2007).

3.5.2 Review of studies applying the theory of planned behaviour to examine physical activity behaviour among obese adults

The Theory of Planned Behaviour has been applied in a number of studies examining physical activity behaviour among obese adults. For instance McConnon et al. (2012) built on Ajzen's theory to investigate weight control behaviours among overweight and obese participants taking part in dietary interventions. In line with the conceptual framework of the TPB model, perceived needs and subjective norms were found to be significantly related to weight reduction. Ahmad et al. (2014) divided 65 elderly adults into exercise and control groups and found the TPB variables to explain 63% of the variance in intention at baseline and 47% at 12 weeks among the exercise group. Prediction of exercise behaviour from intentions and perceived behavioural

control in experimental group, however, was comparable at baseline and follow-up levels explaining 44% and 43% of the variance respectively (Ahmad et al., 2014). Furthermore, in a systematic review examining the link between TPB constructs and weight management, McConnon et al. (2012) concluded that the theory of planned behaviour effectively explained the intentions of obese persons to achieve superior weight-loss. Other studies have also confirmed the association between TPB variables and the practice of physical activities (Han & Powell, 2013; Lijuan, 2015).

Armitage (2005) also investigated the ability of the TPB to predict maintenance of physical activity among overweight people and his findings were very comparable to Martin et al.'s (2007) findings. For instance, among the 94 participants enrolled in the physical activity program (i.e., gymnasium), Armitage (2005) discovered that the TPB explained 49% of the variance in intention, with perceived behavioural control and intention combined explaining 22% of the variance in behaviour. Perceived behavioural control was again the only significant independent predictor of the behaviour (Armitage, 2005). Likewise, in an intervention study among 130 adults in UK, Darker et al. (2010) discovered that perceived behavioural control and attitudes explained the motivation of the participants to engage in a 12 minute walking session per day to reduce their weight.

These evidences notwithstanding, the Theory of Planned Behaviour has been unsuccessful in explaining physical activity behaviour in other weight management studies. For example, in a study of physical exercise behaviour among 105 older adults in the US, Brenes et al. (1998) discovered that attitudes, subjective norms and intentions did not significantly predict behaviour. Perceived behavioural control explained only 27% of the variance in behaviour at a one month follow-up, but decreased to 10% at 3 months follow-up, which is consistent with previous findings related to the impact of the follow-up length (Brenes et al., 1998). Interestingly, by comparing the motivation to exercise and healthy eating among 147 women enrolled in a weight loss program, Gardner and Hausenbas (2005) found that the intention to lose weight predicted

dietary behaviour but not exercise adherence. Neither diet nor exercise intentions were predicted by the TPB variables in this study (Gardner & Hausenblas, 2005).

Despite the above findings the existing evidence concerning the relationship between Ajzen's theory and weight management is relatively limited. Moreover, many scholars have referred to Ajzen's Theory of Planned Behaviour as a theory of illusion. The next section highlights some of the criticisms leveled against the TPB model.

3.6 Limitations of the Theory of Planned Behaviour

There has been no shortage of criticisms of the TPB. For instance, the theory has been criticized for its exclusive focus on rational reasoning without considering unconscious influences on behaviour and the role of emotions to influence eating habits (Sheeran et al., 2013). Some researchers have also argued that the static explanatory nature of the TPB does not help in understanding the impact of perceived behaviour control on cognitions and future behaviour (Paisley & Sparks, 1998; McEachan et al., 2011). Indeed, findings which suggest that individuals are not likely to engage in behaviours that they enjoy less or feel incapable of doing may seem implausible in some situations and cast doubt on the data more than on the underlying theory. This could explain why Paisley and Sparks (1998) suggest the possibility of "need" to be reflected in behaviour, thus emphasizing the importance of perceived need within the TPB model. Paisley and Sparks (1998) propose that although a person may have a negative perception towards a behaviour, this does not mean he/she does not feel the need to carry out such behaviour. Paisley and Sparks (1998) suggest two situations in which there could be conflict between need and behaviour. First, when the benefits of the behaviour outweighs the cost and second, when the outcome of the behaviour is highly valued.

Others scholars have also questioned whether the hypotheses derived from the model are open to empirical justification, or whether they are essentially common-sense statements which cannot be proven (Ogden, 2016; Peyman & Roudi, 2015). Ogden (2016) found that authors of studies with results conflicting with TPB assumptions rarely question the validity of the theory,

but instead consider other explanations such as the operationalization of the theory's constructs. A number of reviews have shown that the majority of variability in observed behaviour is not accounted for by measures of the TPB (Orbell & Sheeran, 1999; Sallis et al., 2015). For example, the problem of individuals who form an intention (such as to lose weight) and subsequently fail to act has been recognized as a limitation of the TPB that remains unaddressed (Orbell & Sheeran, 1999). These criticisms notwithstanding, Sallis et al. (2015) are of the view that the framework of the TPB provides a sound basis for health related research.

3.7 Application of the Theory of Planned Behaviour to this investigation

Given the wide empirical support of the TPB model in obesity studies, this research relied on the theory's framework to examine the relationship between socio-economic status and attitude towards healthy eating and weight management practices among residents in Khayelitsha. The TPB model is therefore used as a theoretical framework for this investigation to explain the link between education and income levels of respondents in the case study area of Khayelitsha and their attitude towards healthy eating. It is hypothesized that the higher the educational and income level of the respondents, the higher the consumption of healthy meals. Individuals who have attained higher education are for instance expected to demonstrate a strong intention to consume healthy food (e.g., fat-free meat) to avoid gaining excess weight. This position aligns with Ajzen's theory that knowledge influences intention to perform an act or behaviour. Furthermore, the TPB model is used in this study to understand how respondents' educational and income status influence their willingness to engage in physical activity. It is expected that respondents who have attained higher education or have higher income will indicate higher intentions to engage in physical activity.

3.8 Justification for the selection of the Theory of Planned Behaviour

There are many theories of behavioural change which are applied in health related behavioural research. Each theory has its own strengths and weaknesses and the application of it is subject to the objectives of the specific investigation. According to Noar (2005), many theories applied to health behaviour studies have grown out of the field of social psychology and as such, they

tend to focus more on attitudes and beliefs as determinants of behaviour as opposed to environmental factors, such as access to health-promotion resources. Although the Social Ecological Model, Social Cognitive Theory and the Health Belief Model are the most common theories used in recent obesity related studies (Painter et al., 2008; Sartorius et al., 2015; Dinbabo et al., 2017), little evidence suggests that one health behaviour theory is universally better than others. Rather, the theories vary in their appropriateness for different behaviours and circumstances (Brewer & Rimer, 2008; Noar & Zimmerman, 2005).

The Theory of Planned Behaviour was chosen for this present study not only because it has been successfully used to explain dietary behaviour in the past (Kassem et al., 2003; Kassem & Lee, 2004), or because the TPB has been suggested to be one of the most promising frameworks for obesity research (Baranowski et al., 2003), but also because it contains components that are relevant to the manner in which people earning low incomes make their food decisions. Apart from helping to explain dietary patterns among low income earners, the conceptual framework of the TPB model also forms a strong basis for understanding the relationship between years of schooling and making healthy food choices (Devaux et al., 2011; Speakman et al., 2005). Given that this present study as part of its objectives purports to examine the relationship between educational level and dietary behaviour, the TPB model was deemed to be most suitable to guide this investigation. It is however important to state that other theories such as the Social Ecological Model and Social Cognitive were considered, but deemed to be less appropriate than the TPB because the constructs they measure are not considered to be as good a fit for the targeted respondents sampled for this study. The next section highlights the hypothesis of this current study in line with the TPB conceptual framework.

3.8.1 Study hypothesis

1. Educational level has a positive significant influence on food choices;
2. Educational level has a positive significant influence on weight control behaviours (engaging in physical activity); and
3. Income level has a positive significant influence on food choices.

3.8.2 Operationalization and measurement of key variables

Mouton (2001) provides that the process of operationalization must seek to give practical meaning to the major theoretical concepts employed in the research questions or hypothesis. In this study, these concepts include the dependent variables (eating habits and weight control) and the independent variable (socioeconomic status). Socioeconomic status is measured through a set of proxy variables (education and income). These variables are in turn measured by a corresponding set of defined clearly indicators stated as:

Education: measured by highest educational level attained;

Income: measured by how income earned on monthly basis;

Eating habits: measured by frequency of eating as well as types of foods consumed; and

Weight management practice: measured by activities (physical exercise and dietary practices) geared towards weight control.

3.9 Chapter summary

The chapter has reviewed the theoretical underpinning of the study and demonstrated the justification for using Ajzen's Theory of Planned Behaviour as a conceptual framework for guiding this investigation of food choice in a case study area of Khayelitsha. Beginning with an exposition of the Theory of Reasoned Action before explaining the Theory of Planned Behaviour, the chapter provided different perspectives supporting the usefulness of the TPB model to explain individuals' food choices and weight management behaviour. Thereafter, attention was drawn to certain limitations and critiques of the theory. The chapter ended with an explanation of the operationalized and measurement of key variables and presented the study's hypothesis. The next chapter presents an overview of the case study area and a detailed discussion of the research design and methodology employed in the current study.

CHAPTER FOUR

OVERVIEW OF CASE STUDY AREA, RESEARCH DESIGN AND METHODOLOGY

4.0 Introduction

This chapter presents information about the selected case study area for this research and the research methodology employed in the study. The chapter commences with a broad overview of Khayelitsha with regards to its settlement history and location, demographic profile and socio-economic characteristics. Attention then turns to the research design and methods applied in this study which include both quantitative and qualitative data collection and analysis.

4.1 Overview of the study area of Khayelitsha

4.1.1 Location of Khayelitsha

Khayelitsha is situated in the Western Cape region of South Africa, some 36 kilometres from the central business district of Cape Town on the Cape flats. As illustrated in Figure 4.1, Khayelitsha is bordered by the N2 highway to the North and the False Bay Coast to the South with Mitchell's Plain to the West. Figure 4.1 further shows the settlement areas of Khayelitsha (Formal and Informal). The formal settlements are known as Bongweni, Ikwezi Park, Khulani Park, Khanya Park, Tembani, Washington Square and Zolani Park. The informal settlements include places such as Site B, Site C, Green Point, Litha Park, Makaza and Harare. The township covers an area of 38.71 square kilometres (Western Cape Government 2013; City of Cape Town, 2013).

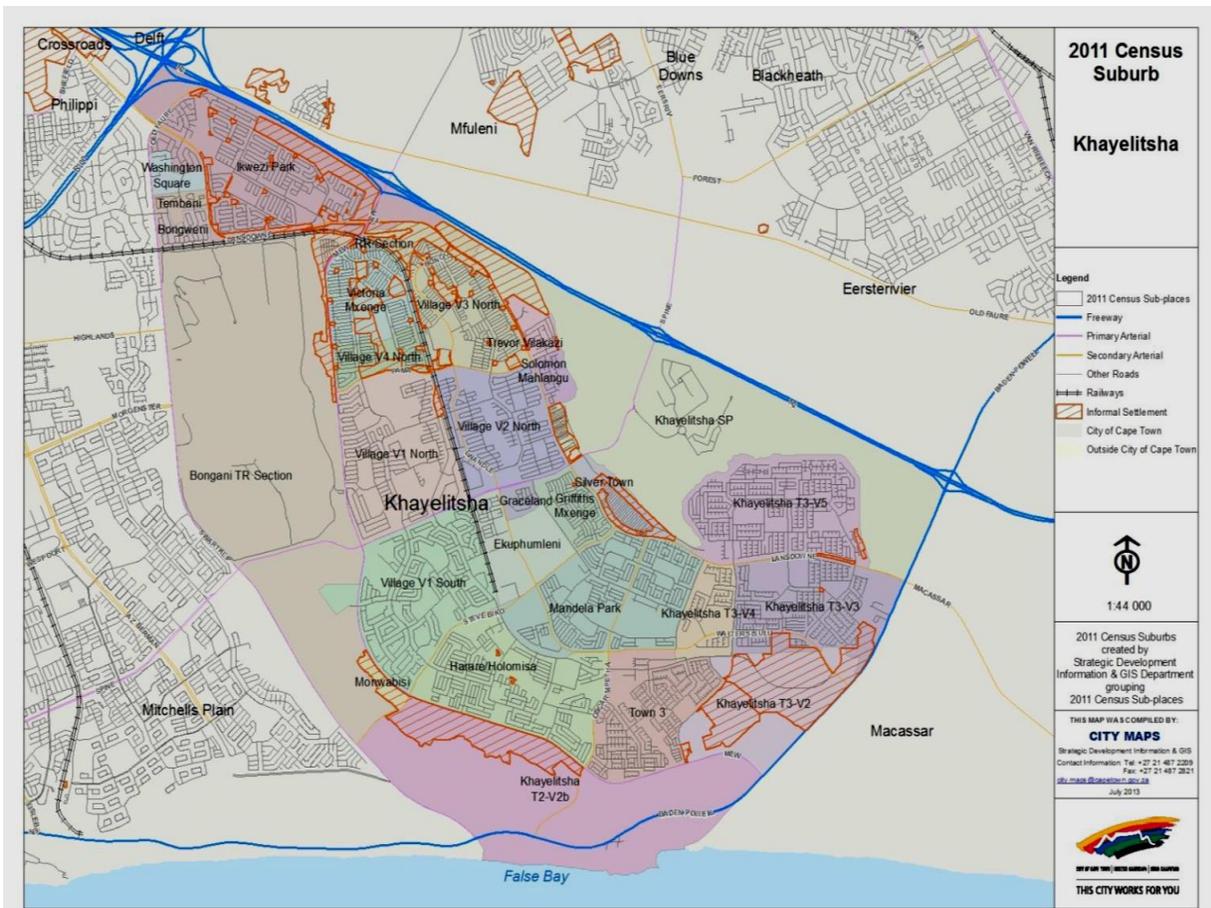


Figure 4. 1 Map of Khayelitsha (Census, 2011)

4.1.2 Brief settlement history

Khayelitsha was conceptualised and established in the early eighties by the then apartheid government in order to accommodate African people who lived in and around the Cape Metropolitan Area after the abolition of the Group Areas Act (Seekings, 2013; Kelly, 2016). Under the Group Areas Act, city planners demarcated specific areas for Black and Coloured occupation and removed these racial groups from residences close to the city centre which were preserved for white settlement only (Seekings, 2013; Kelly, 2016).

Khayelitsha was established in 1985 after the demise of the Pass Laws in 1987 and the Group Areas Act in mid-1991. Since its establishment, Khayelitsha's population rose at a phenomenal rate to accommodate an influx of people from the Eastern Cape who moved to the Western Cape in search of employment and better services and facilities (Seekings, 2013). Khayelitsha is today

the fastest growing township in South Africa and has an estimated population of 391,749 residents, comprising both established and new residents, both young and old and both affluent and poor (Census, 2011, Kelly, 2016; City of Cape Town, 2013).

4.1.3 Governance and participation in Khayelitsha

Khayelitsha forms part of the Cape Town Metropolitan area. The political and governance structure of the metropolitan is comprised of the City council, Sub councils, Ward councils and Ward committees (City of Cape Town, 2013). The City council is the highest structure of local government in Cape Town. The council makes and implements by-laws, sets tariffs for rates and services, decides the metropolitan's budget and enters into service level agreements with private agencies that do business with the City (City of Cape Town, 2013). The City council governs through the sub councils. A sub council is a geographically defined area within the city which is made up of between three and six neighbouring wards (City of Cape Town, 2013). The sub councils serve as the link between local communities in Cape Town and the City Council. Headed by a manager, who is appointed by the executive mayor of the metropolitan, he/she runs the administrative affairs of the sub council. The sub councils serve the residents by engaging with them on metropolitan issues. These issues may include service delivery requests, building and planning applications, fault reporting and other matters. There are a total of 24 sub councils which make up the City of Cape Town's metropolitan structure.

Khayelitsha falls under the jurisdiction of sub council 9 and 10. Sub council 9 consists of six wards located in the north-western section of Khayelitsha along the N2 highway. It is bordered by Mitchells Plain and Philippi in the west and the N2 in the north and east. The southern boundary joins with the greater Khayelitsha area to the south. Sub council 10 consists of six wards spanning the central part of Khayelitsha. It is bounded by Mitchells Plain in the west and the N2 highway in the north-east. Its northern, eastern and southern boundaries connect with other sections of Khayelitsha and the False Bay coastline. These wards are groups of neighbouring suburbs or areas that are managed together. They act as a link between communities and the City. Each ward is headed by a ward councillor, who is voted into office by registered voters within the communities he/she represents. Ward councillors are therefore political leaders and serve as chairpersons of

their ward committees.

The ward committees communicate regularly with people in their wards to determine their needs and priorities. This local knowledge is then used to make recommendations to the sub council on issues affecting the ward. Up to 10 people serve on each ward committee. Members of the ward committees are representatives of registered community-based organisations in the ward. The Community-Based Organisations (CBOs) are voluntary organisations that represent groups with common interests or goals. They are made up of ordinary citizens who participate in daily discussions of issues affecting the community.

