Nutrition transition of adolescents (15-18 years) in the Francistown area, Botswana

ADAMS, T (10574302)

DISSERTATION

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Nutrition transition of adolescents (15-18 years) in the Francistown area, Botswana

by

Tothodzani Adams

Dissertation submitted in partial fulfilment of the requirement for the degree

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in the

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Supervisor: Dr AT Viljoen

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Dedication

This dissertation is dedicated to all the respondents and the Botswana Government

who made this study a success

through their shared experiences and the monetary aspect.

Lastly this dissertation is dedicated to my beloved parents

for my upbringing and the support they showed me throughout my studies;

I love you with all my heart.

Declaration

I, **Tothodzani Adams**, hereby declare that the **dissertation** hereby submitted by me is my own work for a **Masters degree in Consumer Science** at the **University of Pretoria**, and has not previously been submitted for a degree at this university or any other university. It is my own work in design and execution and all reference material contained herein has been acknowledged.

…… ……

TOTHODZANI ADAMS **DATE**

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- Above all I thank the Almighty God for His blessings and guidance, and all that I am today.

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Abstract

TITLE: **Nutrition transition of adolescents (15-18 years) in the Francistown area, Botswana**

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Department: **Consumer Science**

Faculty: **Natural and Agricultural Siences, University of Pretoria**

Degree: **Master of Consumer Science (General)**

The current eating patterns of mid-adolescents in the Francistown area, in various contexts and situations are described to find out how their current food habits and food choice behaviour reflect the nutrition transition in Botswana. The investigation focuses on the extent to which traditional and Western-orientated foods figure in the diets of these young people. From documenting their current food habits at the same time, it was clear the external environments and the individual's preferences influence their food choice behaviour.

Worldwide, the nutrition transition underlies many public health problems associated with nutrition-related non-communicable diseases like obesity, diabetes and hypertension. Sub-Saharan Africa similarly, experiences a nutrition transition in that a Western-orientated food culture has gradually replaced traditional foods and food patterns. Botswana too reflects the presence of a nutrition transition. As there is limited information on the eating patterns and food-related behaviour of mid-adolescents in Botswana, this study fills a gap in the literature. This explorative, descriptive study followed a quantitative research design. A pretested, self-administered survey questionnaire, consisting of closed and open-ended questions, was developed. In three senior secondary schools in Francistown 242 Form 4 learners completed the questionnaire. Information gathered concerned the current eating patterns of the respondents, the extent of their snack and fast food consumption and their familiarity, preferences and frequency of consumption of traditional foods.

Results reflect a change from the traditional meal pattern and its composition to a Western-orientated pattern of three meals a day with in-between meal snacking. Breakfast consisted of either tea and bread, or tea and a soft porridge prepared from sorghum or maize meal. Maize and sorghum continue to be the staple grains. They form part of at least one or more

meals a day. Lunch and supper included stiff cereal porridges or cooked cereal grains prepared from the staple grains. Meat or a vegetable relish or legume dish accompanied these meals.

Most respondents regularly enjoyed traditional Batswana foods, giving positive responses and reasons for doing so. These traditional foods, specifically the staple foods (maize, sorghum and millet) and indigenous legumes are eaten regularly. This study gives valuable insight into how knowledge, beliefs, attitudes and values contribute to food choice behaviour related to healthy eating and traditional foods. Although the respondents were knowledgeable about healthy eating it was not regular practice, and specifically evident in the low consumption of fruit, vegetables and dairy products. This observation raises concerns. Respondents consumed modern foods that are readily available in the external environments of their homes, schools and in retail stores. However, their attitudes, values and beliefs about traditional foods remained positive.

Recommendations from the results of this study suggest that proper nutrition education and nutrition curriculum planning in schools could increase vegetable, fruit and dairy consumption and discourage the consumption of high fat and sugar containing snack foods, particularly among mid-adolescents. In conducting a study there were limitations the researcher encountered mainly that access to respondents who were learners at the previously mentioned schools was not easy to effect.

Keywords:

Eating patterns

Food choice behaviour

Food context

Food habits

Meal composition

Mid-adolescents

Nutrition transition

Traditional Batswana foods

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List of Abbreviations and Acronyms

BMPD	Biomedical Package-statistical software
BW	Botswana
CVD	Cardiovascular Disease
FAO	Food and Agricultural Organisation
KFC	Kentucky Fried Chicken
NCD	Non-communicable Diseases
NR-NCD	Nutrition Related Non-communicable Diseases
SAS	Statistical Analysis System
WHO	World Health Organisation
ZCC	Zion Christian Church

Chapter 1

THE STUDY IN PERSPECTIVE

1.1 INTRODUCTON AND BACKGROUND

Worldwide today the phenomenon 'nutrition transition' underlies many public health problems and challenges particularly in the case of nutrition-related non-communicable diseases (NCDs) such as obesity, diabetes and hypertension. Nutrition transition is described as a change from a traditional, indigenous diet dominated by high-fibre starchy foods and a low-fat intake to a more Western-orientated type of diet with more processed foods that are energy-dense. This includes a substantial increase in the consumption of fats and oils, sugars, sweeteners and refined foods (Popkin, Adair & Ng, 2011; Feeley, Pettifor & Norris, 2009; Zingoni, Norris, Griffiths & Cameron, 2009; Popkin 2006; Vorster, Margetts, Venter & Wissing, 2005b; Popkin, 2004). Some studies define nutrition transition as a sequence of characteristic changes in dietary patterns and nutrient intake associated with social, cultural and economic changes during the time of a demographic transition (Vorster *et al*., 2005b; Popkin, 2002). It is to be stressed that the pace of dietary change has accelerated to varying degrees in different regions of the world (Popkin, 2011a; Popkin, 2011b). It is a worldwide cause for concern that the nutrition transition has far-reaching effects on public health in so many different ways. It is, however, widely accepted that it is accelerated by high urbanisation rates (Feeley *et al*., 2009; Vorster, Bourne, Venter & Oosthuizen, 1999) and associated with the high occurrence rates of NCDs in developing countries (Popkin, 2011a; Vorster *et al*., 2005b).