4.1.4 Demographic and socioeconomic profile

Population: Khayelitsha today, is home to about 391,749 people from different background (Census, 2011, Seekings 2013; Kelly, 2016). The ethnic makeup of Khayelitsha is approximately 90.5% Black African, 8.5% Coloured and 0.5% White. The female to male ratio is skewed towards females with women forming 52% of the population in Khayelitsha (City of Cape Town, 2013; Kelly, 2016). The township is also predominated by female-headed households and a very young population (City of Cape Town, 2013). As shown in Table 4.1, 48, 8% of the population are aged 25-64 years. Less than 2% are 65 years and older and 28.1% are under 15 years of age. Xhosa is the most spoken language in Khayelitsha (Ibid, 2016).

Table 4. 1 Population by race and age

Age	Black African	Coloured	Total
	%	%	%
0 to 4 years	12.0%	12.0%	11.9%
5 to 14 years	16.3%	16.6%	16.2%
15 to 24 years	21.4%	18.1%	21.4%
25 to 64 years	48.7%	50.7%	48.8%
65 years and older	1.6%	2.7%	1.6%
Total	100.0%	100.0%	100.0%

Source: Census, 2011

Religion: In terms of religion, Khayelitsha is a predominantly Christian community, although a small percentage belong to the Islam religion (Khayelitsha Community Trust Annual Report, 2011). There is an estimated 100 churches and 20 mosques within the community (StatSA, 2016; Khayelitsha Community Trust annual report, 2011). Some congregations have formal church buildings, whilst others use any available space for worshipping. Many churches concentrates specifically on human development programmes which are viewed by most residents as a means of building spiritual and physical well-being.

Education and literacy: As indicated in Table 4.2, educational levels tend to be low among residents in Khayelitsha. Secondary education is the highest level of education completed by most residents (47.3%). Only a small proportion (4.9%) has a tertiary or higher qualification. There are approximately 33 public primary schools, 19 public secondary schools and a handful of private schools in Khayelitsha (City of Cape Town, 2013; Khayelitsha Community Trust annual report, 2011). Despite the number of schools in Khayelitsha, the quality of teaching is low. Most teachers in Khayelitsha have low levels of qualification (Khayelitsha Community Trust Report, 2016; Kelly, 2016). Moreover, classrooms generally lack adequate facilities required to enhance quality learning. For instance, most classrooms in Site C, B and D have single desks shared by three to four pupils. The congestion in these classrooms coupled with the low quality of teaching results in high school dropouts (Ibid, 2011). As an alternative measure, most parents send their children to informal vocational training centres to acquire practical skills. This educational training includes programmes such as plumbing, dressmaking, technology, agriculture, administration, building and knitting (Ndingaye, 2005; City of Cape Town, 2013). Training programs enable children to acquire relevant skills needed for employment.

Table 4. 2 Level of Education

Khayelitsha Adult Education	Black African	Coloured	Total
	%	%	%
No schooling	2.5%	3.2%	2.6%
Some primary	9.8%	15.4%	9.8%
Completed primary	4.4%	8.8%	4.4%
Secondary	47.4%	45.7%	47.3%
Grade 12	30.8%	22.9%	30.7%
Higher	4.9%	3.6%	4.9%
Other	0.2%	0.4%	0.2%
Total	100.0%	100.0%	100.0%

Source: Census, 2011

Socioeconomic characteristics: Despite Khayelitsha being a vibrant township known for its entrepreneurial spirit, rich culture and diversity, the community is regarded as one of the most disadvantaged townships in Cape Town. The township is dislocated from the city's business centre where major works are concentrated (Hall, 2013; Khayelitsha Community Trust Report, 2011). According to the Khayelitsha Community Trust Report (2011), there are relatively few formal businesses in the area and most economic activities comprise informal trading based on narrow retail functions (Ibid, 2016). The most popular informal retail businesses include the sale of meat, chicken, braai sausages, red meat, vegetables and fruits on the streets. Nonetheless, other services such as repair works, hairdressing and vehicle cleaning are also common. The typical nature of formal work found in Khayelitsha include security services (10.4%), skilled manual labour (15.2%), unskilled manual labour (11%), domestic work (19.4%) and service work (15.2%) (City of Cape Town, 2013; Western Cape Government, 2013). This sector is very small and as such does not provide enough job opportunities for residents. Consequently, the majority of residents rely on the informal sector for employment. The unemployment rate amongst the 15-64 years hence stands at 38%. Moreover, more than 50% of young men up to the age of 23

are said to be unemployed (Khayelitsha Community Trust annual report, 2011; Kelly, 2016).

Given the unemployment situation in Khayelitsha, the average income earned by households are reportedly low compared to other communities in Cape Town. For instance, the average annual income per family is R20,000 compared to the overall city's average of R40,000 (Kelly, 2016; Economic District Fact Sheet, 2016). Moreover, a large number of households (73.7%) are reported to earn between R1 and R3 200 per month, while 18.8% of the population have no source of income (Census, 2011; City of Cape Town, 2015). As such, the majority of the population depend on government support in the form of social grants (Kelly, 2016; Seekings, 2013; Dinbabo et al., 2017). According to the South African Social Security Agency (2016), an average of 11 000 old age pensions, 87 000 child grants and 10 000 disability grants are paid to residents every month.

Housing: In terms of housing characteristics, only 44.6% of residents live in formal dwelling structures (City of Cape Town, 2013). The majority of households (57.4%) live in informal settlements characterized by poor infrastructure, overcrowding and absence of basic social amenities. Housing and security are therefore priority issues for Khayelitsha. Concerning water provision, although 61% of the residents have direct access to piped water in their houses or yards, it is reported that one in three people has to walk 200 meters or further to access water (Nattrass & Walker, 2005; Seekings, 2013; Kelly, 2016; Dinbabo et al., 2017). Furthermore, 10% of the population have no access to toilets, 4.1% of the population uses septic toilets, 3.4% use chemical toilets, while 6.6% use bucket toilets (Dinbabo et al., 2017). However, as far as waste removal is concerned, over 80% of the population have access to waste removal services at least once a week (Hall, 2013; Kelly, 2016; Dinbabo et al., 2017).

Health: Khayelitsha has one of the highest burdens of both communicable and non-communicable diseases. For instance, in 2016, antenatal HIV prevalence was measured at 31.1%, the TB case-notification rate reached nearly 1 600 per 100 000 and the TB/HIV co-infection, close to 70% (Khayelitsha Community Trust annual report, 2011). The infant mortality rate (IMR) declined from 42 per 1 000 in 2003, to 32 per 1 000 births in 2015 (Ibid, 2011). This is mainly

attributed to the successful implementation of the Prevention of Mother to Child Transmission (PMTCT) and Antiretroviral (ART) programmes rolled out in the township. Even so, HIV/AIDS has remained the leading cause of death among children 1-4 years of age. On the other hand, the prevalence of obesity and overweight stands at 56% (Dinbabo et al., 2017).

Criminality and violence: As noted by Seekings (2013), crime is a constant consideration in the lives of people living in Khayelitsha; it is a major constraint when moving around after dark and is a source of anxiety in many neighborhoods even during daytime. Indeed the township has one of the highest reported number of murders in the country. According to official police statistics, about 354 murders were committed in year 2012/2013. According to a survey undertaken by the Khayelitsha Commission of Inquiry (2014), 41.3% of all respondents had personally been a victim of crime. These included, armed robbery, common robbery and what was loosely referred to as gangsterism. The survey further suggested that only six out of every 10 crimes are reported to the police. There is increasing evidence that many youth are exposed to co-occurring forms of violence across multiple life domains, including school and community (Smith et al., 2016; Khayelitsha Commission of Inquiry, 2014:134).

Despite its socio-economic and demographic description, Khayelitsha, is now undergoing significant transformation. Khayelitsha is one of the province's national Urban Renewal Nodes, earmarked to be transformed from a township into a fully functional suburb by the year 2020 (Smith et al., 2016). It is transforming into a township where communities work with both the government and private investors to make it a better place to live. Khayelitsha is now home to numerous shopping centres, a race course, a public swimming pool, a multi-purpose centre, a magistrate's office and a licensing centre, amongst other facilities. Tourism too is on the increase: Lookout Hill for instance has been earmarked as a hub venue for township tours. There is an increase in traditional craftworks and from time to time Hollywood celebrities visit and create exposure for the township (Smith et al., 2016, Kelly, 2016). Khayelitsha is undoubtedly destined for bigger and better things and while many improvements are still needed, Khayelitsha is starting to show growth in the direction of its true potential.

4.2 Research design

A research design is a plan, structure and strategy of investigation in order to obtain answers to research questions (Babbie & Mouton, 2001; Craig, 2009). According to Kumar (2011:97), a research design must ensure that the procedures undertaken obtain valid, objective and accurate information about the research topic. Although there are several ways of classifying research designs, Kumar (2011:138) notes that they fall into three general categories, namely experimental, quasi-experimental and nonexperimental. In this study, a nonexperimental research design which involved the use of secondary data is adopted. There are essentially three reasons why this approach was chosen. The first reason is for the purpose of cost and time efficiency. Second, for feasibility, as it was not possible to either randomly select respondents or manipulate the variables (dietary behaviour and income/education level) employed in this study. The third reason is to strengthen confidence in findings from the original study.

The original study which was conducted by researchers from the Institute for Social Development (ISD), gathered data on factors that influence food choices of residents in Khayelitsha and Mitchells Plain, two poor urban communities in Cape Town (Dinbabo et al., 2017). The data generated from the original study provided a reliable and useful source relevant for understanding how income and education levels influence food decisions and weight control among people with low socio-economic status. However, for this research attention was focused on analysing responses from Khayelitsha residents in an attempt to explore the relationship between socio-economic status and obesity.

Although it may be inappropriate to assume that dietary behaviour of residents in Khayelitsha generally reflects that of other low income groups in South Africa, evidence from previous studies on this topic reveal that there is little difference with regards to eating habits of residents in other disadvantaged communities (Dinbabo et al., 2017; Sartorius et al., 2015). As such, it is hypothesized that findings from this study are likely to confirm the generality of dietary behaviour characteristics found among people with low socio-economic status in South Africa.

4.3 Research methodology

The epistemological position undergirding this study includes elements of the positivist and interpretivist paradigms as both perspectives were deemed most suitable in answering the research question.

Mouton (2001:35) describes methodology as the means or methods of engaging in research. According to Burns and Grove (2010:488), methodology includes the design, setting, sample and the data collection and analysis techniques applied in a study. Henning (2004:36) describes it as coherent group of methods that complement one another and have the ability to deliver data and findings that will reflect the research question and suit the research purpose. For Holloway (2005:293), methodology means a framework of theories and principles on which methods and procedures are based. Thus, according to the above sources, research methodology helps to highlight systematic ways of providing answers to research questions and solving the research problem.

In this study, a mixed-methods research technique involving both quantitative and qualitative approaches is employed. While the quantitative approach was used to understand the statistical relationship between socio-economic status and dietary behaviour, the qualitative approach was used in order to gain deeper understanding of the experiences and attitudes of respondents with regard to making food decisions and controlling weight. The rationale for choosing a mixed-methods strategy over an 'all quantitative or all-qualitative' research approach was to allow for triangulation of results from multiple data collection sources and analytical techniques (Petty et al., 2012). Moreover, both approaches have their relative strengths and weaknesses and thus in examining the association between socio-economic status and dietary behaviour, the weaknesses of one will be complemented by the relative strengths of the other (Babbie, 2008). The next section presents the procedures adopted in gathering and analyzing the quantitative data.

4.4 Quantitative data

4.4.1 Quantitative data collection

The data used in this study as indicated earlier was extracted from a larger study conducted by the Institute for Social Development (ISD), University of the Western Cape in two localities on the Cape Flats namely Khayelitsha and Mitchells Plain. Quantitative data collection was based on the use of a structured questionnaire. A team of scholars from different professional and academic backgrounds provided input into the design of the questionnaire. The design of the questionnaire took place during training sessions attended by all the researchers. Following the finalisation of the questionnaire, enumerators were recruited and trained at the University of the Western Cape's School of Government. The training workshops centred on the sampling approach, data collection procedures and the protocols when conducting the interviews.

With regard to the sampling procedure, the researchers applied a two-stage cluster sampling technique which involved selecting clusters of households using probability proportion to size (PPS) during stage 1 and the actual selection of households in the second stage. In all, a total of 532 households translating into 2120 respondents (1410 adults of 18+ years and 710 children) were sampled in Khayelitsha. Data gathering commenced from 19th May to 29th June, 2016. Individual interviews were completed within a time span of two hours. Data captured included information relating to household profiles, household characteristics, employment, income sources and food consumption patterns using a 24-hour dietary recall. Moreover, data on respondents' eating habits, weight management practices, perception of health status, perceptions of obesity as well as BMI of respondents were captured.

Given the purpose of this study, which was to investigate the influence of socio-economic status on dietary behaviour and weight management practices, attention focused only on adult responses. As such a total of 1410 responses from adults were sampled for analysis. The data elicited therefore centred on socio-economic and demographic characteristics, income levels, eating patterns and perceived health status and weight management practices of respondents.

Socio-economic and demographic information: The structured questionnaire measured demographic and socio-economic characteristics of the respondents. Demographic characteristics included age, gender, race, marital status, educational level and religious affiliation of the population group. Socio-economic status was measured on the basis of employment and household income. Whilst the employment status measurement focused on the nature and type of paid work engaged by the respondents, the income status measurement focused on monthly income earned and sources of income.

Dietary patterns: The survey also sought to obtain data on the respondent's eating behaviour. The variables measured included the types and sources of meals eaten, the frequency of eating, the proportion of fruits and vegetables intake and the amount of water consumed a day. In addition, the questionnaire sought to measure the level of fat consumed by respondents. Examples of questions in this regard included the following: "how much of the visible fat on beef, pork or lamb do you remove before eating? How often do you remove the skin from cooked chicken before eating?"

Perceived health status: Participants responded to a series of questions assessing their perception of health status. Examples of questions included the following: "In general, how do you perceive your health? In comparison to other individuals of your age and gender would you say you are physically healthy? During the past 30 days, about how many days did poor physical health keep you from doing your usual activities, such as self-care, work, recreation or school?"

Weight management practices: The questionnaire further captured weight management practices. This part of the survey consisted of 5 items dichotomized into "Yes" and "No" or "don't know". Questions sought to elicit information from respondents about practices employed to lose weight or to keep from gaining weight, types of regular exercise activities, eating foods with lower calories, fasting and so forth. In addition, the survey sought to obtain data on the sedentary behaviour characteristics of respondents using a 5-point Likert scale ranging from "Strongly Disagree" to "Strongly agree" on topics such as use of leisure time.

4.4.2 Quantitative data analysis

Burns and Grove (2010) define quantitative data analysis as a systematic approach to investigations in which information gathered is transformed into numerical data. It gathers and statistically analyzes data from the real-world setting to support or reject hypotheses (Babbie, 2008; Petty et al., 2012).

For this study, data collected from the questionnaire was coded and entered into Windows SPSS 17.0. Both descriptive and inferential analysis was conducted. While the descriptive statistics focused on describing and explaining data, the inferential statistics were used to draw an inference about the population from which the sample had been drawn. For the descriptive part, a univariate data analysis of single variables (e.g., gender and age) was conducted. Univariate analysis, according to Mouton (2001), enable researchers to describe trends in data and also to determine whether any relationship exists between the variables. The descriptive statistics were presented in the form of graphical representations, charts, tables and frequency distributions. Additionally, mean values and standard deviations of the frequencies were presented to determine its central tendencies and data dispersions respectively.

With regards to the inferential analysis, Pearson's correlation analysis was used to examine the associations between income/education and eating habits. Pearson's correlation analysis was further applied to assess the relationship between perceived health status and weight management practices. The relationship between income and eating habits was assumed to depict either of the following: *directly associated* (thus, low income earners will show lower interest in consuming food from outside), *inversely associated* (low income earners will show higher interest in consuming food from outside) and *null* (no statistically significant relationship observed between income and eating food from outside). Similarly, the relationship between education and eating habits was assumed as *directly associated* (thus respondents with high education level will show higher interest to consume healthy foods), *inversely associated* (thus respondents with high education level will show less interest to consume healthy foods) and *null*

(no statistically significant relationship observed between education and consumption of healthy foods).

On the other hand, the relationship between perceived health status and weight management practice was assumed to depict either of the following: *directly associated* (thus respondents who perceived themselves as unhealthy will demonstrate low interest in engaging in physical activity), *inversely associated* (thus respondents who perceived themselves as unhealthy will demonstrate high interest in engaging in physical activity) and *null* (no statistically significant difference observed between perception of health and engaging in physical activity). Pearson's correlation analysis test was deemed the most appropriate statistical tool for testing the present study's hypotheses, because both the dependent and independent variables are ranked and scaled measured.

4.5 Qualitative data

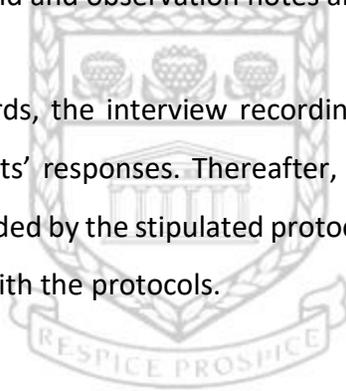
4.5.1 Qualitative data collection

The use of qualitative research methods was particularly pertinent to a study of this nature as it reveals the original intention of the respondents, which could not be expressed in numerical terms (Creswell & Clark 2017). In essence, qualitative methodologies reveal significant information pertaining to perceptions and more sensitive viewpoints of respondents. Qualitative information was gathered using semi-structured interviews, focus group discussions (FDG) and observation methods. Semi-structured interviews and FDG's were conducted to gather information on people's perceptions about causes of obesity, factors that influence people's food choices and what respondents perceive as government's role in tackling obesity in their communities. On the other hand, observational data was gathered through transect walks, visiting individual households and observing participants throughout the research process. In all, a total of 50 purposively identified households were interviewed in Khayelitsha. Furthermore 3 FDGs were conducted comprising 7 to 12 participants from different sub-regions in Khayelitsha, each lasting about two and a half hours. All qualitative information relevant to the research

questions of this investigation was extracted from the semi-structured interviews and focus group discussions.

Similar to the quantitative information, the qualitative data used in this study was drawn from responses on factors that influence respondents' foods choices and weight management practices. The process of data extraction began by examining the relevance of the gathered data in answering the research questions presented in this study. To do so, access to all the necessary background information regarding qualitative data collection was granted by the principal researcher of the larger study. Detailed documentation was kept on qualitative data collection methodologies, fieldwork experiences and the recruitment process of fieldworkers, which provided evidence of careful and consistent data collection. The records included semi-structured interview protocols, field and observation notes and interview recordings.

Having had access to these records, the interview recordings were checked for transcription accuracy and clarity of participants' responses. Thereafter, the interviewing procedures were examined to ensure they were guided by the stipulated protocols. The interview transcripts were found to be accurate and in line with the protocols.



4.5.2 Qualitative data analysis

Qualitative data analysis is defined and interpreted in different ways by many scholars, yet they all point to a common objective. For instance, Shaw (1999) defines qualitative data analysis as a search for general statements about relationships among categories of data. Dörnyei (2007) describes qualitative analysis as the process of making sense from interviewees' views and opinions of situations, corresponding patterns, themes, categories and similarities within the data. For Blanche and Durrheim (1999), qualitative data analysis tends to be primarily an inductive process of organizing data into categories and identifying patterns. All these definitions point to the direction that qualitative methods reveal the original intention of respondents which could not be expressed in numerical terms.

For this study, qualitative analysis was based on transcripts of interviews relating to the factors that influence food choices of residents in Khayelitsha. The process of analysis began by working through each transcript to remove texts which did not relate directly to the topic in hand. Once the transcripts had been refined, text was divided into 'meaning units'. According to Mostyn (1985), a meaning unit is a discrete phrase, sentence or series of sentences which conveys one idea or one related set of perceptions. Having divided the text into "meaning units", each text was coded.

The text coding procedure was guided by the thematic and structural approaches used in Atlas Ti's software. With regards to the thematic approach, codes were developed and entered into Atlas Ti's software allowing for data organization based on emerging thematic patterns and categories. The units of analysis or codes were guided by the study's research questions and as the analysis process evolved, they were merged into categories. Individual quotes from interview transcripts, documents and observational notes were developed into descriptive statements. Once preliminary codes have been assigned, data was grouped into themes. By using Atlas Ti software, where coded phrases and paragraphs are automatically connected to themes, it became possible to efficiently compare and contrast coded narratives until each category was viewed as an independent identifiable structure.

This procedure according to Bowen (2009) not only helps refine evolving thematic patterns, but also assists in creating a narrative structure with logical, valid and reliable relationships between the research questions and findings. After preliminary analysis, a more detailed inductive, conventional content analysis was performed. Specifically, more detailed coding and category formations were guided by the data to explore and describe, rather than prove or confirm, an examined phenomenon. Specifically, narratives were actively reread and separate text fragments were assigned thematic codes to answer the research questions using participants' words.

4.6 Chapter summary

This chapter has contextualized the study by presenting a broad overview of the case study area as well as the research approaches adopted in the collection and analysis of data. The epistemological position forming the basis for this research was guided by the concepts of positivist and interpretivist paradigms, as both perspectives were deemed relevant for answering the research questions. Additionally, a mixed methods approach using a combination of quantitative and qualitative methodologies was adopted in order to broaden the data base and enhance the depth of this study. Moreover, a blend of descriptive and inferential statistics was utilised in analysing the quantitative data while the qualitative analysis was conducted using thematic content analysis. The next chapter presents the empirical data and findings of this investigation.



CHAPTER FIVE

DATA ANALYSIS AND RESEARCH FINDINGS

5.0 Introduction

This chapter presents the empirical results of the study and a discussion of findings emanating from the analysis of data drawn to examine the relationship between socioeconomic status and obesity in Khayelitsha. It responds to the research questions as posed in the first chapter of this study. The chapter commences with an overview of the quantitative results on household characteristics, eating habits, perception of health and weight management practices of respondents. Attention then turns to a discussion on the determinants of food choices relating to results from hypothesis testing where the emphasis was on determining whether education/income level has a significant effect on dietary behaviour/weight control practices. The chapter concludes with a presentation of qualitative findings on respondents' dietary behaviour and weight management practices.

5.1 Household characteristics

5.1.1 Gender and age distribution

This study analysed data on 1410 adult respondents from Khayelitsha who participated in the primary study conducted by the Institute for Social Development. As represented in Figure 5.1, 37% of the sample was male and 63% female. This gender difference, although noted as a default finding from the statistical analysis, confirms the gender statistics from the 2011 census which provides that there are more females than males in Khayelitsha (City of Cape Town, 2013). The ages of the respondents ranged from 18 to 88 years with a mean age of 36 years.



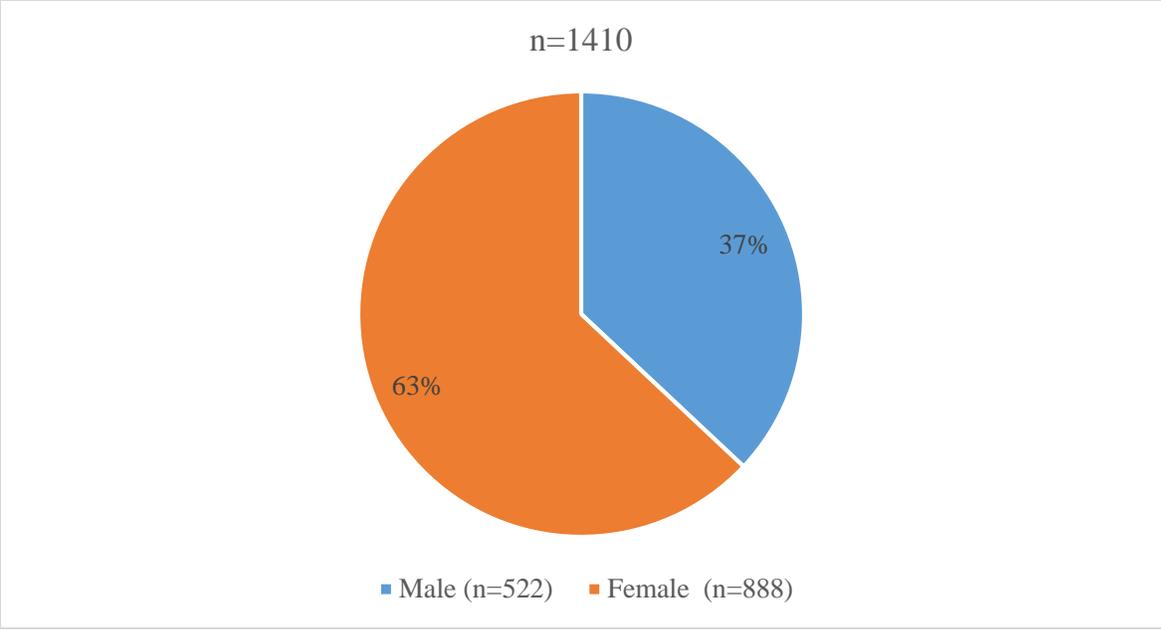


Figure 5. 1 Gender distribution of respondents (Survey data, 2017)

5.1.2 Race

Racial segregation has been a distinctive feature of South Africa’s political, social and economic life in the past and still has implications on the distribution of resources, opportunities and development programmes across the country. Hence, it is crucial to consider racial dynamics when examining the socioeconomic status of townships in South Africa. This study therefore explored the racial distribution of the respondents. As represented in Table 5.1, 99% of the respondents were Black Africans, 0.3% were Coloured and 0.2% were Asian.

Table 5. 1 Racial distribution

Race	Male	Female	Total
Black	99.6%	99.4%	99.5%
Coloured	0%	0.5%	0.3%
Indian	0.4%	0.1 %	0.2%
Total	100%	100%	100%

Survey data, 2017

5.1.3 Marital status

With regard to the marital status of respondents, Table 5.2 shows that 28.8% are married, 63.7% had never been married, 2.8% are cohabitating, 2% had divorced and 2.6% are widowed. Among those who are married, about 33.5% are men and 25.9% are women. In the case of those who have never been married, 60.7% are men and 65.4% are women. These figures are consistent with the findings of Posel and Casale (2009) who observed that marriage rates in South Africa are significantly lower among African women. On the other hand, 3.6% of women compared to 1.2% of men are widowed whilst 2.6% and 0.8% respectively are divorced.

Table 5. 2 Marital status

Marital status	Male (n=516)	Female (n=869)	Total (n=1384)
Never married	60.70%	65.40%	63.70%
married	33.50%	25.90%	28.80%
Cohabitation	3.90%	2.20%	2.80%
Divorce or Separated	0.80%	2.60%	2.00%
Widowed	1.20%	3.60%	2.60%

Survey data, 2017

5.1.4 Religious affiliation

Religion plays an important role in the lives of many South Africans and thus contributes to shaping their dietary habits and physical activity (Schoeman, 2017; Cabrita & Erlank, 2018). Given the institutional primacy of the church and mosque in South African's lives, the relationship between religion and dietary behaviour is particularly salient for this population. As shown in Table 5.3, an overwhelming majority of 85.2% reported being Christians indicating that the study took place in a predominantly Christian community. Only 13.5% reported being Traditionalist. Within this faith, 17.9% were males and 10.9% females.

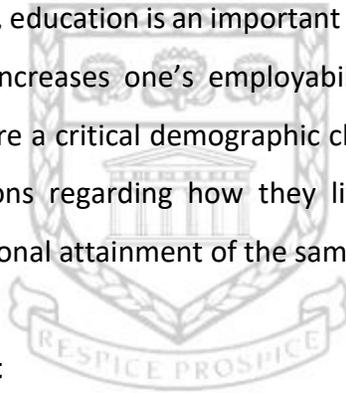
Table 5. 3 Religious affiliation

Religion	Male(n=526)	Female (n=877)	Total(n=1403)
Christian	81.4%	87.6%	85.3%
Islam	0.0%	0.0%	0.0%
Traditionalist	17.9%	10.9%	13.5%
Total	99.3%	98.5%	96.3%

Survey data, 2017

5.1.5 Educational attainment

According to Dinbabo et al. (2017), education is an important mechanism for enhancing the well-being of individuals because it increases one's employability and sustains positive choices. Educational attainment is therefore a critical demographic characteristic to consider because it helps to explain peoples' decisions regarding how they live their lives. Table 5.4 provides information regarding the educational attainment of the sampled respondents.

**Table 5. 4 Educational attainment**

Education	Male(n=526)	Female (n=877)	Total(n=1403)
Primary	12.00%	10.00%	10.80%
Secondary	70.70%	70.20%	70.40%
Technical college	4.00%	7.80%	6.30%
Tertiary (University)	7.40%	7.80%	7.60%

Survey data, 2017

From Table 5.4, it can be observed that 10.8% of the respondents have completed primary education, 70.4% have completed secondary education, 6.3% technical college and 7.6% tertiary education. However, overall, more females had attained higher education compared to their male counterparts.

5.1.6 Employment status

The nature of work in Khayelitsha is largely informal commercial trading with few government paid jobs (Seekings, 2013). According to the City of Cape Town (2013), a significant proportion of workers in the township fall within the low skilled and informal category. What this implies is that a sizeable proportion earn low incomes. To ascertain the economic position of the respondents, responses regarding employment status were analysed. The results are illustrated in Table 5.5 below.

Table 5. 5 Employment status

Employment status	Male(n=526)	Female (n=877)	Total(n=1403)
Employed for wages/salary	38.6%	32.4%	34.8%
Self-employed	6.8%	1.5%	4.2%
Out of work and looking for work	9.1%	7.4%	8%
Retired	18.2%	19.1%	18.8%
Unemployed	27.3%	35.3%	32.1%

Survey data, 2017

As observed from Table 5.5, about 35% of the respondents are employed, 8% are out of work, 18.8% are retired and 32.1% are unemployed. Furthermore, the proportion of males who are employed for wages or salaries was 38.6% as compared to 32.4% for females. In addition, the proportion of persons who are self-employed was 6.8% and 1.5% respectively for men and

women. In the case of those who are out of work and looking for work, 9.1% are males and 7.4% are females. On the other hand, the percentage of individuals who have never been employed was 27.3% for men and 35.3% for women.

5.1.7 Income level

The income status of the study participants was equally important in this study as it represents one of the key measures of socioeconomic status. As shown in Table 5.6, the average income of the respondents was R1201-R3600. About 58% of the respondents earn below R3600 per month. By contrast, only 23% of the respondents were found to earn above R3600 per month. This finding is similar to what is reported by the City of Cape Town that approximately 63% of households in Khayelitsha fall within the lower income bracket, of which 16.5% have no income (City of Cape Town, 2013). However, marked variations were observed by gender distribution. Among those who earn between R2401 and R3600, 23.9% are women and 20.8% are men. Similarly, the proportion of respondents who earn between R1201 and R2400 was 28.3% for females and 18.1% for males. On the other hand, a relatively higher proportion of men at 7.6% compared to women earn between R3601 and R4800.

Table 5. 6 Monthly income of respondents

Monthly income	Male (n=72)	Female (n=92)	Total (n=164)
No income	0.0%	1.1%	1.1%
R1-1200	16.7%	6.5%	11.0%
R1201 – 2400	18.1%	28.3%	23.8%
R2401-3600	20.8%	23.9%	22.6%
R3601-4800	8.3%	7.6%	7.9%
More than R 4800	16.7%	14.1%	15.2%
Total	100.0%	100.0%	100.0%

Survey data, 2017

By focusing on their alternative sources of income, analysis of the data as indicated in Table 5.7, shows that 40.4% are recipients of child support grants (CSG), 34.8% benefit from old-aged grants, 7.9% receive disability grants and 3.2% are beneficiaries of foster care grants. Of the 40.4% recipients of the CSG, 36.1% men and 43.6% are women. Similarly, more women at 40% compared to 29% men benefits from the old age grant. These results indicate that there is a high dependence on government grants in Khayelitsha.

Table 5. 7 Income from social grants

Government grants	Male (n=72)	Female (n=92)	Total (n=479)
Child support grants	36.1%	43.6%	40.4%
Old-aged grants	28.6%	39.6%	34.8%
Disability grants	8.8%	7.1%	7.9%
Foster care grants	2.4%	4.3%	3.2%
Total	75.9%	94.6%	86.3%

Survey data, 2017

5.2 Eating habits

This section focuses on results of the participants' eating habits. First, the results on the meal patterns of the respondents are presented. Attention then turns to findings on the choices of foods consumed by the participants. The concluding part of this section focuses on results pertaining to how TV advertisement influence respondents' buying decisions.

5.2.1 Meal patterns

The term 'meal patterns' is often used to describe individuals' eating patterns such as breakfast, lunch or dinner (Leech et al., 2015). Literature provides that frequent eating during the day moderates variability in hunger sensations and thereby reduces energy intake (Holmbäck et al., 2010; Mattes, 2014). On the other hand it has been reported that dietary behaviours such as skipping breakfast as well as eating “heavy” food at night are associated with a higher risk of gaining excess weight (Watanabe et al., 2014; Wang et al., 2014; Murakami & Livingstone, 2015). Understanding the ways in which different meal patterns correlate with weight gain is therefore important. Table 5.8 illustrates the meal patterns of the sampled respondents. From Table 5.8, it can be observed that majority of respondents usually eat breakfast, lunch or dinner at least 4 to 5 days a week. However, on regular basis (6-7 days/week), only 22%, 11.4% and 18% of the respondents have breakfast, lunch and dinner respectively. The low percentage of respondents who consume breakfast on regularly basis, as revealed in this study agrees with Patnode et al's. (2007) findings which reported that over 70% of Cape Town-based black South African adolescents do not have breakfast before school.

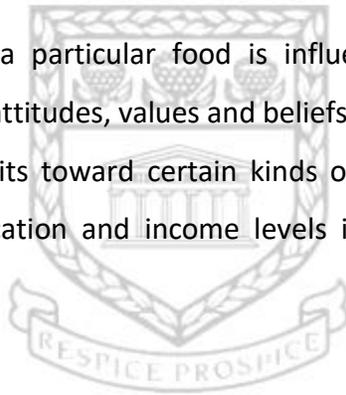
Table 5. 8 Meals per day

Meals per day	Breakfast	Lunch	Supper
	%	%	%
0-1 day/week	9.2%	4.5%	1.3%
2-3 days/week	19.4%	11.1%	2.2%
4-5 days/week	49.1%	28.5%	34.7%
6-7 days/week	22.0%	11.4%	18.0%
Total	100%	56.1%	56.4%

Survey data, 2017

5.2.2 Food choices

Making a decision to consume a particular food is influenced by certain factors such as educational status, income level, attitudes, values and beliefs (Brehm et al., 2013). These factors can orient a person's eating habits toward certain kinds of food. This section explores how respondents' educational qualification and income levels influence the kinds of foods they consume.