The impact has been disastrous and over the past decades sub-Saharan Africa has experienced a nutrition transition in a way that traditional foods and food patterns have progressively been replaced by a Western-orientated food culture (Raschke, Oltersdorf, Elmadfa, Wahlqvist, Cheema & Kouris-Blazos, 2007; Popkin, 2004). It is estimated that currently the NCDs in sub-Saharan Africa account for 40% of deaths and that in developing countries there will be a threefold increase in deaths due to cardiovascular disease (CVD) and type 2 Diabetes (WHO, 2010; Raschke, *et al*., 2007).

Botswana, a sub-Saharan African country with a population of 1.85 million and a growth rate of 2.4% per annum, also experiences the same phenomenon of nutrition transition. According to the World Health Organisation (WHO) Global Information Data, mortality for all NCDs in Botswana was 17.1% for males and 19.8% for females. This is

a matter of concern as the age distribution is heavily weighted towards the younger age groups with approximately 43% of the population in Botswana being younger than 15 years of age (WHO, 2010).

Nutrition transition is the result of escalating rates of urbanisation, modernisation, technological advancements and the changing of traditional lifestyles to a Western lifestyle (Popkin, 2011b; Madanat, Lindsay & Campbell, 2010; Vorster *et al*., 1999). Botswana is a classic example of urbanisation in sub-Saharan Africa, as is evident in the expansion taking place within its cities, and the emergence of new urban centres (Giddings & Hovorka, 2010; Ijagbemi, 2003). Most Batswana today live in cities, predominantly residing in the growing capital city of Gaborone.

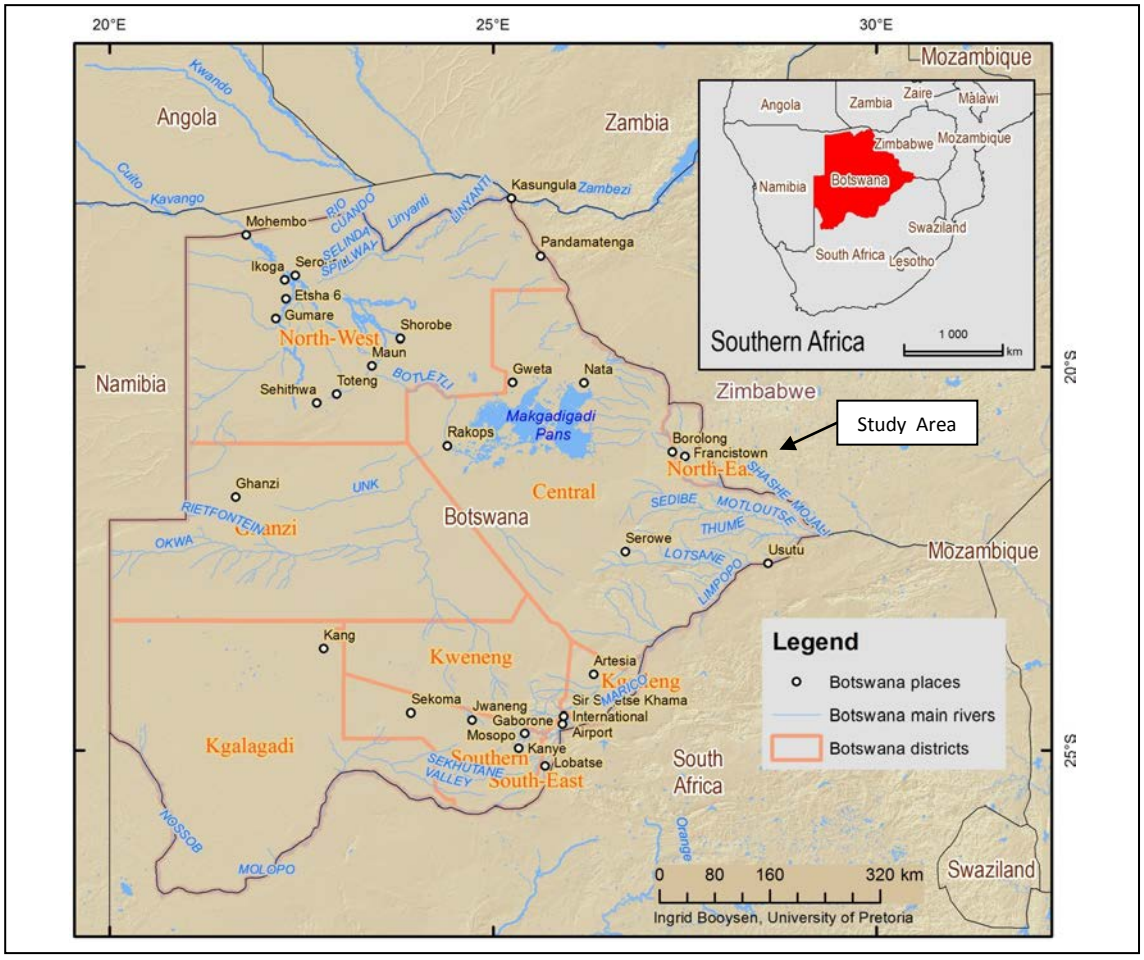


FIGURE 1.1: BOTSWANA ORIENTATION MAP

Geographically Botswana is a landlocked country bordered by its neighbours, South Africa, Namibia, Zimbabwe and Zambia. Relief-wise the country is flat and 84% of the country lies in the Kalahari Desert (Botswana Tourism Board, 2009:8).