5.2.2.1 Association between educational attainment and food choices

The association between educational attainment and individual's dietary behaviour has been examined by many scholars with evidence pointing to a strong positive correlation (Andrews et al., 2017; Nakamura et al., 2015). Yet, it is not clear why education is strongly linked to dietary behaviour. Meanwhile, some scholars suggest that education exposes individuals to a different set of beliefs and values, which affects their food-related behaviour (Andrews et al., 2017; Nakamura et al., 2015; Scaglioni et al., 2018).

To understand how respondents' education level influence their food decisions, responses regarding their 24-hour Dietary Recall was correlated with their educational attainment. From Table 5.9, it can be observed that the percentage of respondents with university education who consume cereal foods such as mealies is slightly higher (29.78%) than those with technical

education (28.71%), secondary education (27.65%) and primary education (22.45%). With regards to vegetable consumption, the proportion is higher among those with primary education (9.28%) than those with technical education (7.13%) and university education (6.93%). However, for fruit consumption, the percentage difference is in favour of those with university education (5.2%) as compared to the other educational groups.

Table 5. 9 Educational attainment and food choices

Food groups	None	Primary	Secondary	Technical	University
Cereals (mealies, maize)	20.54%	22.45%	27.65%	28.71%	29.78%
Vegetables (spinach)	10.70%	9.28%	6.13%	7.13%	6.93%
Fruits (mango, orange)	1.50%	1.07%	2.62%	2.17%	5.2%
Meat (beef, pork, chicken)	2.76%	1.56%	0.84%	0.94%	0.89%

Survey data, 2017

From Table 5.9, it can be clearly seen that while respondents with higher education consumed more cereals and fruits compared to those with lower education, respondents with lower education remarkably consumed more vegetables and meat than those with higher education. However, to be able to determine whether there is any significant difference between educational attainment and food choices, a statistical test was employed. In this case hypothesis testing using Pearson's chi square test was adopted. Pearson's chi square test was the appropriate statistical tool because both the group variable (educational attainment) and the test variable (food choices) are nominally scaled. The hypotheses are stated as follows;

Null hypothesis= Educational attainment has no significant impact on food choices

Main hypothesis= Educational attainment has a significant impact on food choices

The decision rule for this test is that given a range of -1 and +1 a *correlation coefficient value* of >0 suggest that the relationship between the two variables is positive (i.e. educational attainment impacts positively on the kinds of foods consumed). On the other hand where the *coefficient value* is <0 , it suggests that the relationship between the two variables is negative (i.e. educational attainment impact negatively on the kinds of foods consumed). Furthermore, given a standard significance level of 0.05, if the corresponding significance value (labelled “sig. (2-tailed)” in SPSS output table) exceeds the given level of significance, then the null hypothesis has to be accepted, meaning there is no statistical difference between the variables. On the other hand, if the significance value is lower than or equal to the given level of significance (0.05), then the null hypothesis has to be rejected, meaning there is a statistical difference between the group means. From the Chi square test results as displayed in Appendix I, a correlation coefficient value of 0.021 was reported, meaning the relationship between respondent’s educational attainment and their food decisions is positive. However, the difference between the two variables is not statistically significant (sig.0.551). Hence the main hypothesis that “Educational attainment has significant impact on food choices” is rejected.

5.2.2.2 Association between income level and food choices

Besides education, other socioeconomic variables such as income is reported to have great influence on individual’s dietary behaviour (Nakamura et al., 2015). Low income has been identified as a major factor in reducing variety and balance in the diets of poor families (Nakamura et al., 2015). To examine how respondents’ income level influence their food decisions, responses regarding their 24-hour Dietary Recall was correlated with their monthly income. Table 5.10 shows that about 35.51% of respondents who earn between R1-1200 per month (low income earners) consume cereals, 8.18% consume vegetables, 11.27% consume fruits and 15.56% consume meat. By comparison, about 19.59% of respondents who earn more than R4800 per month (high income earners) consume cereals, 17.50% consume vegetables, 31.50% consume fruits and 21.76% consume meat. Evidently, differences were observed between the various income categories and food groups. However, to be able to determine whether the difference is statistically significant, a statistical test was employed. In this case

hypothesis testing using Pearson’s chi square test was adopted. The hypotheses are stated as follows:

Null hypothesis= Income level has no significant impact on food choices

Main hypothesis= Income level has a significant impact on food choices

The rules governing the test are well explained in the section above. From the Chi square test results as displayed in Appendix II, a correlation coefficient value of 0.021 was reported, meaning the relationship between respondent’s income level and their food decisions is positive confirming what Nakamura et al. (2015) have reported. However, the difference between the two variables was not statistically significant (sig.0. 0.208). Hence the main hypothesis that “Income level has significant impact on food choices” is rejected.

Table 5. 10 Income level and food choices

Food Groups	R1-1200	R1201– 2400	R2401-3600	R3601-4800	More than R 4800
Cereals (mealies, maize)	35.51%	29.68%	28.71%	26.65%	19.59%
Vegetables (spinach)	8.18%	10.23%	27.13%	16.83%	17.50%
Fruits (mango, orange)	11.27%	12.64%	22.47%	25.26%	31.50%
Meat (beef, pork, chicken)	15.56%	12.84%	16.94%	23.89%	21.76%

Survey data, 2017

5.2.3 Removal of visible fat from meat before eating

According to McLachlan and Landman (2013), fat enhances the flavour of meat, yet it also decreases the overall nutritional value of meat. Frequent consumption of visible fat on meat is reported to increase the risk of developing heart disease as it elevates cholesterol levels (Asghari et al., 2017). An effective way to reduce excessive fat and calorie consumption is therefore to remove visible fat from meat before eating (Schonfeldt et al., 2013). This habit constitutes part of a healthy eating plan geared towards avoiding excess fat accumulation. Table 5.11 illustrates the proportion of respondents who remove visible fat from meat before eating.

Table 5. 11: Removal of visible fat from meat before eating

	Male (n=289)	Female (n=389)	Total (n=765)
Remove all visible fat	29.4%	33.9%	32.3%
Remove most	21.1%	21.3%	21.3%
Remove small part of fat	8%	7.9%	7.9%
Remove none	34.9%	32.3%	33.3%
Don't eat meat	3.8%	3.3%	3.5%

Survey data, 2017

From Table 5.11, it can be observed that 32.3% of the total sample remove all visible fats from meat before eating. In addition, 21.3% remove most fat and 7.9% remove a small portion of visible fat. Interestingly, about 33.3% of the total respondents do not remove visible fat from meat before eating. There were differences between men and women who remove fat from meat before eating. For example, while 33.9% of the female respondents indicated that they remove all fat from meat before eating, only 29.4% of the male respondents indicated that they remove all fat.

However, to determine whether education has any significantly influence on the removal of visible fat from meat before eating, respondents' educational level was correlated with their tendency to remove visible fat. From Table 5.12, it can be seen that 13.89% of respondents with university education compared with only 9.56% of those with primary education remove all visible fat from meat before eating. Moreover, while 11.23% of respondents with technical education indicated that they remove most fat, only 5.83% of those with primary education said they remove most fat from meat before eating. Despite the percentage difference, the chi square test results (as displayed in Appendix III) showed a significant value of 0.318, meaning the difference is not statistically significant. Hence, it can be concluded that respondent's education status has no significant impact on their tendency to remove visible fat from meat before eating.

Table 5. 12: Educational attainment and removal of visible fat from meat before eating

	None	Primary	Secondary	Technical	University
Remove all visible fat	2.76%	9.56%	13.84%	8.94%	13.89%
Remove most	6.94%	9.83%	5.83%	11.23%	15.78%
Remove small part of fat	1.50%	1.07%	12.22%	12.27%	15.26%
Remove none	38.76%	41.56%	26.84%	41.48%	35.89%
Don't eat meat	1.10%	0.07%	2.62%	2.67%	5.23%

Survey data, 2017

5.2.4 Removal of chicken skin before eating

With regards to the removal of chicken skin before eating, Table 5.13 shows that only 32.1% of the respondents always remove chicken skin before eating. Approximately 45% do not get rid of the skin of chicken before eating. The proportion of respondents who do not remove chicken skin before eating as reported in this study is relatively higher than findings from a study in Spain by Leon-Munoz et al. (2016) who reported that 23.7% of participants never or almost never removed skin from chicken before eating.

Table 5. 13: Removal of chicken skin

	Male (n=288)	Female (n=490)	Total (n=778)
Don't eat chicken	1%	2.9%	2.2%
Removes None	47.6%	42.7%	44.5%
Seldom	6.6%	6.9%	6.8%
Often	14.6%	12.4%	13.2%
Always	29.5%	33.7%	32.1%

Survey data, 2017

Moreover, to explore the nexus between education and the removal of chicken skin before eating, responses regarding participant's educational level was correlated with their likelihood to remove chicken skin before eating. From Table 5.14, it can be seen that the proportion of respondents who always remove chicken skin before eating is slightly higher among those with university education (4.81%) than those with primary education (0.13%). However, despite this percentage difference, the chi square test results (as displayed in Appendix IV) showed a significant value of 0.432, meaning the difference is not statistically significant. Hence, it can be concluded that respondent's education status has no significant impact on their tendency to remove visible fat from meat before eating.

Table 5. 14: Educational attainment and removal of chicken skin before eating

Removal of visible meat	None	Primary	Secondary	Technical	University
Don't eat chicken	1.06%	0.59%	1.67%	0.87%	1.09%
Removes None	36.4%	23.8%	15.88%	10.29%	9.78%
Seldom	1.53%	1.57%	13.26%	6.29%	9.60%
Often	0.69%	1.46%	6.82%	11.48%	9.95%
Always	0.13%	0.6%	0.27%	1.54%	4.81%

Survey data, 2017

5.2.5 Fruit and vegetables consumption

The health benefits of fruit and vegetables are well established in the literature (Slavin & Lloyd, 2012; Liu, 2013). For example, the consumption of fruit is reported to attenuate obesity-related diseases such as diabetes and coronary heart disease (Devalaraja et al., 2011; Fung et al., 2008). In South Africa, the Department of Health (DoH) recommends a daily consumption of vegetables and fruit for healthy living. The DoH further provides that while vegetables can be taken in at least one or two mixed meals a day, fruit must be eaten with every meal (DoH, 2016).

Data on the frequency at which respondents consume fruit and vegetable consumption among respondents is summarised in Figure 5.2. From the bar chart it can be observed that vegetable consumption is higher among respondents than fruit consumption. However, in terms of frequency, more than half of the respondents (50.8%) consume vegetables on a regular basis compared to 32% and 15.4% who often and seldom consume vegetables. Interestingly, only 1.4% reported that they never eat vegetables. With regards to the frequency of fruit consumption, the bar chart further shows that about 24% of respondents consume fruits on a regular basis

compared to the 26.8% and 45.9% who indicated that they often or seldom consume fruit. The low intake of fruit and vegetables revealed in this study is aligned to findings from Peltzer and Phaswana-Mafuya (2012) as well as Faber et al. (2013) who reported that South Africa is characterized with low intake of fruits and vegetables.

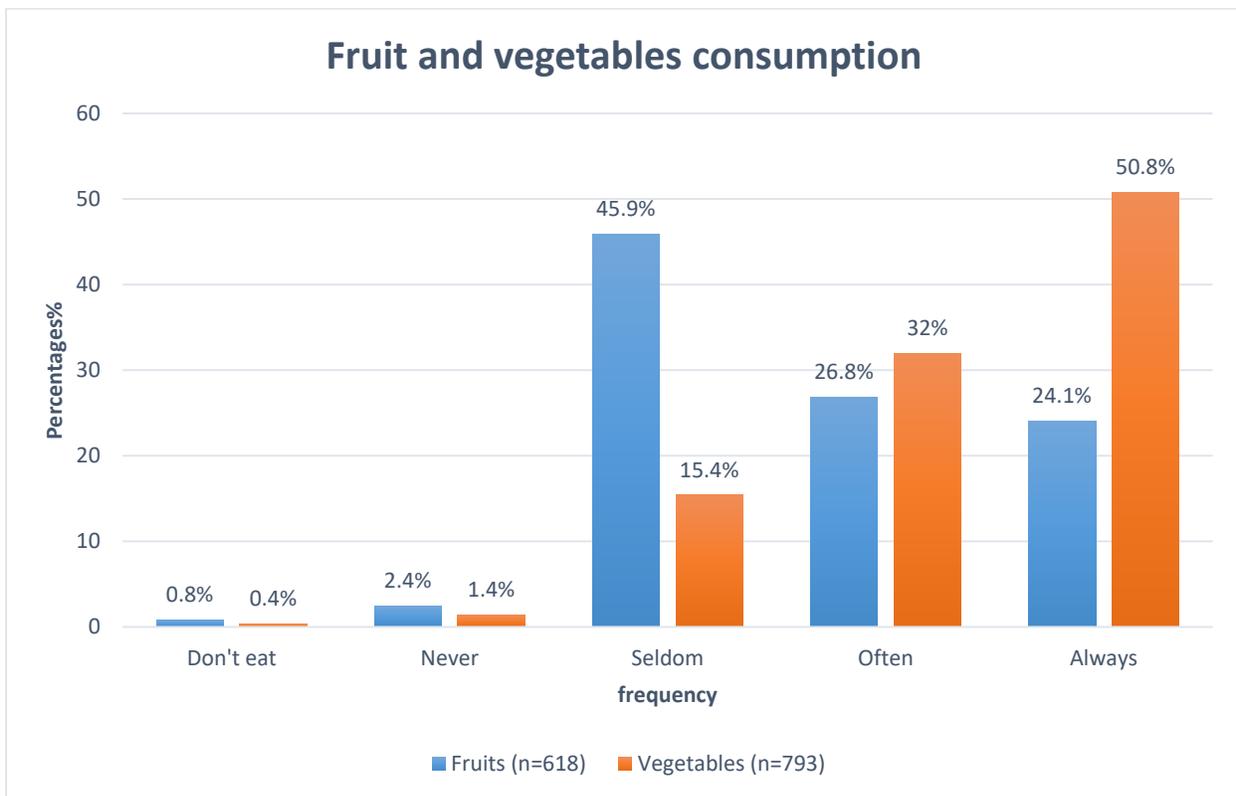


Figure 5. 2: Fruit and vegetables (Survey data, 2017)

Moving further, to ascertain whether education status has any significant impact on the frequency of fruit and vegetables consumption, responses regarding educational attainment was correlated with the frequency of vegetable and fruit consumption. From Table 5.15, it can be seen that the proportion of respondents who always consume fruit and vegetables was found to be higher among those with university education (14.88%) compared to those with primary education (9.18%). Similarly, the proportion of respondents who often consume fruit and vegetables was higher among those with university education (19.95%) compared to those with secondary education (9.13%). In general, respondents with better or higher education consumed

more fruit and vegetables on a regular basis than those with a low education. However, the difference between education status and the frequency of consuming fruit and vegetables was not significant at 95% confidence interval, as the chi test results reveal a significant value of 0.142. This suggests that respondent's educational level has no significant impact on the frequency of fruit and vegetables consumed.

Table 5. 15: Education level and frequency of fruit and vegetables consumption

Fruits and vegetables consumption	None	Primary	Secondary	Technical	University
Don't eat	0.00%	0.01%	0.25%	0.17%	0.09%
Never	0.4%	0.8%	0.8%	0.2%	0.6%
Seldom	2.53%	3.57%	12.24%	5.29%	9.60%
Often	1.54%	2.46%	9.13%	10.54%	19.95%
Always	6.89%	9.18%	10.37%	11.58%	14.88%

Survey data, 2017

5.2.6 Fried foods consumption

Frying is one of the old methods of cooking and has been used in many countries for centuries. Although frying enhances the taste and durability of food, it is established that when food is fried it becomes more calorific because the food absorbs the fat in the oil (Leitzmann & Kurth, 2012). According to Leitzmann and Kurth (2012), fried foods served in fast-food restaurants in particular are often cooked in reused oils, which are high in fats and dangerous to a person's health. Frequent fried food consumption has been reported to be positively associated with a higher risk of incident overweight/obesity (Guallar-Castillón et al., 2007; Sayon-Orea et al., 2013). In line

with these evidences, responses regarding the frequency of consuming fried foods both at home and outside the home was analysed. Results are summarised in Table 5.16.

Table 5. 16: Consumption of fried foods

Frequency of consuming fried foods	Fried food eaten outside the home			Fried food eaten at the home		
	Male (n=284)	Female (n=482)	Total (n=765)	Male (n=288)	Female (n=491)	Total (n=779)
Never	43.1%	44.0%	43.7%	18.8%	17.5%	18.0%
Once a week	14.1%	10.6%	11.9%	13.5%	14.7%	14.2%
2-3 times a week	38.2%	42.1%	40.7%	59.7%	62.5%	61.5%
4-6 times a week	2.8%	2.1%	2.4%	5.2%	2.9%	3.7%
Daily	1.8%	1.2%	1.4%	2.4%	2.2%	2.3%

Survey data, 2017

From Table 5.16, it can be observed that 43.7% of respondents do not consume fried foods away from home, as compared to 18.0% who consume fried foods at home. Once in a week, however, 14.2% and 11.9% eat fried foods at home and away from home respectively. More noteworthy is the proportion of those who consume fried foods more than once a week. About 61.50% and 40.7% of respondents consumed fried foods more than once a week at home and outside the home respectively. It is apparent from the analysis that consumption of fried foods is pervasive among respondents, although a greater number of these respondents consume fried foods at home rather than away from home.

5.3 Influence of Television on the choices of food

Food and beverages advertisement on television is reported to have a strong influence on consumers' perception and their buying decisions (Bargh & Chaerand, 2000; Tomasello et al., 2005). On the other hand, spending too much time watching TV can also contribute to weight gain, especially when it is combined with late-night eating (Dinbabo et al., 2017). In this study, responses regarding the influence of TV on the choices of food consumed were analysed. As depicted in Table 5.17, about 41.6% of the total respondents agreed or strongly agreed that their food decisions are influenced by TV advertisements. In contrast, 50.5% indicated that TV advertisements have less or no impact on their choices of foods. Interestingly, more men (46.2%) compared to women (38.8%) agreed or strongly agreed that their food buying decisions are influenced by television advertisements.

When asked if they spent most of their leisure time watching TV or browsing the internet over 60% answered in the affirmative. From these results, it can be concluded that TV plays an influential role on the eating habits and food choices of respondents. These findings are in agreement with a study conducted in South Africa by North and Kotzé (2001) who reported that over 50% of their study participants agreed or strongly agreed that television advertisements help them not only to find the best product but also influence their buying decisions.

Table 5. 17: Influence by advertisement

	TV advert influences my food choices			I spent most time watching TV or browsing the internet		
	Male (n=266)	Female (n=473)	Total (n=736)	Male (n=266)	Female (n=470)	Total (n=739)
Strongly Agree	17.3%	12.3%	14.1%	18.8%	17.5%	21.9%
Agree	28.9%	26.6%	27.5%	13.5%	14.7%	39.1%
Indifference	11.3%	10.6%	10.8%	59.7%	62.5%	9.1%
Disagree	20.7%	26.2%	24.2%	5.2%	2.9%	13.2%
Strongly Disagree	21.8%	24.3%	23.4%	2.4%	2.2%	16.7%
Total	100%	100%	100%	100%	100%	100%

Survey data, 2017

5.4 Weight management practices

Adequate nutrition from a balanced diet as well as daily physical activity are known to be key elements for effective weight management (Kirk et al., 2012). The basic principle underlying effective weight control is to maintain low levels of energy storage. However, this low level of energy storage is only achieved when caloric expenditure exceeds caloric intake. According to Kirk et al. (2012), the most effective way of creating a caloric deficit is through a combination of diet and exercise. In line with this position, responses regarding weight management practices among the respondents were analysed.

From Figure 5.3, it can be seen that the majority of the respondents do not engage in weight management practices. For example, over 70% of the respondents neither engage in physical exercise nor eat foods low in fat. Similarly, more than 80% do not take diet pills or eat a special diet in a bid to control their weight. In comparison, only 24.6% and 1.6% engage in physical

exercise and take diet pills respectively to control their weight. Moreover, only 18% go without food (fasting) for 24 hours in an effort to manage their weight.

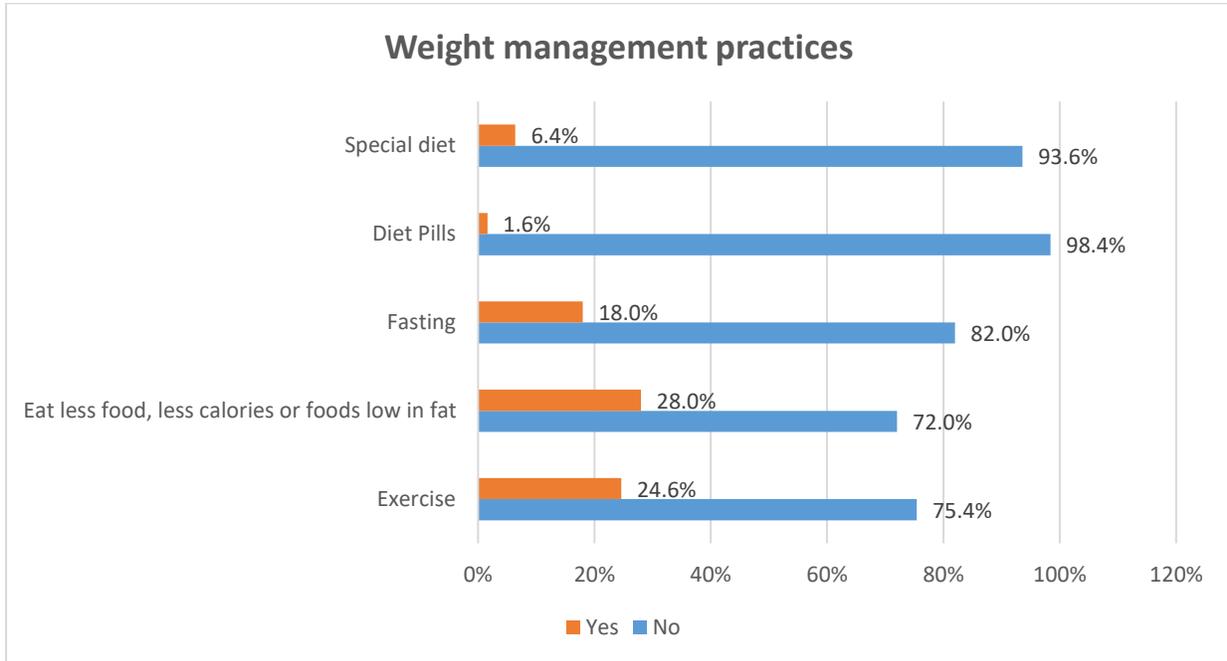


Figure 5. 3: Weight management practices (Survey data, 2017)

Moving further, to determine whether respondents' educational level significantly influence their weight control decisions, responses regarding the practice of weight control were correlated with their level of education. As depicted in Table 5.18, respondents with higher education achievements engage in more weight control practices than those with lower levels of education. Specifically, whilst about 6.71% of those with university education reported that they engage in physical exercise, only 0.13% of those with primary education indicated that they do physical exercises to control their weight. On the contrary, the proportion of respondents with primary education who take diet pills (0.81%) was higher than respondents with university education (0.18%). However, to determine whether the percentage difference was significant, a statistical test was employed. In this case, hypothesis testing using Pearson's chi square test was adopted. The hypotheses to be tested are stated as follows:

Null hypothesis= Educational level has no significant impact on weight management decisions

Main hypothesis= Educational level has a significant impact on weight management decisions

The rules governing the test are well explained in Section 5.2.3.1 above. The results of the Pearson’s chi square test are shown in Appendix V. The test results report a significance value of 0.523. Consequently, since the significance value exceeds the given level of significance (0.05), the null hypothesis is accepted, meaning that educational attainment has no significantly impact on weight control practices.

Table 5. 18: Educational level and weight control

Weight control	None	Primary	Secondary	Technical	University
Special diet	0.06%	0.23%	1.75%	0.66%	0.12%
Diet pills	0.45%	0.81%	0.94%	0.22%	0.18%
Fasting	0.35%	0.21%	1.32%	0.24%	0.62%
Eat less food, less calories or foods low in fat	2.69%	0.36%	0.86%	1.68%	1.65%
Exercise	0.03%	0.13%	3.25%	1.87%	6.71%

Survey data, 2017

5.5 Water Intake

Water is an essential nutrient recommended for cognitive and physiologic functioning (Asher et al., 2016). Researchers have shown much interest in the estimation of the causal effect of water intake on weight loss (Stookey et al., 2008; Dennis et al., 2010; Muckelbauer et al., 2009; Hernández-Cordero et al., 2014; Peters et al., 2014). While some were of the opinion that frequent drinking of water is positively associated with weight loss (Stookey et al., 2008; Dennis et al., 2010), others disagree with this sentiment (Muckelbauer et al., 2009; Hernández-Cordero

et al., 2014). However, the evidence available in the literature generally shows a strong association between water consumption and weight control (Dennis et al., 2010). In line with this position, responses regarding the frequency of water intake among respondents were analysed. Results are summarised in Table 5.19.

Table 5. 19: Water Intake

Water Intake	Male	Female	Total
	%	%	%
1-2 Glasses	24.3%	12.9%	23.7%
3-4 Glasses	42.6%	23.2%	42.2%
5-6 Glasses	19.0%	8.9%	17.1%
7-8 Glasses	12.0%	9.2%	14.9%
Above 9 Glasses	1.8%	1.0%	1.8%
Total	100%	55.3%	100%

Survey data, 2017

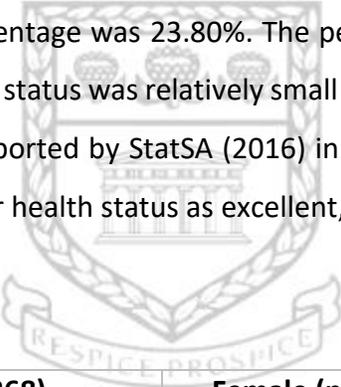
From Table 5.19, it can be seen that the average amount of water consumed per day is between 3 to 4 glasses. About 24% of the respondents drink 1 to 2 glasses of water each day. A small proportion (2%) consume more than 9 glasses of water per day. In terms of gender comparison, men consumed more water per day than women. Yet, the mean number of water consumed per day by both genders (2.2 glasses) is far below the average 5 glasses of water recommended by the South African Department of Water and Sanitation. This evidence suggests that water intake among residents in Khayelitsha is generally low. This finding is consistent with Bourne and Seager's (2001) research, which indicates that the mean water intake among the black population in Cape Town is 1.4 litres per day.

5.6 Self-perceived health status

Health status is often referred to as an individual's relative level of wellness and illness, taking into account the presence of biological or physiological dysfunction, symptoms and functional impairment (Wilson & Cleary, 1995). Health perceptions or perceived health status are subjective ratings by the affected individual of his or her health status (Kaleta et al., 2009). While some people perceive themselves as healthy although they may be suffering from one or more chronic diseases, others may perceive themselves as ill when no evidence of disease can be found.

As shown in Table 5.20, 22.4% of the respondents rated their health status as excellent, 12.90% rated theirs as very good and 34.20% rated as good. In addition, 23.5% rated their health as fair while 6.2% perceived their health as poor. There were some differences in the perceived health status of women and men. For example, 20.10% of men perceived themselves as having excellent health, while for women this percentage was 23.80%. The percentage of the total respondents who reported having a poor health status was relatively small (6.2%). The results in this study are slightly lower than the findings reported by StatSA (2016) in which 50.1%, 36.1% and 12.0% of the sampled population rated their health status as excellent, good and poor respectively.

Table 5. 20: Perception of health



Perception of health	Male (n=268)	Female (n=463)	Total (n=731)
Excellent	20.10%	23.80%	22.40%
Very Good	11.20%	13.80%	12.90%
Good	35.40%	33.50%	34.20%
Fair	25.40%	22.50%	23.50%
poor	7.10%	5.60%	6.20%

Survey data, 2017

Moreover, when respondents were asked to indicate how they perceived their health status by comparing themselves with people within their age range, the results (as depicted Figure 5.4) portrays that about 40.6% believed that they were much healthier than their age mates. Only 11.1% perceived their health status to be worse than other people within their age range.

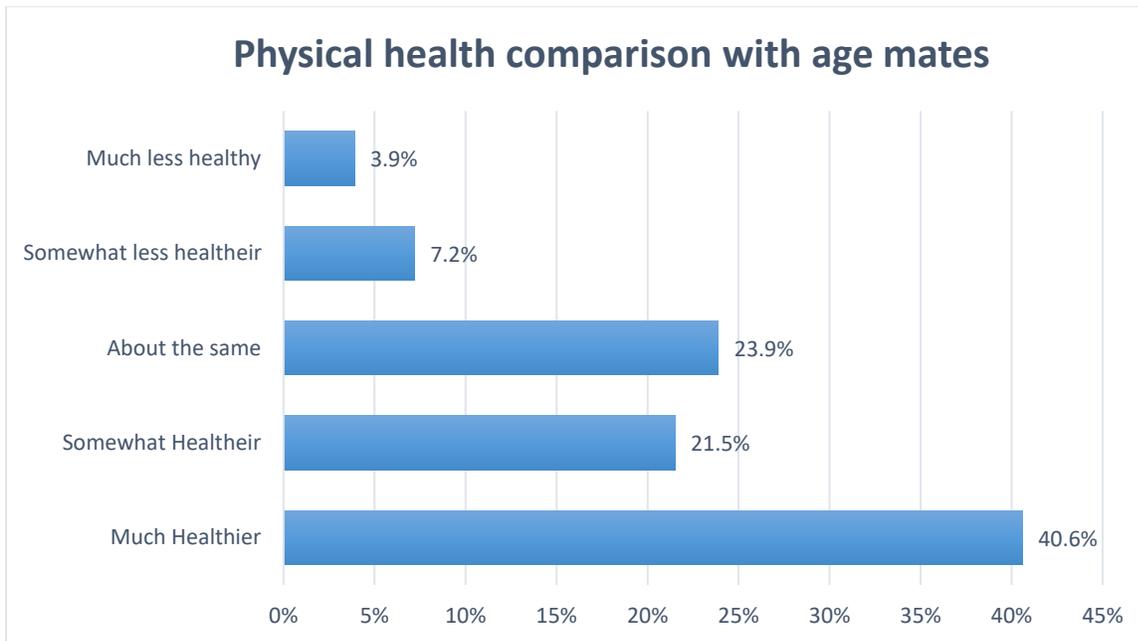


Figure 5. 4: Physical health comparison with age mates (Survey data, 2017)

5.7 Respondent's chronic health conditions

A chronic health condition is basically any disease or illness that is persistent and affects a person's general health and well-being. The term is usually used to denote an illness which may or may not be serious, such as diabetes, arthritis, asthma and HIV (Fernandez-Martinez et al., 2012). Having a chronic condition doesn't necessarily mean an illness is critical or dangerous, although some chronic illnesses such as cancer and HIV can be life-threatening (Ibid, 2012). When the respondents were asked to indicate the health conditions from which they suffer, the results, as illustrated in Figure 5.5, shows that High Blood Pressure (HBP*) was the most common negative health condition that respondents suffered from affecting 25.3%. This is followed by High Cholesterol levels, affecting 12.7% of respondents. The proportion of respondents with type 1 diabetes and type 2 diabetes was 6.3% and 6.1% respectively. The prevalence of diabetes,

obtained from this analysis is slightly lower than what is reported by the International Diabetes Foundation (2015), which estimate the prevalence as 7%. Moreover 6% suffered from cancer-related problems.

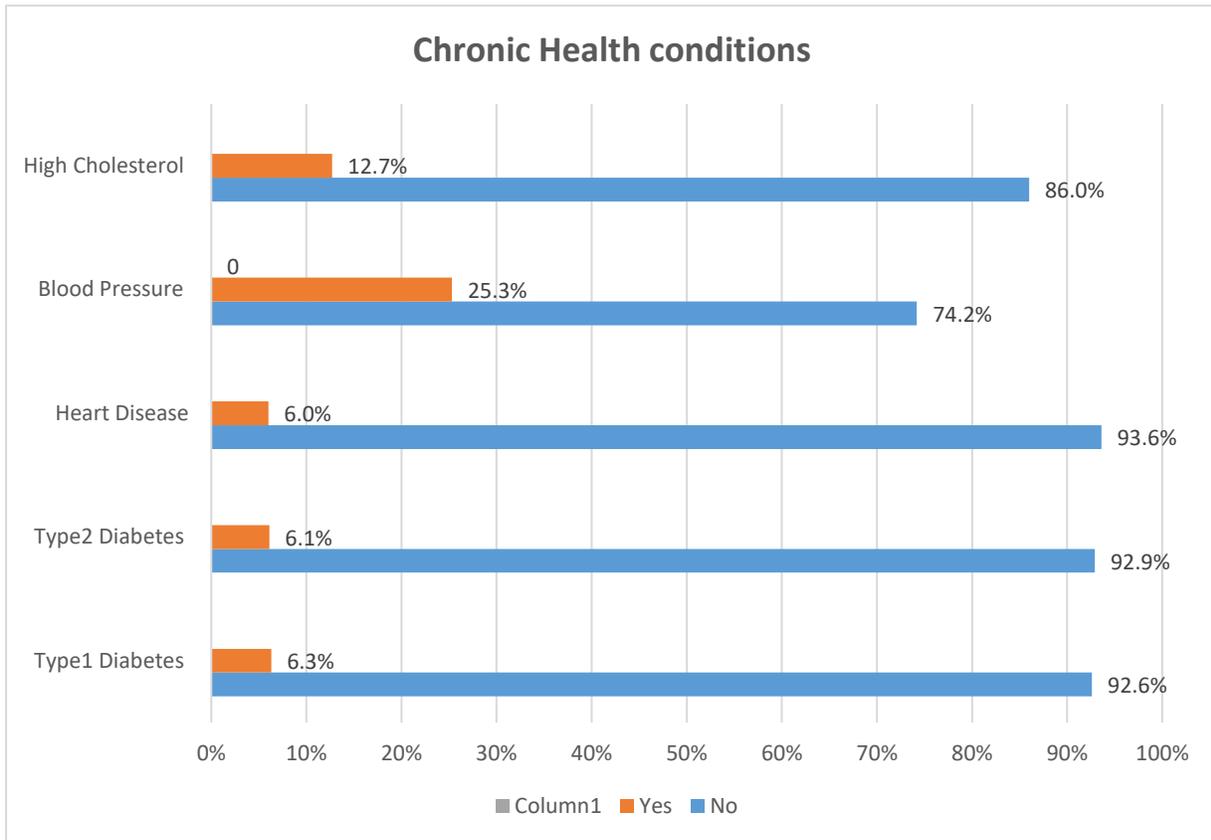


Figure 5. 5: Chronic Health conditions (Survey data, 2017)

5.8 Overweight and obesity prevalence in Khayelitsha

This section presents an overview of the obesity prevalence in Khayelitsha. Specifically, it reports the BMI results of the respondents in relation to the WHO guidelines for BMI cut offs (Underweight BMI<18.5, Normal Weight BMI>=18.5 and <=24.9, Overweight BMI, >=25.0 and <=29.9, Obese Class 1 BMI>=30.0 and <=34.9, Obese Class 2 BMI>=35.0 and <=39.9, Obese Class 3 BMI>=40) (WHO, 2016). Results from the analysis are presented in Table 5.21.