Historically the Batswana are agro-pastoralists although this form of livelihood is under threat due to Botswana's susceptibility to drought (Kruger & Grotzke, 2009). Fearing

famine, people move to towns for an income-based livelihood that leads to on-going rural-urban migration, a practice that accounts for the fact that over 50% of the population has now settled in urban areas (Botswana Tourism Board, 2009:8). By 2001 the level of urbanisation in Botswana had increased from 9% in 1971 to about 52.9% in 2001. This alarming rate of urbanisation is estimated from results of the 2001 national census, with a projection that it will increase up to 55.6% by the year 2011 (Giddings & Hovorka, 2010; Gwebu, 2004; Ijagbemi, 2003; Gwebu, 2003). These figures show that the urbanisation process in Botswana is primarily fuelled by the influx of migrants from the rural areas rather than by a natural increase in the existing urban population (Botswana Tourism Board, 2009:8; Ijagbemi, 2003).

Other contributing factors to urbanisation are opportunities for education and employment. The extensive literature on urbanisation in Africa highlights the fact that migrants are either attracted by the glamour and opportunities which urban centres offer or are pushed out by the hardships experienced in the rural areas or both. Whatever might be the motive for migration these migrants form a significant proportion of the urban population (Gwebu, 2004; Ijagbemi, 2003). Technological advancement and convenience also influence rural-urban migration due to the ease of access to food, health facilities, schools, roads and other infrastructures (Weatherspoon & Reardon, 2003). A study conducted by the Food and Agricultural Organisation (FAO) in 2007 reveals that the rapidly increasing rate of urbanisation, which stands at 5% in sub-Saharan Africa, is one of the most striking demographic features of the last half of the twentieth century and has implications for all aspects of food production and consumption (Popkin, 2011a). It is thus inevitable that these socio-economic developments, which include varying degrees of modernisation and Westernisation, will influence dietary habits and bring about a change in food consumption patterns (Kittler, Sucher & Nahikian Nelms, 2011:11; Popkin, 2011b).

Since independence the Batswana have also experienced many lifestyle changes of which the rapid and accelerating changes in eating patterns have resulted in numerous social problems that have affected all members of the society (Maundeni & Ntseane, 2004). As the Batswana begin to adopt Western-orientated food consumption patterns, the composition of meals has become different resulting in an over-consumption of fat, sugar and kilojoules. This has contributed to the challenge the Batswana are facing today in that they find it difficult to follow good eating habits (Maruapula & Chapman-Novakofski, 2007).

It is further observed in southern Africa that the nutrition transition has gathered momentum through the rapid increase in the number of supermarkets and because

supermarkets today offer a large and regular supply of food to consumers. It has now become easier for consumers to purchase food instead of cultivating produce (Popkin, 2011b; Reardon, Timmer, Barrett & Berdegue, 2003; Weatherspoon & Reardon, 2003). However, it is not only supermarkets that have contributed to the nutrition transition, but also the phenomenal growth of the fast food industry. The increased rate of fast food consumption has had a negative impact on the food habits[1] and food choice behaviours of people in both developed and developing countries (Van Zyl, Steyn & Marais, 2010). Various studies confirm that the major reason for the shift away from traditional staple foods is convenience (FAO, 2008; Vorster, Venter, Wissing & Margetts, 2005b; Viljoen, Botha & Boonzaaier, 2005). The age groups that appear to have undergone the most dramatic changes in food habits over recent decades are adolescents (12-18 years old) and young adults (19-29 years) (Van Zyl, *et al*., 2010).

Adolescence is the period of life between 11 and 21 years of age (Brown, Isaacs, Krinke, Murtaugh, Sharbaugh, Stang & Wooldridge, 2011). It is an especially nutritionally vulnerable period of life for several reasons (Spear, 2002; Sturdevant & Spear, 2002). This life stage is considered to be the bridge between childhood and adulthood (Treuth & Griffin, 2006:819). It is a critical period that brings about many changes at all levels that it also involves numerous psycho-social challenges including the establishing of individual eating patterns[2] (Brown *et al*., 2011; Videon & Manning, 2003; Story, Neumark-Sztainer & French, 2002;). It is specifically the mid-adolescents (15-18 years old) who are experiencing the most dramatic changes in food habits and its consequences, as seen in the increasing number of studies that confirm the high incidence of obesity (Van Zyl *et al.,* 2010; Otinwa, 2009).Mid-adolescence is thus a life stage characterised by a search for independence and identity when a person is developing and maturing sexually, emotionally, cognitively and physically (Mahgoub, Chilisa & Lombe, 2000). This is also the life stage where a person's future eating patterns are established (Venter & Winterbach, 2010; Feeley *et al.,* 2009; Videon & Manning, 2003).

[1] Food habits are the practices and associated attitudes that predetermine what, when, why, and how a person will eat, given preferred alternatives (Eckstein, 1980:15). This description of Eckstein resembles Mead's (1945) definition that a food habit "….. is the way in which individuals or groups of individuals, in response to social and cultural pressures, select, consume, and utilize portions of the available food supply (National Research Council, 1945:13)."

[2] Eating patterns are recurring patterns in which an individual chooses, prepares and consumes food from the available, acceptable food for a specific meal or snack. Eating patterns include the specific combination of foods that are used as a meal or a snack as well as the distribution of the meals and snacks through the day. Eating patterns therefore describe the meal composition and meal distribution of an individual or group (Viljoen & Gericke, 1998).

1.2 PROBLEM STATEMENT AND JUSTIFICATION

As Botswana is not an exception to the global observation of changing eating patterns, there is a growing concern regarding the future health of the people of Botswana in general. There is a gap in the research as far as the Botswana population is concerned because limited information is available on their current eating patterns and food-related behaviour. Apart from one study on the eating patterns of the Batswana conducted by Grivetti in 1976, there are only four recent studies on the eating patterns of specific age groups in the population. Two studies dealt with elderly, namely those by Maruapula and Chapman-Novakofski (2007) and the other three were on adolescents conducted by Mahgoub *et al.* (2000), Otinwa (2009) and Maruapula, Jackson, Holsten, Shaibu, Malete, Wrotniak, Ratcliffe, Mokone, Stettler and Compher (2011). Information on food habits is still lacking because these studies basically focus on the occurrence of obesity and diabetes and not on the underlying cause, the nature of the person's food habits. Currently nothing is known about the food habits of adolescents in Botswana as no study has been conducted yet to establish the extent of the nutrition transition of this population age group.