Table 5. 21: Weight status

Weight status	Male (n= 298)	Female (n=450)	Total (n=748)
Underweight	14.56%	14.75%	11.23%
Normal Weight	23.79%	26.23%	28.07%
Overweight	16.99%	22.95%	22.59%
Obese	44.66%	36.07%	38.9%

Survey data, 2017

Overall, 38.9% of the respondents were obese and 22.59% were overweight. About 12% were underweight and 28.7% had a normal weight. However, from a gender perspective, a higher proportion of males, 45% compared to females at 36.07% were found to be obese. In contrast, more females at 23% compared to males at 17% were found to be overweight. Interestingly, a similar pattern was observed among those who fell within the normal weight range with 26.23% females and 23.79% males indicating normal weights. However the proportion of those found to be underweight was comparable between the males and females. The results portray high level of overweight and obese persons in Khayelitsha. Yet, the difference between the gender distributions was not significant enough to conclude that males were more susceptible to obesity than women.

5.9 Qualitative analysis findings

This section presents findings from the qualitative data analysis. The results presented in this section focus on respondents' views and perceptions about their eating patterns and attitudes toward weight control. The section specifically highlights the subjective opinions and insights of the sampled population and complements the quantitative findings presented in the previous section.

5.9.1 Eating patterns

The patterns of eating contribute significantly to a person's overall quality of life. The literature provides two main patterns of eating among societies, namely the 'prudent' and the 'western' pattern. The 'prudent' pattern is defined by Slattery et al. (1998) as a diet characterized by a high consumption of fruit and vegetables and low consumption of red meat, processed meat and sugar. The Western pattern on the other hand is defined as a diet characterized by the high consumption of red meat, processed meat, fast food, refined grains and sugar, alongside a low consumption of vegetables and fruit (Slattery et al., 1998). According to Ronquest-Ross et al. (2015), the 'western' patterns of food consumption is very popular in countries undergoing economic transformation.

Studies conducted over the past few decades suggest that food consumption patterns among South Africans living in urban areas have shifted toward a more western-orientated diet (Reardon, 2008; Popkin, 2006; Ronquest-Ross, et al., 2015). For example, in a study examining food consumption patterns in South Africa, Ronquest-Ross et al. (2015) discovered that consumption of food has shifted towards an increase in sugar-sweetened beverages intake. While Ronquest-Ross et al. (2015) view globalization as a key factor which may have accounted for these changes, income and the cost of food are also noted as major indicators of the kinds of food consumed. Ronquest-Ross et al. (2015) further report that for most South African black women, who do most of the household grocery shopping, the most important consideration when choosing a food item is price.

As reported in other communities within South Africa, some respondents in Khayelitsha also shared the view that income and cost of food items influence their eating habits. For example, one participant, Kelly, mentioned how much she loves to eat vegetables but could not afford to buy it. She noted the following: *[I]f I could eat [vegetables] every day, you know if the money is there because it seems to be very expensive nowadays. So, if I could eat it every day I would eat it every day. I eat it when I can.* This position was equally expressed by Maryam who remarked that food in shops are not affordable: *I mean foods stuff in the shop it's expensive. I don't think people can eat that healthy anymore. ... To be like a healthy person it costs ... it's not on not for the lower class people maybe the [rich] people that is there...they can still afford to eat things like that.* Another respondent, Margaret had this to say: *I won't lie, I go to the Somalian shop to ask for credit around the 20th of the month. I get whatever I don't have on credit, even electricity. I get it from them. I take credit, then repay them when I have money.*

The views expressed by Kelly, Maryam and Margaret point to the fact that income plays a significant impact on the eating habits of residents in Khayelitsha. The opinions shared by Kelly, Maryam and Margaret support the quantitative findings which revealed that respondents who earn between R1-1200 spend more on cereal foods and less on vegetables and fruits. Essentially in many households, lack of adequate income impacts on the ability to make better and healthier food choices despite their knowledge of the implications of eating unhealthy food. In this case, data reveals that respondents only consume healthy and nutritious foods when the cost of such foods is not an issue. This position resonates with findings from other studies which have consistently provided that consumption of healthy foods is associated with cost and income. For example, Temple et al. (2011) reported that a healthier diet can cost as much as 69% more than a typical South African diet and concluded that a healthy diet is largely unaffordable for most South Africans. Other researchers (Wiggins and Keat, 2015; Carlson and Frazao, 2012) also suggest that it is more expensive to maintain a healthy diet compared to an unhealthy diet. When healthy foods become unaffordable, poor people begin to prioritize quantity as opposed to quality.

5.9.1.1 Culture and eating habits

Culture is defined as shared beliefs, values and ways of life of a designated group of people (Di Cagno, 2013). According to Nestle et al. (1998), culture can dictate the type and time of consuming certain foods. Likewise, Ludy and Mattes (2012) provide that culture influences the kind of food one is exposed to. In the view of Urie Bronfenbrenner (1989) macro-systems such as cultural values and social settings shape the mind of an individual towards accepting or accommodating a particular dietary behaviour. In terms of this line of thought, the researcher analysed responses with regards to how societal values shape respondents' choices of food. The analysis revealed interesting insights into how culture influences the food preferences of some participants. For example, Rose had this to say: *"I like pap. We are Sotho people here at home. We were raised on pap."* This position was further articulated by Palesa who stated that: *"I like eating. ... I most cook traditional Xhosa meals. Mostly I cook imifino [a meal made up of spinach, bitter greens and maize-meal] or umngqusho [samp and beans]. I don't like eating Western food. I prefer Xhosa meals"*.

In a more surprising response, one participant, John, linked his choice of food to spirituality. He mentioned that he eats *'ital'* foods which he described as: *food that is clean and vital into our souls. Also, the food that we eat must be colourful, into your eyes. In Babylon language you can say beautiful, looks terrific. But the food you prepare and eat must always catch your eye and be natural. Definitely, when there is no cow, blood, it is healthy.*

The opinions expressed by the respondents in this study suggest that culture strongly influences their eating habits. Culture can promote either healthy or unhealthy food consumption. For example, a person's eating habit or preference to particular food can be shaped by what his/her parents regard as healthy food (Birch et al., 2007). Parents who follow a vegan diet, for example, are more likely to introduce vegan food to their children. Some researchers suggest that children adopt eating behaviours by observing the eating habits of their parents (Young et al., 2004; Fisher, 2002).

5.9.2 Weight control practices

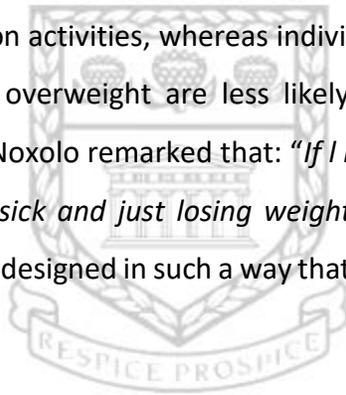
According to the World Health Organization (2016), maintaining a healthy diet as well as engaging in frequent physical exercise play significant role in the fight against overweight and obesity. Physical inactiveness is therefore regarded as one of the risk factors of gaining excess weight (Hamilton et al., 2007). Notwithstanding the numerous benefits of physical exercise Ronquest-Ross et al. (2015) report that most South Africans do not engage in frequent exercise. This position has been confirmed by Micklesfield (2014) whose study revealed that 43% to 49% of South Africans age 15 years or older do not engage in frequent physical activities.

This section explores respondents' subjective views about their weight management practices and the challenges faced in such endeavours. As stated in the quantitative section, only 24.6% of the respondents do exercise. Results from the qualitative analysis also confirm the low level of physical exercise among respondents in Khayelitsha. For example, one respondent, Joyce had this to say *"I am very passive for exercising ... [I am] very lazy"*. In the opinion of Joyce, most residents in Khayelitsha do not engage in physical exercises. The opinion shared by Joyce was further espoused by Simone who remarked that: *I hate it with a passion. I started walking for a while and then just stopped ... I just hate exercising. I just wish there is an easier way out than to exercise [laughs]. I tell myself no. I sweep here and I do everything that's enough exercise for me.*

It should however be noted that while some of the respondents expressed the desire to engage in outdoor physical activities, concerns about safety and security stifle these desires. For example Debbie, remarked that: *"this is a very cruel area and people are scared to go out because they gonna get robbed or maybe killed"*. She further stated, *"that is why people are scared to run early mornings."* Debbie's view was further supported by Joyce who stated that *"[Y]ou would say you are jogging and then next you get robbed there"*. It is important to state that not everyone shared these fears. For example, Sithembiso, indicated that he jogged *"seven days"* a week. Menzi, also stated that *"everyday after supper I exercise"* and proceeded to say *"there are some people who join me"*.

For some of the respondents, avoiding the stigma of being overweight is the reason why they engage in physical activity. For instance, Richard remarked that: *Ehh! My friend's sister, she is very huge, that is what encourages me. I don't want to look like that. Just by seeing her, you [will] understand what I am saying. I mean, she is heavy-overweight. She can hardly move and she is just a few years older than me. She is my age but just to see her it is enough for me to control my weight.* Another participant, Zukanye opined that: *Yet when you have a [slimmer] body you can dress well. For example, with us younger people your husband will lose interest in you when you are fat. He will be thinking 'What happened to the [young lady] I married?' Just because you are fat.*

It is however important to state that weight control practices are precipitated by perceptions of body weight. For example, people who perceive themselves as overweight or obese are more likely to engage in weight reduction activities, whereas individuals who may have excess weight but do not perceive themselves overweight are less likely to involve themselves in weight reduction activities. For example Noxolo remarked that: *"If I lose a lot of weight I would go for a check up to make sure I am not sick and just losing weight"*. Weight management campaign programmes need to be therefore designed in such a way that it considers the personal dynamics associated with losing weight.



5.10 Chapter summary

This chapter has presented findings from both the quantitative and qualitative analysis of data in examining the relationship between socioeconomic status and dietary behaviours in relation to obesity. The findings were discussed in line with the research questions and objectives. The literature was extensively explored to support findings from both the quantitative and qualitative analysis. The chapter commenced by highlighting the socioeconomic characteristics of the respondents. It further described the eating habits and weight management practices of the respondents and explored its relationship with educational attainment and income level. The researcher provided both positivist and interpretive analyses of the findings. Based on evidence from the hypotheses testing, education and income were found to correlate positively with

dietary behaviours and weight control, yet the differences were not statistically significant. On the other hand, the qualitative evidence offered better insights into why respondents eat what they eat as well as why they engage or do not engage in physical activities to control their weight. The analysis revealed that while income and culture determine respondents' consumption patterns, perception of body size and security issues influenced their attitudes toward engaging in physical activity. The next chapter presents a summary of the findings, theoretical reflections, limitations of the study and areas for further research.



CHAPTER SIX

SUMMARY OF RESEARCH FINDINGS RECOMMENDATIONS AND CONCLUSION

5.0 Introduction

This chapter presents the final chapter of the research. The chapter commences with a brief summary of key findings from the study, presents theoretical reflections and highlights some of the limitations of the research. Thereafter, priority areas for further research are discussed. The chapter concludes with suggested policy recommendations for the prevention and control of obesity in South Africa.

5.1 Summary of research findings

The aim of this research was to examine the relationship between socioeconomic status and obesity. The findings reported from this investigation were based on analysis of data drawn from a broader study conducted by researchers from the Institute for Social Development (ISD) on the topic of food choices and BMI indexes. The data gathered by ISD offered a relevant source for examining the association between socioeconomic status and obesity in poor urban communities. Specifically, this study assessed the causal effect of education and income on eating habits and weight control behaviours. Education status was measured by level of education attained by respondents. Individuals' total monthly earnings measured income status. Eating habits was measured by the frequency of eating as well as types of foods consumed. Weight management practice was measured by activities geared towards weight control. The research questions of the study were as follows:

- What is the relationship between education level and individual's food choices?
- What is the relationship between education level and individual's weight control behaviour?
- What is the relationship between income and individual's food choices?

5.1.1 Food choices, consumption patterns and weight control behaviours

The food basket of the respondents included cereals (mealies, maize), bread (white bread), pasta (spaghetti, macaroni), milk products (yoghurt, cheese), processed meat, fried chicken, fish and oil fat (butter), soft drinks, fruit and vegetables. The study revealed that cereals, bread and processed meat were the kinds of food mainly consumed by most respondents (94%). In terms of fruit and vegetable consumption, the study revealed a low intake among respondents. This finding agrees with findings reported by Faber et al. (2013) and Dinbabo et al. (2017) that most South Africans eat less than the recommended amount of fruit and vegetables. In general, cost was identified as the main barrier for the frequent consumption of fruit and vegetables.

On the subjects of fried food consumption, together with the habit of the removal of chicken skin and visible fat from meat before eating, it was discovered that a high proportion of the respondents consumed fried foods both at home (81.7%) and outside the home (56.4%). Furthermore, it was discovered that most respondents neither remove visible fat from meat (33.3%) or chicken skin (45.5%) before eating. This suggests a high consumption of fatty foods among the respondents. The high consumption of fatty foods revealed in this study is aligned to findings reported by Peltzer and Phaswana-Mafuya (2012) as well as Ronquest-Ross et al. (2015). However, when the aforementioned findings were correlated with education status, the results revealed no significant impact.

With regards to weight control practices, the results revealed a low practice of weight control measures among the respondents. For instance, only 24.6% indicated that they engage in physical exercise. Additionally, only 18% reported that they go without food (fasting) for 24 hours in an effort to manage their weight. The reasons for such low practices of physical exercises and weight control in general were as a result of limited resources, safety and security concerns as well as individuals evaluation of their weight status. Resources such as gymnasiums, swimming pools and safe jogging trails that promote physical exercises were found to be limited in the case study area of Khayelitsha. This finding is also in line with what was reported by Dinbabo et al.

(2017), that limited facilities and safety issues prevent most residents in Khayelitsha and Mitchells Plain to engage in frequent physical activities.

5.1.2 Relationship between education level, food choices and weight management practices

Findings from the analysis revealed an overall positive relationship between education and eating habits, with most educated individuals' demonstrating high intentions to consume healthy foods compared to people with lower education. This finding is consistent with those reported in a number of other studies, notably Kenkel et al. (2006), Cutler and Lleras-Muney (2006) and Devaux et al. (2011). The positive relationship between education and eating habit as revealed in this study is likely to be explained by two reasons: 1) education enhances access to health-related information and improved ability to handle such information; 2) education increases knowledge of the risks associated with lifestyle choices. Interestingly, despite the overall positive association that was found between education and respondents' eating habits the difference was not statistically significant. This suggests that respondents' educational level may have played a role regarding the kinds of food they consumed, however it does not explain their general attitude towards maintaining a healthy diet.

Similar to the eating habit, this study revealed an overall positive relationship between respondents' education level and their attitudes toward weight control. However, the difference was not statistically significant. What this suggests is that although education could help an individual to appreciate the benefits of maintaining a balanced weight, the decision to engage in weight control activities may be influenced by other factors beyond an individuals' level of education. For instance, perception of weight status and safety concerns were discovered to be among the main impediments to engaging in physical activity.

5.1.3 Relationship between income and individual food choices

Moving further, the results of this study revealed a positive relationship between income and food choices. However the overall effect of income on food choice was not statistically significant. Cost of food and low family income were found to be key barriers to the purchase and

consumption of healthy foods. This position confirms findings by Temple et al. (2011) whose study revealed that a healthy diet is largely unaffordable for most South Africans. In general, the results from this study increase our understanding on the relationship between socioeconomic status and obesity.