In this study the current food habits and food choice behaviour of mid-adolescents in the northern part of Botswana were determined and described, and their contribution to the nutrition transition of mid-adolescents living in the Francistown area noted in various contexts and situations (family, friends or peer group and when experiencing time constraints). Furthermore how they perceived their own food choices in each of these contexts and situations was documented. This was done in order to give an indication of the extent to which traditional and Western-orientated foods figure in the diets of this group. In exploring and describing their current food habits and identifying how the external environment and individual influences affect food choice behaviours, these are investigated. Baseline information was collected in order to gain insight into the current eating patterns and food choice behaviour of mid-adolescents in the Francistown area. The researcher was thus interested in finding out whether mid-adolescents in Botswana are moving away from a traditional Batswana type of eating pattern to a Western-orientated one, what food choice behaviours are associated with their food practices and the degree to which they still eat indigenous, traditional foods.

1.3 RESEARCH OBJECTIVES

The following objectives were set to guide the research:

1. To determine and describe the current food habits of mid-adolescents (15-18 years) in the Francistown area of Botswana (henceforth referred to as the study group)

2. To determine and describe to what extent traditional (indigenous), snack or fast foods are included in the eating patterns of the study group and their frequency of consumption and preference ratings

3. To determine and describe in which of the following contexts or situations traditional (indigenous) and/or modern (Western-orientated) foods are considered for consumption in:

    - family/household context;
    - friends/peer group context; and
    - when experiencing time constraints.

4. To explore and describe how the various external environments (physical environment, economic and political environment, and socio-cultural environment) contribute to the food choice behaviour of the study group

5. To determine and describe the contribution of the individual environment (knowledge, attitudes, beliefs, values) on the food choice behaviour of the study group

6. To interpret and describe the implications of the nutrition transition on the current eating patterns of the study group

1.4 RESEARCH DESIGN AND METHODOLOGY

In this explorative and descriptive study, a quantitative research approach was followed. Data for this cross-sectional study was collected by means of a pilot tested survey questionnaire. The questionnaire measured different dimensions of food habits, including the respondents' familiarity, frequency of consumption, attitudes and beliefs regarding traditional Batswana as well as modern / Western-orientated foods. The contexts or situations when these foods were consumed were included in the investigation. Observations by means of an observation check list that focused on the various external environments (physical/natural, economic and socio-cultural) including the school environment of the respondents formed part of the data collection to

contextualise the food consumed by the study group during the school days. The survey questionnaires were completed by 242 secondary schoolchildren in the Francistown area, Botswana.

1.5 DELIMITATIONS OF THE STUDY

The study was confined to the Francistown area in Botswana. All three senior secondary schools participated in the study. Data was collected from those mid-adolescents between the ages of 15-18 years who obtained the required informed consent from their parents/guardians to participate in the study.

1.6 OUTLINE OF THE RESEARCH REPORT

Figure 1.2 presents the outline of the research report showing a list of basic content as discussed in each chapter. Chapter 1 starts with a background, problem statement and justification, gives the research aim and objectives explain the research design and methodology followed and gives the delimitations of the study. Chapter 2 explains the theoretical perspective the research is based on and reviews the literature for theory and research, and further strives to conceptualise and contextualise the research pertaining to food choice and food habits for this study. In Chapter 3 adolescence as life phase is explained together with the food choices and nutritional needs that are associated with it. Chapter 4 explains the research design and methodology employed in this study, describes the measurement instruments and how the data was collected and analysed. Chapter 5 describes and discusses the data. Chapter 6 draws the conclusions, evaluates the study and makes recommendations.

1.7 CHAPTER CONCLUSION

The introductory chapter sketched the background and introduction in order to contextualise the problem statement and justification for the study. It included the research objectives, methodology followed and delimitations of the study. Lastly, an outline of the structure of the report was given.

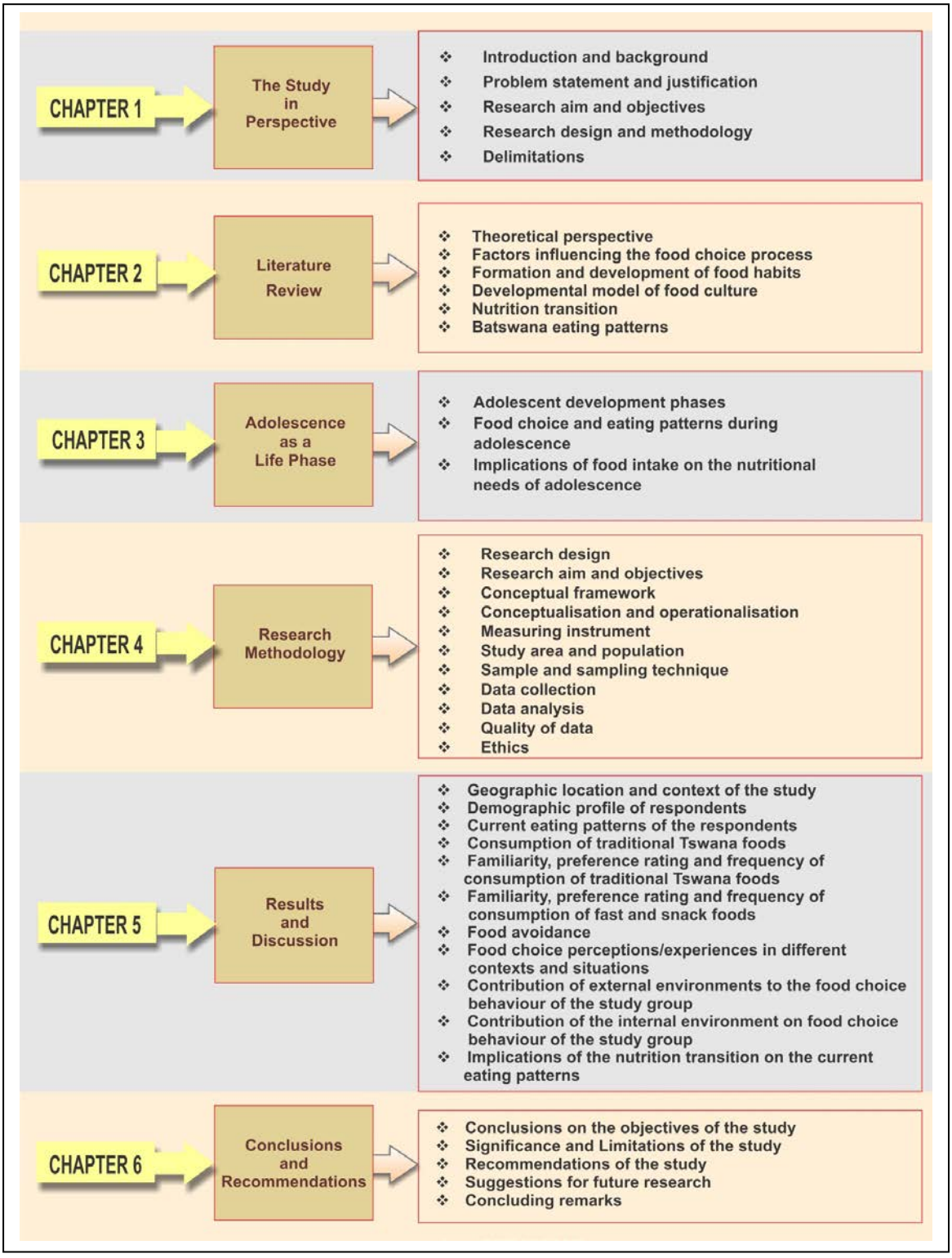


FIGURE 1.2: OUTLINE OF THE RESEARCH PROJECT

The next chapter addresses the theoretical perspective, reviews the literature on the food choice process, formation of food habits and how Batswana food patterns developed and evolved.

Chapter 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter provides a review of the literature that deals with the theoretical perspective on which the research is based and explains how the study will be approached. The chapter then continues with a review of the factors influencing the food choice process and elaborates on how food habits are formed and developed. The developmental model of food culture and nutrition transition is described. Lastly the development of the Batswana eating patterns is given to help in further contextualising the study.

2.2 THEORETICAL PERSPECTIVE

This section deals with the brief description and justification of the theoretical perspective chosen for this study. By clarifying the perspective, the ideas and compatible methodologies and ways of discovering new knowledge become clearer. A perspective is a point of view or framework. A theoretical perspective is a larger framework for organising knowledge and guiding inquiry (Kaiser, 1990:32). To have a perspective helps when reflecting on the subject under study and using critical thinking to analyse patterns of relationships within an articulated viewpoint. It assists in developing a framework that spells out the basic questions the researcher is trying to answer. Hence meaningful coherence and direction are provided for pursuing further knowledge (Kaiser, 1990:32). In this research on the food habits of adolescents in Botswana, the human ecological perspective serves as the theoretical perspective and is regarded as appropriate because it views individuals within the context of their own environments that differ from person to person. The perspective focuses on individuals as both biological and social beings that are in interaction with their environments (Story *et al.,* 2008; Bubolz & Sontag, 1993:425).

Multiple factors from various external and internal environments influence human food habits and the food choice process. The perspective assumes that all factors affecting a situation are interdependent and interrelated. Therefore, the phenomena under study should be viewed from a holistic point of view. Furthermore, it allows for the investigation of the relationship between multiple interacting environmental factors.

The factors contributing to the food choice process are grouped by some as macro-, exo-, meso- and micro-environmental factors (Larson & Story, 2009; Story *et al*., 2008:; Bronfenbrenner, 1994; Bubolz & Sontag, 1993:425; Sims & Smiciklas-Wright, 1978). The macro-environment, for example, refers to the physical environment; the exo- and meso-environments together inform the societal environmental levels of the economic and political and socio-cultural environments. The micro-environment refers to the individual or personal environment. The human ecological systems perspective was the most appropriate to use in this investigation as it allows for the consideration of the interacting dynamics of the environmental forces and their components. The perspective is dynamic so accommodates the relative changes that are characteristic of the problem under study. It can be used to investigate the relationship between interacting or linked environments thus addressing the problem holistically. The following assumptions of the human ecological perspective as emphasised by Bubolz & Sontag (1993:425-426) applied to this study:

- All parts of the environment are interrelated and influence each other.
- Humans interact with multiple environments.
- Humans respond to, change, develop, act on, and modify their environments. Adaptation is a continuous process in ecosystems.
- Environments do not determine human behaviour, but pose constraints as well as possibilities and opportunities for humans.

Examples to illustrate what each of these assumptions of the human ecological perspective means in terms of food habits are given.

i. **All parts of the environment are interrelated and influence each other.**

The physical environment affects our food production in the sense that when the soil is fertile and the rainfall is good farmers normally produce quality products and harvest larger yields. Another example relates to the north-eastern part of Botswana where mophane trees dominate. When the rainfall is good the foliage of these trees provide food for edible worms, known as *phane* (mopane worms/caterpillar worms). The abundance of *phane* worms will cause large numbers of people to go out and camp in the bush to harvest them, because they are more readily available and accessible in this area than is other parts of the country (Lucas, 2010:4; Sebego, Arnberg & Ringrose, 2008). As a result of the socio-cultural environment most people in this area eat *phane* worms because the habit is acceptable according to their culture and they are familiar with it. It is an individual's choice as to whether a *phane* worm is

considered edible as this is guided by the individual's cultural background as well as the acceptance of the sensory attributes of *phane* worms.