5.2 Theoretical reflections

Ajzen's Theory of Planned Behaviour (TPB) was applied in this study to conceptualize respondents' eating habits and weight management behaviours. The TPB has been applied to study numerous dietary behaviours including fat intake, fruit and vegetable intake and overall healthy diet consumption (Zoellner et al., 2014; de Bruijn & van den Putte, 2009; McEachan et al., 2011). In all these studies, attitude, perceived norms and perceived behavioural control explained the variance for intentions to maintain healthy eating. In this study, findings from the quantitative analysis portrayed that respondents' dietary patterns were not just explained by their education status or income level, but also their intentions to maintain a healthy standard of living. Intention to maintain a healthy diet was demonstrated through behaviours such the removal of all visible fat from meat before eating, removal of chicken skin before eating and frequent consumption of fruit and vegetables.

Apart from helping to explain eating behaviour, previous studies have also provided evidence in support of using the TBP model to explain weight control decisions (Blue, 1995; Mummery et al., 2000; De Bruijn et al., 2008). For example, in a literature review examining the use of attitudinal and personality variables as predictors of weight reduction, De Bruijn et al. (2008) discovered that intentions to lose weight were accurately predicted on the basis of attitudes, subjective norms and perceived control. In this study, findings from the quantitative analysis demonstrated that respondents' weight control behaviours was explained by their intentions to maintain healthy weight. Intention to maintain healthy weight was demonstrated through the practices of weight control activities such as eating less calorie-rich foods, engaging in frequent exercises and fasting.

Furthermore, findings from the qualitative analysis confirmed the efficacy of Ajzen's Theory of Planned Behaviour to predict weight control behaviours. This was evident from the opinions shared by some of the respondents. For example, the decision to engage in physical exercise in order to avoid the stigma attached to overweight demonstrate how subjective norms influence intention to engage in an act. Such responses are aligned to Ajzen's view that a negative evaluation of a behaviour and its outcomes influence actions. Similar to these findings, Martin et al. (2007) found attitudes, subjective norms and perceived behavioural control to contribute 45% to the variance in intentions in a study of physical activity behaviour of 475 Mexican American children.

5.3 Study limitations and future research priorities

Some methodological issues should be considered when interpreting the findings of this research. First, given that this research was based on an analysis of secondary data, there was no control of the variables outlined in the research questions. Second, the selection of respondents was limited to those whose weight/height measurements were reported in the broader study. This suggests a possible selection bias in this current investigation. Third, all the responses were drawn from Khayelitsha, hence the findings reported in this study are restricted to only one poor urban community in South Africa. It is certainly possible that the relationship between socioeconomic status and obesity could play out differently in other communities in South Africa. Fourth, other relevant factors such as cultural and environment influence on obesity were given little attention in this study. By taking the above limitations into consideration, future studies should aim at investigating the relation between socioeconomic status and dietary patterns in other poor communities in South Africa. Additionally, future studies could focus on examining the sociocultural influence of obesity.

5.4 Recommendations

This study has shown that obesity in South Africa is not just a problem of the rich but also of the poor. In particular, increased urbanization and the adoption of western lifestyles have brought about alterations in dietary behaviours among people with low income (Micklesfield, 2013; Dinbabo et al., 2017). Base on the complexity of factors driving obesity in South Africa as reported in this study, an integrated approach requiring efforts from a wide range of stakeholders from both the public and private sectors will be necessary to change public-health outcomes. For such ventures to be fruitful, public health interventions focusing on the promotion of proper dietary patterns, physical activity and weight reduction would be essential. Moreover, given the high cost of food which is often reported as a barrier to consuming healthy diet, policies must include measures such as price reduction for healthy foods. These strategies need to take gender, socioeconomic and culturally specific factors into account. Finally, a multidisciplinary approach to obesity prevention that addresses psychological, social, environmental and biological factors is critical to produce best outcomes.

5.5 Conclusion

This study examined the relationship between socioeconomic status and obesity in South Africa by using Khayelitsha as a case study area. After a comprehensive review of literature, the study revealed that obesity prevalence has increased in South Africa thereby becoming a major concern for the government. Although many factors are reported to contribute to this rising trend, changes in dietary and lifestyle habits as a result of urbanization and industrialization are reported to play a significant role. In particular, high consumption of processed meat, fats and oils, sauces, sweet and soft drinks combined with low levels of physical exercises among South Africans have led to the increase levels of overweight and obesity in South Africa. Given the low income status of most South Africans, it was interesting to discover from literature that the prevalence of obesity was not only high among the wealthiest South Africans but also among those in poor communities. This observation formed the basis for exploring the nexus between socioeconomic status and obesity in this study.

The epistemological position forming the basis for this research was guided by the concepts of positivist and interpretivist paradigms, as both perspectives were deemed relevant for answering the research questions outlined in this study. Additionally, a mixed methods approach using a combination of quantitative and qualitative methodologies was adopted in order to broaden the data base and enhance the depth of this study. Moreover, a blend of descriptive and inferential statistics was utilised in analysing the quantitative data while the qualitative analysis was conducted using thematic content analysis.

Moving further, Azjen's Theory of Planned Behaviour (TPB) formed the basis under which this research was conducted. The Theory of Planned Behaviour was chosen for this present study not only because it has been successfully used to explain dietary behaviour in the past or because the TPB has been suggested to be one of the most promising frameworks for obesity research but also because it contains components that are relevant to the manner in which people earning low incomes make their food decisions. The conceptual framework of the TPB helped to explain the role that attitudes and subjective norms play on dietary behaviours and weight management practices in this study. From this same theory, the impact of education/income on Body Mass Index (BMI) was explored. Based on the findings, attitudes and intentions were strongly correlated to individuals weight control behaviours and eating habits. Moreover, education and income status were found to correlate positively with dietary lifestyle and that gaining excess weight are not just problems for those in the upper-income bracket but also those in the lower income brackets. However, in contrast to the hypotheses outlined in this study, neither education nor income status was found to significantly impact on dietary and weight control behaviours. In general, other factors like price of foods, television advertisement and perception of weight status also contributed to respondents eating and weight management behaviours.

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APPENDICES

APPENDIX I

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	0.634	1	0.551		
Continuity Correction ^b	0.021	1	0.813		
Likelihood Ratio	0.645	1	0.573		
Fisher's Exact Test				0.988	0.675
Linear-by-Linear Association	0.134	1	0.853		
N of Valid Cases	875	1			

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 35,50.

b. b. Computed only for a 2x2 table



APPENDIX II

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	0.335	1	0.208	0.974	0.537
Continuity Correction ^b	0.021	1	0.736		
Likelihood Ratio	0.243	1	0.873		
Fisher's Exact Test					
Linear-by-Linear Association	0.245	1	0.234		
N of Valid Cases	875	1			

- a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 35,50.
b. b. Computed only for a 2x2 table



APPENDIX III

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	0.345	1	0.318	0.467	0.3573
Continuity Correction ^b	0.067	1	0.245		
Likelihood Ratio	0.342	1	0.534		
Fisher's Exact Test					
Linear-by-Linear Association	0.134	1	0.456		
N of Valid Cases	875	1			

- a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 35,50.
- b. b. Computed only for a 2x2 table



APPENDIX IV

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	0.856	1	0.432	0.944	0.452
Continuity Correction ^b	0.253	1	0.456		
Likelihood Ratio	0.844	1	0.896		
Fisher's Exact Test					
Linear-by-Linear Association					
Association	0.566	1	0.847		
N of Valid Cases	875	1			

- a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 35,50.
- b. b. Computed only for a 2x2 table



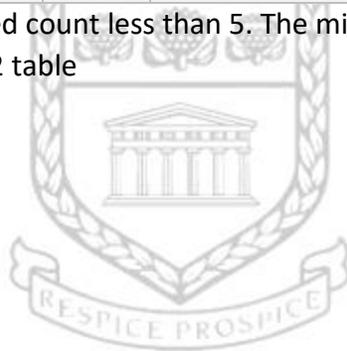
APPENDIX V

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	0.632	1	0.523		
Continuity Correction ^b	0.454	1	0.455		
Likelihood Ratio	0.808	1	0.654		
Fisher's Exact Test				0.653	0.267
Linear-by-Linear Association	0.536	1	0.784		
N of Valid Cases	875	1			

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 35,50.

b. b. Computed only for a 2x2 table





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12 May 2016

Dr M Dinbabo
Institute for Social Development
EMS Faculty

Ethics Reference Number: HS/16/3/1

Project Title: Food choices and Body Mass Index (BMI) in Adults and Children: evidence from the National Income Dynamics Study (NIDS) an Empirical Research from Khayelitsha and Mitchell's Plain in South Africa

Approval Period: 10 May 2016 – 10 May 2017

I hereby certify that the Humanities and Social Science Research Ethics Committee of the University of the Western Cape approved the methodology and ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval. Please remember to submit a progress report in good time for annual renewal.

The Committee must be informed of any serious adverse event and/or termination of the study.

A handwritten signature in black ink, appearing to read 'Josias', is placed on a white rectangular background.

Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape

SECTION A: HOUSEHOLD ROSTER (NB: A household is defined as a person or group of persons living together and 'eating from the same pot).

This section is to be completed by the household head and/or spouse.

1. Person Code	2. What is the name of this HH member? [Please indicate name of household head first]	3. What is this person's relationship to HH head?	4. What is the gender of this HH member?	5. What is the age of this HH member?	6. What is the marital status of this HH member?	7. What is the highest educational attainment of this HH member?	8. Is this HH member currently in school?	9. What is the religious affiliation of this HH member?	10. What is the race of this HH member?	11. What is the country of birth for this HH member?	12. If born in South Africa, in which province was this person born?	13. If born within Western Cape Province, in which city/town did this person live before moving to this place?	14. If born outside the Western Cape, in which year did [...] move to the Western Cape?	15. Which of the following best explains this person's reason for moving to the Western Cape?
01														
02														
03														
04														
05														
06														
07														
08														

Relationship to HH head (Q3)	Gender (Q4)	Marital status (Q6)	Highest educational Level (Q7)	Currently in School (Q8)	Religion (Q9)	Race (10)	Country of Birth (Q11)	Province of Birth (Q12)	Main reason for moving to Western Cape (Q15)
1 → HH head 2 → Spouse 3 → Son/Daughter 4 → Brother/Sister 5 → Daughter-in-law/Son-in-law 6 → Grandchild 7 → Step child 8 → Parent/Parent-in-law 9 → Other relative -7 → Refused -8 → Don't know	1 → Male 2 → Female -7 → Refused -8 → Don't know	1 → Never Married 2 → Married 3 → Cohabitation 4 → Divorced / Separated 5 → Widowed -7 → Refused -8 → Don't know	1 → None 2 → Primary 3 → Secondary 4 → Technical college 5 → Tertiary (eg. university) -7 → Refused -8 → Don't know	1 → Grade R 2 → Primary 3 → Secondary School 4 → Technical college 5 → Tertiary (eg. university) 6 → No -7 → Refused -8 → Don't know	1 → Christian 2 → Islam 3 → Traditionalists -7 → Refused -8 → Don't know	1 → Black 2 → Coloured 3 → Indian 4 → White -7 → Refused -8 → Don't know	1 → South Africa 2 → Zimbabwe 3 → Zambia 4 → Nigeria 5 → Mozambique 6 → Ethiopia 7 → Somalia 8 → Malawi 9 → Other (Specify) -7 → Refused -8 → Don't know	1 → Western Cape 2 → Eastern Cape 3 → Northern Cape 4 → Mpumalanga 5 → Gauteng 6 → North West 7 → Limpopo 8 → Free State 9 → KwaZulu-Natal 10 → Born outside SA -7 → Refused -8 → Don't know	1 → Better housing opportunities 2 → Better employment opportunities 3 → Job transfer 4 → Better education opportunities 5 → Married someone living here 6 → Other (Specify) -7 → Refused -8 → Don't know

SECTION B: HOUSEHOLD CHARACTERISTICS (To be asked of household heads)

16. What is this household's main source of water?		<input type="checkbox"/> ₁ Piped (tap) water in dwelling <input type="checkbox"/> ₂ Piped (tap) water on site or in yard <input type="checkbox"/> ₃ Public tap <input type="checkbox"/> ₄ Water-Carrier/tanker <input type="checkbox"/> ₅ Borehole on site <input type="checkbox"/> ₆ Well <input type="checkbox"/> ₇ Other (specify) _____ <input type="checkbox"/> _{.7} Refuse <input type="checkbox"/> _{.8} Don't know
17. How far is the water source from the dwelling?		<input type="checkbox"/> ₁ Less than 100m <input type="checkbox"/> ₂ 100 - 200 m <input type="checkbox"/> ₃ 201 - 500 m <input type="checkbox"/> ₄ 501 - 999 m <input type="checkbox"/> ₅ 1 km or more <input type="checkbox"/> _{.7} Refuse <input type="checkbox"/> _{.8} Don't know
18. What type of toilet facility is available for this household?		<input type="checkbox"/> ₁ Flush toilet with onsite disposal (septic tank / soak-away) <input type="checkbox"/> ₂ Flush toilet with offsite disposal <input type="checkbox"/> ₃ Chemical toilet <input type="checkbox"/> ₄ Pit latrine with ventilation pipe (VIP) <input type="checkbox"/> ₅ Pit latrine without ventilation pipe <input type="checkbox"/> ₆ Other (specify) _____ <input type="checkbox"/> _{.7} Refuse <input type="checkbox"/> _{.8} Don't know
19. Is the toilet facility shared with other households?		<input type="checkbox"/> ₁ Yes <input type="checkbox"/> ₂ No <input type="checkbox"/> _{.7} Refuse <input type="checkbox"/> _{.8} Don't know
20. Does this household have access to electricity even if currently disconnected?		<input type="checkbox"/> ₁ Yes <input type="checkbox"/> ₂ No <input type="checkbox"/> _{.7} Refuse <input type="checkbox"/> _{.8} Don't know
21. What is the main source of energy/fuel for lighting for this household?		<input type="checkbox"/> ₁ Electricity from mains <input type="checkbox"/> ₂ Electricity from generator <input type="checkbox"/> ₃ Gas <input type="checkbox"/> ₄ Paraffin <input type="checkbox"/> ₅ Solar Energy <input type="checkbox"/> ₆ Other (specify) _____ <input type="checkbox"/> _{.7} Refuse <input type="checkbox"/> _{.8} Don't know
22. What is the main source of energy/fuel for cooking for this household?		<input type="checkbox"/> ₁ Electricity from mains <input type="checkbox"/> ₂ Electricity from generator <input type="checkbox"/> ₃ Gas <input type="checkbox"/> ₄ Paraffin <input type="checkbox"/> ₅ Solar Energy <input type="checkbox"/> ₆ Other (specify) _____ <input type="checkbox"/> _{.7} Refuse <input type="checkbox"/> _{.8} Don't know
23. Does your household have:	a. A radio?	<input type="checkbox"/> ₁ Yes <input type="checkbox"/> ₂ No <input type="checkbox"/> _{.7} Refuse <input type="checkbox"/> _{.8} Don't know
	b. A television?	<input type="checkbox"/> ₁ Yes <input type="checkbox"/> ₂ No <input type="checkbox"/> _{.7} Refuse <input type="checkbox"/> _{.8} Don't know
	c. A non-mobile telephone?	<input type="checkbox"/> ₁ Yes <input type="checkbox"/> ₂ No <input type="checkbox"/> _{.7} Refuse <input type="checkbox"/> _{.8} Don't know
	d. A computer?	<input type="checkbox"/> ₁ Yes <input type="checkbox"/> ₂ No <input type="checkbox"/> _{.7} Refuse <input type="checkbox"/> _{.8} Don't know
	e. A refrigerator?	<input type="checkbox"/> ₁ Yes <input type="checkbox"/> ₂ No <input type="checkbox"/> _{.7} Refuse <input type="checkbox"/> _{.8} Don't know
	f. A freezer?	<input type="checkbox"/> ₁ Yes <input type="checkbox"/> ₂ No <input type="checkbox"/> _{.7} Refuse <input type="checkbox"/> _{.8} Don't know
	g. A washing machine?	<input type="checkbox"/> ₁ Yes <input type="checkbox"/> ₂ No <input type="checkbox"/> _{.7} Refuse <input type="checkbox"/> _{.8} Don't know
24. Does any member of this household own:	a. A mobile phone?	<input type="checkbox"/> ₁ Yes <input type="checkbox"/> ₂ No <input type="checkbox"/> _{.7} Refuse <input type="checkbox"/> _{.8} Don't know
	b. A bicycle?	<input type="checkbox"/> ₁ Yes <input type="checkbox"/> ₂ No <input type="checkbox"/> _{.7} Refuse <input type="checkbox"/> _{.8} Don't know
	c. A motorcycle or motor scooter?	<input type="checkbox"/> ₁ Yes <input type="checkbox"/> ₂ No <input type="checkbox"/> _{.7} Refuse <input type="checkbox"/> _{.8} Don't know
	d. A car or truck?	<input type="checkbox"/> ₁ Yes <input type="checkbox"/> ₂ No <input type="checkbox"/> _{.7} Refuse <input type="checkbox"/> _{.8} Don't know

SECTION C: EMPLOYMENT & INCOME (NB: This captures employment status and income sources of household members who are adults (18+ years))