The above example also illustrates that environments are interrelated and influence each other as humans interact with multiple environments. In those areas in Botswana where *phane* worms are not harvested people could obtain them through interaction with other people coming from the north-eastern parts. The abundance of worms there, and the fact that it is not available all year round, gives people the opportunity to preserve *phane* worms by drying them to ensure availability when they are not in season. People therefore take the opportunity to sell them. In this instance the people are interacting not only with the physical environment but also with the economic and political environments, as some people sustain their lives from harvesting and selling worms. In Botswana, laws and regulations do not prohibit the harvesting, use and selling of *phane*. It is allowed and harvesting can be done by anyone and everywhere in the bush (Lucas, 2010:10; Stack, Dorward, Gondo, Frost, Taylor & Kurebgaseka, 2003).

ii. **Humans respond to, change, develop, act on, and modify their environment. Adaptation is a continuous process in ecosystems.**

The ecological concept of adaptation refers to continuous, change-orientated processes, cognitive, sensory–perceptual and behavioural processes that people use to sustain or improve the level of fit between themselves and their environments (Gitterman, 1996). People adapt by changing the environment, or themselves, or both. In contrast to adjustment which can be described as a passive fitting into the social order, adaptation refers to an active, change-orientated process. Adaptations include actions to change the environment (including moving to new environments), or people themselves, or both. Then adapting to those changes and changes made to the environment (such as natural disasters or new social expectations) is a never-ending process. Humans can adapt to nearly all environments as they are able to respond to change since they have the ability to adopt or act on and modify their environment. Through adaptation humans can specifically digest a wide selection of plants and animals available in their environments (Kittler *et al*., 2011:2).

An example of adaptation and responding to change in a new environment is that of the hunter-gathers. People hunted wild animals and collected wild fruits and vegetables for food consumption. This was determined by what was available in their environments. For example, food availability and accessibility in the physical environment changed when people moved from a rural area to live in an urban area. Here hunting and gathering is no longer performed so people have to eat what is now

available in the urban retail environment. Instead of gathering indigenous green leafy vegetables (such as the Pigweed/*Amaranthus,* locally known as *thepe*) people adapt and purchase cultivated green leafy vegetables such as spinach, as a substitute for the indigenous green leafy vegetables. Today, people have thus reacted to changes that have taken place in their physical environment due to changing circumstances and conditions.

iii. **Environments do not determine human behaviour, but pose constraints as well as possibilities and opportunities.**

In urban areas, for example, the supply of indigenous green leafy vegetables is limited. Therefore it poses a constraint for the people who would like to collect and consume indigenous green leafy vegetables. In some instances they can purchase cultivated green leafy vegetables such as spinach as it is generally abundantly available in urban markets. Spinach can then be substituted for what they initially consumed as indigenous green leafy vegetables (*thepe*). The constraint of not finding an indigenous green leafy vegetable has given the opportunity to use and taste other green leafy vegetables (spinach) sold in the urban market.

A broad range of factors has been identified as influencing the food choices of young people (Sobal & Bisogni, 2009; Sobal, Bisogni, Devine & Jastran, 2006; Furst, Connors, Bisogni, Sobal & Winter Falk, 1996). Therefore in this study, it is also important to consider these factors from an ecological perspective in that pays particular attention to the relationship between individuals and their environments. Moreover this approach views behaviour as both affecting and being affected by multiple levels of influences (Fitzgerald, Heary, Nixon & Kelly, 2010). In the next section these are addressed.

2.3 FACTORS INFLUENCING THE FOOD CHOICE PROCESS

Food choice is a complex process that is deeply embedded in culture, influenced by many factors, both external and internal to the person and carries many different meanings (Contento, Williams, Michela & Franklin, 2006; Rozin, 2006:19). The range of factors potentially involved in choosing foods is diverse (Sobal *et al*., 2006:2) as almost everything influences food choice, at one time and place or another (Rozin, 2006:19). These factors are grouped as either external or internal environments. To structure the discussion the model by Viljoen (2009:23) will be used to illustrate the external environment (macro-, exo- and meso) and internal environment (micro) and

where each contributes to the food choice process. Figure 2.1 shows where and how these environments operate in the food choice process.