Person Code	Name of Respondent	25. Are you currently ... 1→ Employed for wages/salary 2→ Self-employed 3→ Out of work and looking for work 4→ A student 5→ Retired 6→ Unemployed 7→Other, specify -7→ Refused -8→ Don't know	26. If employed for wages/salary, is it ...? 1→ Temporary 2→ Permanent -7→ Refused -8→ Don't know	27. Do you currently receive income from any of these Government grants? a. Disability grant 1 → Yes 2 → No -7→ Refused -8→ Don't know b. Old age grant 1 → Yes 2 → No -7→ Refused -8→ Don't know	28. Have you received any transfers (money/ food) from migrant relatives in the last 30 days? 1 → Yes 2 → No [If no, skip to question 30] -7→ Refused -8→ Don't know	29. If answer to question 28 is yes, how much is this transfer? [Please indicate amount...R]	30. Have you transferred either money or food to relatives in the last 30 days? 1 → Yes 2 → No [If no, skip to question 32] -7→ Refused -8→ Don't know	31. If answer to question 30 is yes, how much is this transfer? [Please indicate amount...R]	32. In a typical week, how many hours do you spend at work? [To be answered by mothers] State time in hours
33. How much does your household earn monthly?				<input type="checkbox"/> ₁ No income <input type="checkbox"/> ₂ R 1-1200 <input type="checkbox"/> ₃ R 1201 - 2400 <input type="checkbox"/> ₄ R 2401-3600 <input type="checkbox"/> ₅ R 3601-4800 <input type="checkbox"/> ₆ More than R 4800 <input type="checkbox"/> ₇ Refuse <input type="checkbox"/> ₈ Don't know					
34. Does your household currently receive income from any of these Government grants?		a. Child support grant		<input type="checkbox"/> ₁ Yes <input type="checkbox"/> ₂ No <input type="checkbox"/> ₇ Refuse <input type="checkbox"/> ₈ Don't know					
		b. Disability grant		<input type="checkbox"/> ₁ Yes <input type="checkbox"/> ₂ No <input type="checkbox"/> ₇ Refuse <input type="checkbox"/> ₈ Don't know					
		c. Old age grant		<input type="checkbox"/> ₁ Yes <input type="checkbox"/> ₂ No <input type="checkbox"/> ₇ Refuse <input type="checkbox"/> ₈ Don't know					
		d. Foster care grant		<input type="checkbox"/> ₁ Yes <input type="checkbox"/> ₂ No <input type="checkbox"/> ₇ Refuse <input type="checkbox"/> ₈ Don't know					

SECTION D-2: MEALS TAKEN AND SOURCES (To be answered by household members who are adults (18+ years) and children (5-11 years))

Person Code	Name of Respondent	43. How much responsibility do you have for:			44. In a typical week, where are most of your meals prepared?			45. How often do you eat any food, including meals and snacks, from a fast-food restaurant, such as Kentucky Fried Chicken, Hungry Lion, Zebros or another similar type of place?	46. Would you like to eat more healthily than you do?	47. If yes, please list the reasons you do not eat as healthily as you would like
		1→None 2→Less than half 3→Half 4→Most 5→All -7→ Refused -8→ Don't know	a. Food shopping?	b. Planning meals?	c. Preparing meals?	a. Breakfasts prepared?	b. Lunches prepared?			
48. For food purchased on the market with cash, where does your household normally buy them? [choose only one]					<input type="checkbox"/> ₁ Spaza shop <input type="checkbox"/> ₂ Shoprite <input type="checkbox"/> ₃ Checkers <input type="checkbox"/> ₄ Pick n Pay <input type="checkbox"/> ₅ Spar <input type="checkbox"/> ₆ Taxi rank retail <input type="checkbox"/> ₇ Woolworth <input type="checkbox"/> ₈ Informal markets <input type="checkbox"/> ₈ Other, specify _____					
49. Which of the following best explains your reason for buying from selected shop?					<input type="checkbox"/> ₁ Easy access <input type="checkbox"/> ₂ I do not have enough money <input type="checkbox"/> ₃ The prices of their foodstuffs are very cheap <input type="checkbox"/> ₄ Their food stuffs are of high quality <input type="checkbox"/> ₅ Other, specify _____ <input type="checkbox"/> ₇ Refuse <input type="checkbox"/> ₈ Don't know					
50. How far do you travel to purchase food?					<input type="checkbox"/> ₁ Under 200m <input type="checkbox"/> ₂ 201-700 m <input type="checkbox"/> ₃ 701- 1400 m <input type="checkbox"/> ₄ 1401- 2100 m <input type="checkbox"/> ₅ 2100+ m <input type="checkbox"/> ₇ Refuse <input type="checkbox"/> ₈ Don't know					
51. On the average, how much does your household spend on food in a month?					R _____ <input type="checkbox"/> ₇ Refuse <input type="checkbox"/> ₈ Don't know					
52. In the past week, has there been an instance where you attempted to buy food in your neighbourhood but could not access it due to unavailability?					<input type="checkbox"/> ₁ Yes <input type="checkbox"/> ₂ No <input type="checkbox"/> ₇ Refuse <input type="checkbox"/> ₈ Don't know					
53. If answer to question 52 is YES, which of the following actions did you take?					<input type="checkbox"/> ₁ I do nothing about it <input type="checkbox"/> ₂ I travel to nearby neighbourhood to buy that food item <input type="checkbox"/> ₃ Ask from a neighbour <input type="checkbox"/> ₄ I wait until it is available <input type="checkbox"/> ₅ Other (specify) _____ <input type="checkbox"/> ₇ Refuse <input type="checkbox"/> ₈ Don't know					

SECTION E: EATING HABITS (NB: This captures eating habits of household members who are adults (18+ years) and children (5-11 years)).

Person Code	Name of Respondent	54. In a typical week, how often do you eat the following meals? 1→ 0-1 day/week 2→ 2-3 days/week 3→ 4-5 days/week 4→ 6-7 days/week -9→ Not Applicable			55. In general, how often do you eat fruits? 1→ Don't eat fruit 2→ Never 3→Seldom 4→Often 5→ Always	56. In general, how often do you eat vegetables? 1→Don't eat vegetable 2→ Never 3→ Seldom 4→ Often 5→ Always	57. In a typical day, how many glasses of water do you take? 1→1-2 glasses 2→ 3-4 glasses 3→ 5-6 glasses 4→7-8 glasses 5→ 9+ glasses	58. How often do you eat fried food away from home? (e.g., fried chicken, fried fish) 1→Never 2→ once a week 3→ 2-3 times per week 4→ 4-6 times per week 5→ Daily	59. How often do you eat fried food at home? (eg. Fried chicken, fried fish) 1→Never 2→Once a week 3→ 2-3 times per week 4→ 4-6 times per week 5→ Daily	60. How much of the visible fat on beef, pork or lamb do you remove before eating? [Please read out all of the options to respondent] 1→Remove all visible fat 2→Remove most 3→Remove small part of fat 4→ Remove none 5→Don't eat meat -9→ Not Applicable	61. How often do you remove the skin from cooked chicken before eating? 1→Don't eat chicken 2→ Remove none 3→Seldom 4→Often 5→ Always -9→ Not Applicable
		a. Breakfast	b. Lunch	c. Supper							
62. When buying or preparing food for your household , do your children have a say in what they prefer or would like to eat?							<input type="checkbox"/> ₁ Never <input type="checkbox"/> ₂ Sometimes <input type="checkbox"/> ₃ Always <input type="checkbox"/> ₉ Not Applicable				

SECTION F: EATING HABITS (NB: This captures Parents (in particular, mother or caregiver's) concern about child's eating habits in household and at school if applicable. Asked to adults (18+ years)

Person Code	Name of Respondent	63. Are you concerned about your child's eating lifestyle 1 → Yes 2 → No -7 → Refused -8 → Don't know	64. If child attends school, how often does the child take food to school 1 → Never 2 → Seldom 3 → Sometimes 4 → Often 5 → Always -7 → Refused -8 → Don't know w	65. In the last day child attended school, did this child take food to school? 1 → Yes 2 → No -7 → Refused -8 → Don't know [If interview takes place on weekend, last school day is Friday]	66. If Yes Q65, what kind of food did the child take to school? [Fill answer below] -7 → Refused -8 → Don't know	67. Is this the usual food the child takes to school? 1 → Never 2 → Seldom 3 → Sometimes 4 → Often 5 → Always -7 → Refused -8 → Don't know	68. How often does the child take food to school? 1 → Never 2 → Seldom 3 → Sometimes 4 → Often 5 → Always -7 → Refused -8 → Don't know	69. How often do you inquire what the child eats from the feeding scheme? 1 → Never 2 → Seldom 3 → Sometimes 4 → Often 5 → Always -7 → Refused -8 → Don't know	70a. Does the child's school have a feeding scheme 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No -7 <input type="checkbox"/> Refused -8 <input type="checkbox"/> Don't know	70b. Has your child ever complained that he/she does not like the food given at school? 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No -7 <input type="checkbox"/> Refused -8 <input type="checkbox"/> Don't know
Q66. Write food type child took to school										
71. If Yes in Q63, what are your main concerns? [Chose more than one if applicable]		<input type="checkbox"/> ₁ Child losing weight <input type="checkbox"/> ₂ Child gaining weight <input type="checkbox"/> ₃ Child eats too little <input type="checkbox"/> ₄ Child skip meals <input type="checkbox"/> ₅ Child eats too much candies and chips <input type="checkbox"/> ₆ Child eats too frequently <input type="checkbox"/> ₇ Child likes fatty food <input type="checkbox"/> -								

SECTION I-1: SELF-PERCEIVED HEALTH STATUS & HEALTH CONDITIONS (NB: This captures self-perceived health status of household members who are adults (18+ years) and children (5-11 years)).

Person Code	Name of Respondent	82. In general, how do you perceive your health? 1→Excellent 2→Very Good 3→Good 4→Fair 5→Poor -7→ Refused -8→ Don't know	83. Please indicate which of the following health conditions this person currently has						84. In comparison to other individuals of your age and gender would you say you are physically: 1→much healthier 2→somewhat healthier 3→about the same 4→somewhat less healthy 5→much less healthy -7→ Refused -8→ Don't know	85. During the past 30 days, for about how many days did poor physical health keep this person from doing their usual activities, such as self-care, work, recreation or school? -7→ Refused -8→ Don't know
			a. Type 1 Diabetes 1 → Yes 2 → No -7→ Refused -8→ Don't know	b. Type 2 Diabetes 1 → Yes 2 → No -7→ Refused -8→ Don't know	c. Heart disease 1 → Yes 2 → No -7→ Refused -8→ Don't know	d. Cancer 1 → Yes 2 → No -7→ Refused -8→ Don't know	e. High blood pressure 1 → Yes 2 → No -7→ Refused -8→ Don't know	f. High cholesterol 1 → Yes 2 → No -7→ Refused -8→ Don't know		

SECTION I-2: SELF-PERCEIVED HEALTH STATUS & HEALTH CONDITIONS CONT'D (NB: This captures perceived health status of households (Household head and spouse if applicable))

Person Code	Name of Respondent (household head and spouse if applicable)	86. For each of the family relations, provide details on their past health condition(s)												
		a. Father [For each adult, tick all that apply]	b. Paternal Grandfather [For each adult, tick all that apply]	c. Paternal Grandmother [For each adult, tick all that apply]	d. Father's brothers [For each adult, tick all that apply]	e. Father's sisters [For each adult, tick all that apply]	f. Mother [For each adult, tick all that apply]	g. Maternal Grandfather [For each adult, tick all that apply]	h. Maternal Grandmother [For each adult, tick all that apply]	i. Mother's brothers [For each adult, tick all that apply]	j. Mother's sisters [For each adult, tick all that apply]	k. Your brothers [For each adult, tick all that apply]	l. Your sons [For each adult, tick all that apply]	m. Your daughters [For each adult, tick all that apply]
		<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	
		<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	<input type="checkbox"/> ₁ Severe Obesity <input type="checkbox"/> ₂ Heavy <input type="checkbox"/> ₃ Normal Weight <input type="checkbox"/> ₄ Diabetes <input type="checkbox"/> ₅ Heart Problems <input type="checkbox"/> ₉ Not Applicable	

93. What do you think can be done to control obesity?	<hr style="border: 1px solid black;"/>
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SECTION K-1: SCHOOL FEEDING PROGRAM *(This Section captures child food choices and eating habit outside the household. Only children 5-11 years are to answer this section)*

Child Code	Name of Respondent	94. What is your current grade (if child attends school? See Q8 Section A) (Interviewer confirms with HH or person answering for the child)	95. Does your school give food at school? 1 → Yes 2 → No -7 → Refused -8 → Don't know [If NO skip to question 97]	96. If Yes in 95, how often do you eat the food provided by the school? 1 → Always 2 → Sometimes 3 → Never -7 → Refused -8 → Don't know	97. Do you take food to school? 1 → Yes 2 → No -7 → Refused -8 → Don't know	98. In the last 5 days of school, how many days did you take food to school? 1 → Every day 2 → One day 3 → Two days 4 → Three days 5 → Four days 6 → Never -7 → Refused -8 → Don't know	99. In the past 5 days at school how many days did you not have anything to eat at school? 1 → Every day 2 → One day 3 → Two days 4 → Three days 5 → Four days 6 → Never -7 → Refused -8 → Don't know	100. At what period are you normally allowed to eat in school 1 → First break and Lunch 2 → Lunch time only 3 → Anytime during class 4 → Anytime outside class -7 → Refused -8 → Don't know	101. During lunch time do you buy food at school shop/ nearby spaza shop? 1 → Yes 2 → No -7 → Refused -8 → Don't know	102. Does your Parent or caregiver give money to buy food at school 1 → Always 2 → Sometimes 3 → Never -7 → Refused -8 → Don't know	103. Does your school prepare meal and ask pupils to bring money to buy? 1 → Always 2 → Sometimes 3 → Never -7 → Refused -8 → Don't know
Child Code	Name of Respondent	104. What items do you usually buy on your way to school, at school or on your way back home? List below the kind of food you usually buy or eat on the way.									

SECTION K-2: CHILD WATER INTAKE (*This Section captures child water intake at school*)

Child Code	Name of Respondent	105. Does your school have a running tap on the premises accessible to pupils 1 → Yes 2 → No -7 → Refused -8 → Don't know	106. Does your classes have water and cups for pupils to drink water while in class 1 → Yes 2 → No -7 → Refused -8 → Don't know	107. Do you have a water bottle 1 → Yes 2 → No -7 → Refused -8 → Don't know	108. In the past 5 days of school, how often did you take your water bottle to school? 1 → Every day 2 → One day 3 → Two days 4 → Three days 5 → Four days -7 → Refused -8 → Don't know	109. Are you allowed to drink water anytime in class? 1 → Yes 2 → No -7 → Refused -8 → Don't know	110. Do you sometimes have juice /tea/milk or other drinks in your water bottle instead of water? 1 → Yes 2 → No -7 → Refused -8 → Don't know	111. What is the size of your water bottle (Please show child image to select from list?) 1 → 300ml 2 → 500ml 3 → 750ml 4 → 1000ml -7 → Refused -8 → Don't know	112. How many glasses of water do you drink per day? -7 → Refused -8 → Don't know	113 Do you drink all your water bottle content in school 1 → Yes 2 → No -7 → Refused -8 → Don't know

SECTION L-1: BEST INTEREST OF THE CHILD CONT'D (*What is your opinion about the following statement*)

Child code	Name of Respondent	114. Do you ask for food when you feel hungry 1 → Always 2 → Sometimes 3 → Never -7 → Refused -8 → Don't know	115. Do you ask for food when there is food in the house 1 → Always 2 → Sometimes 3 → Never -7 → Refused -8 → Don't know	116. Do you eat late because food is prepared late 1 → Always 2 → Sometimes 3 → Never -7 → Refused -8 → Don't know	117. Is your portion of food kept when you do not want to eat? 1 → Always 2 → Sometimes 3 → Never -7 → Refused -8 → Don't know	118. Do you sometimes skip meals at home 1 → Yes 2 → No -7 → Refused -8 → Don't know	119. Do you sometimes refuse to eat from neighbour's house? 1 → Yes 2 → No -7 → Refused -8 → Don't know	120. Do your parent stop you from eating food giving by neighbours/stranger 1 → Always 2 → Sometimes 3 → Never -7 → Refused -8 → Don't know	121. Do your parent stop you from eating fatty food 1 → Always 2 → Sometimes 3 → Never -7 → Refused -8 → Don't know

SECTION L-2: BEST INTEREST OF THE CHILD (*What is your opinion about the following statement*)

Child code	Name of Respondent	122. Do you think the food you eat is what you like 1→ Always 2→ Sometimes 3→Never -7→ Refused -8→ Don't know	123. Do your parents ask for what you like to eat when they go shopping? 1→ Always 2→ Sometimes 3→Never -7→ Refused -8→ Don't know	124. Do you feel hungry shortly after eating a full meal? 1→ Always 2→ Sometimes 3→Never -7→ Refused -8→ Don't know	125. Do you think that your plate of food is usually too small 1→ Always 2→ Sometimes 3→Never -7→ Refused -8→ Don't know	126. Do you think food is served when you are no longer hungry? 1→ Always 2→ Sometimes 3→Never -7→ Refused -8→ Don't know

CONTACT DETAILS

1	Apartment number (if any)	
2	Street Address (if any)	
3	Suburb or Local Area	
4	Town or City	
5	Post Code	
6	A landline we can contact this household on	

THANK YOU FOR YOUR PATIENCE AND COOPERATION!