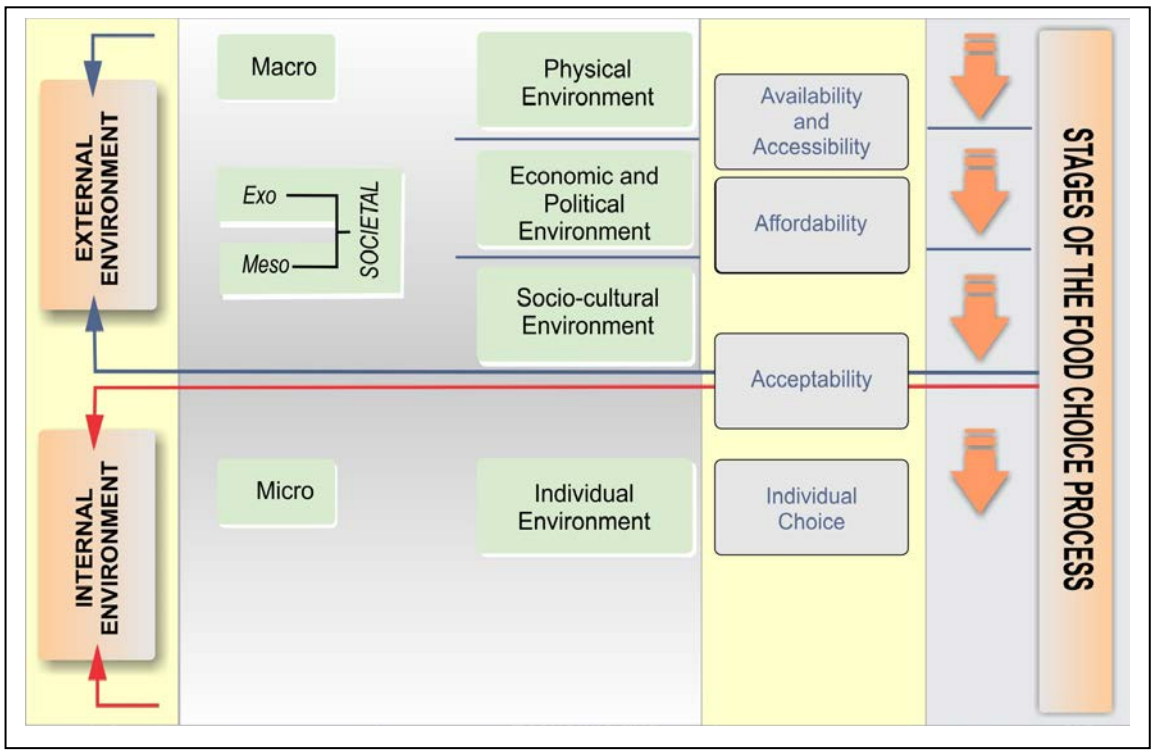


FIGURE 2.1: ENVIRONMENTAL LEVELS CONTRIBUTING TO THE FOOD CHOICE PROCESS (Viljoen, 2009:23, 279)

2.3.1 External environmental factors

The external environment consists of the physical environment (macro-), the economic and political environment (exo-) as well as the socio-cultural environment (meso-) (Story *et al*., 2008). The physical environment refers to the natural environment and human built environment. The physical environment includes climate, topography and soil conditions, which determines what food can be produced whereas the human built environment includes technological developments for the processing, storing and distribution of food. The external environment therefore mainly determines the purchase, location, availability and accessibility and diversity of food products for human consumption (Story *et al*., 2008; Eertmans, Baeyens & Van Den Bergh, 2001). These external environments influence the availability and accessibility of food (Larson & Story, 2009; Bryant, De Walt, Courtney & Schwartz, 2003:3). There is a whole sequence of steps leading from the availability and accessibility of foods to final consumption. However, it is to be noted that the food should first be available in the

neighbourhood (stores); the next step will the selection in the store; the third step involves taking the food into the home situation.

The broader economic and political environment also impacts on the food choice process. This environment refers to the ways humans are organised and stratified within groups, amongst which are communities, nations, and regions. It also involves the way in which production, exchange and consumption of all goods are managed and this would include food products. The economic and political environment thus influences people's access to food and other resources as well as their capacity to exploit these resources (Bryant *et al*., 2003:13). For example, the economic and political situation of a country may lead to a situation whereby lack of transportation of food and limited storage facilities in a rural or remote area would result population groups living there to be deprived of an adequate intake of food since the availability and accessibility of food will be limited. Research indicates that inaccessibility to food stores limits food choice and food consumption. These are major limiting factors to an adequate food supply being available or accessible (Richards & Smith, 2007). Those people residing in disadvantaged areas where income is often lower and location remote, or the place is difficult to reach, will have less access to supermarkets and convenience stores and fewer healthy food choices available in stores (Williams, Thornton, Ball & Crawford, 2011).

The physical environment influences what foods are available and accessible in a community. These are the macro-level environmental factors associated with a more distal and indirect role but also have a substantial and powerful effect on what people eat (Larson & Story, 2009; Story *et al*., 2008). Take for an example, children's consumption of vegetables. The physical environment determines whether vegetables are available in the multiple contexts where children spend their time - home, school and other social places or contexts. Climatic and soil conditions would thus determine whether families had easy access to high-quality and affordable vegetables in their neighbourhood or not. Children consuming home-cooked meals have an opportunity to eat more vegetables than those who consume meals in other places (Sweetman, McGowan, Crocker & Cooke, 2011).

In terms of affordability, cost is an important influence on food choice in situations where the food is available and accessible. Normally what a person can afford influences food choices. Income level and cost are the most significant socio-demographic factors in predicting the selection of food from that which is available and accessible. The issue of affordability differs from one individual to another, even if they are in the same environment. For example, individuals tend to spend a smaller

percentage of their disposable income on food as their income increases (Larson & Story, 2009; Story *et al*., 2008).

The economic and political environments contribute to having more supermarkets in urban areas, which provide the opportunity to select from a wider variety of foods. Stores selling a wide variety of food items such as chain supermarkets tend to be located in areas that are predominantly in middle or high socio-economic areas (Freedman & Bell, 2009; Larson & Story, 2009) whereas, convenience stores and smaller non-chain grocery stores are more prevalent in lower socio-economic areas. The types of foods sold inside these food stores differ by social context according to income and eating preferences. For instance, foods sold in convenience or non-chain grocery stores, are typically more expensive than the same product in a chain supermarket because they have a higher price tag (Kittler *et al*., 2011:14-15; Freedman & Bell, 2009; Larson & Story, 2009). The effect of all these specific factors will influence whether vegetables are available to children to choose and consume or not (Sweetman *et al.,* 2011:272; Gross, Pollock & Braun, 2010; Peltzer & Pengpid, 2010; Larson & Story, 2009).

In Figure 2.1 the exo- and meso-environments are grouped as societal environments, as they are guided by cultural norms, values and beliefs of the society concerned (Larson & Story, 2009; Story *et al*., 2008). The twin concept 'socio-cultural' encompasses the social and the cultural environments indicating that there is interdependency and inseparability of the social and the cultural. To ease the understanding of these concepts they will be explained by using the early definition of culture by Tylor (1871) as given in Fieldhouse (1995:2) who states that, "culture is that complex whole which includes knowledge, beliefs, art, morals, law, customs, and other capabilities and habits acquired by man as a member of society." According to Fieldhouse what is implied here, is that culture cannot exist without a society, and that culture describes the patterns of behaviour in a society. Society refers to the people who participate in a culture (Fieldhouse, 1995:2). Implied here is the inseparability of people and their culture, because human beings create culture and yet are simultaneously products of culture (Coertze, 1980:26). It is explained that humans acquire culture only through the process of learning and interaction with other people within their social environment (Larson & Story, 2009; Ferraro, 2001). The socio-cultural environment can be considered as a complex matrix consisting of people, their culture and society that provides a framework for societal behaviour society which would include its food-related behaviour (Viljoen, 2009:24). The socio-cultural environment therefore plays an important role in determining the acceptability of food in the food choice process.

With regard to the availability, accessibility and acceptability of food, adolescents are, to a large extent, likely to be restricted in their food choice by others, such as their parents and their peers. At home by their parents and at school and other social contexts their peers will influence what to eat and what not to eat from a selection of foods considering the food variety available and/or sold at school (Sweetman *et al.,* 2011; Gross *et al.,* 2010; Peltzer & Pengpid, 2010; Larson & Story, 2009; Sheikh & Thomas, 1994).

The model (Figure 2.1) also includes the internal micro-environment that affect the individual's food choice through personal factors such as food preferences and the individual's own values, beliefs, attitudes and knowledge about food (Rozin, 2006:19).

2.3.2 Internal environmental factors

The internal micro-environment represents the unique characteristics of the individual that influence their personal food choices described as acceptability and preferences. These characteristics not only represent the biological and physiological characteristics of the individual, but also the individual's characteristics of knowledge, attitudes, values and beliefs (Rozin, 2006:19, Sobal *et al*., 2006:2, Sims & Smiciklas-Wright, 1978). This is closely guided by cultural norms, values and beliefs coming from the socio-cultural environment. Certain internal factors therefore co-exist to influence an individual's own personal food choices and include the individual's values (norms and standards), attitudes, beliefs, and knowledge (Rozin, 2006:28, Sims & Smiciklas-Wright, 1978).

The individual uses these internal variables to choose food from amongst those foods that are available and culturally acceptable. It is the ideological component of culture that influences our knowledge, attitudes, beliefs and values when making food choices. In this regard Bryant *et al.* (2003:223) also highlight that, cultural rules and expectations about food and meals are important influences on what is eaten and when. These, together with the symbolic value and meaning of food could exert powerful influences on an individual's food choice. This implies that, what the individual normally considers to be acceptable food during the food choice process is guided by their own values, attitudes, beliefs and knowledge. Such attributes are in turn guided by the cultural background of the person (Sobal *et al.,* 2006:5). Individual food preferences govern the acceptance of the type of foods preferred. Food preferences are guided by sensory perceptions of food such as taste, appearance and texture (Peltzer & Pengpid, 2010; Richards & Smith, 2007; Eertmans *et al.,* 2001).

For example, a wealth of information currently exists that supports the benefits of eating enough fruit and vegetables. However, it is essentially the individual's

preferences that determine the acceptance of fruits and vegetables (Peltzer & Pengpid, 2010). This together with the sensory attributes of fruits and vegetables will determine whether or not an individual will accept particular fruits and vegetables, as it relates to innate taste preferences (Fitzgerald *et al*., 2010; Peltzer & Pengpid, 2010; Baxter & Schroder, 1997). Therefore, apart from sweet and bitter tastes, other sensory attributes such as colour, flavour, texture and odour influence taste thresholds, taste perception, food preference, and expected food pleasantness and acceptability (Fitzgerald *et al*., 2010; Baxter & Schroder, 1997). Apart from their knowledge of beneficial health practices, an individual's choice regarding fruit and vegetables is further guided by their own values, attitudes and beliefs.

In conclusion, a wide variety of influences such as social, cultural and economic factors thus operate to shape food choices and contribute to the development, continuation and change of dietary patterns (Contento *et al*., 2006; Sobal *et al*., 2006:5). The various factors interact directly and indirectly to influence the food choice process. It is necessary to emphasise that food habits although stable, continue to develop and change over the life course of a person. This is because, as people develop and change over a lifetime, they are shaped by their environments and personally construct their individual life course that includes past and current food and eating experiences and situations as well as expectations about future possibilities (Larson & Story, 2009; Sobal *et al*., 2006:2). In the next section the formation and development of food habits will be addressed.

2.4 FORMATION AND DEVELOPMENT OF FOOD HABITS

Food habits are acquired early in life and, once established, are likely to be long-lasting and resistant to change although they also have the tendency to change. Since food habits are simultaneously static and dynamic, they are established through the synergistic relationship that exists amongst the various external and internal environments (Larson & Story, 2009; Story *et al*., 2008; Fieldhouse, 1995; Parraga, 1990). In this regard Fieldhouse (1995:4) explains that food habits develop in three distinct stages during an individual's lifetime, referred to as the primary and secondary socialisation and resocialisation stages (Figure 2.2). The first two development stages are simultaneously a concrete manifestation of culture and the socio-psychological structure and cognition of the individual as related to the processes of socialisation[3]

[3] Socialisation according to Segall (1979:187) "includes all the more or less direct teaching to which the individual is exposed". This teaching involves the inculcation of norms and customs by various socialisation agents such as parents, teachers, elders and others who are consciously shaping the

and enculturation[4]. Resocialisation, however, would be the process of learning, adapting or changing established food patterns and practices by replacing them with patterns and practices that have a proven health benefit (Fieldhouse, 1995:4; Schaefer & Lamm, 1992:113). Resocialisation typically occurs in middle and old age when dietary changes have to be made usually for specific health reasons such as having contracted non-communicable diseases (NCDs) like diabetes, cardio vascular disease, or being overweight or obese.

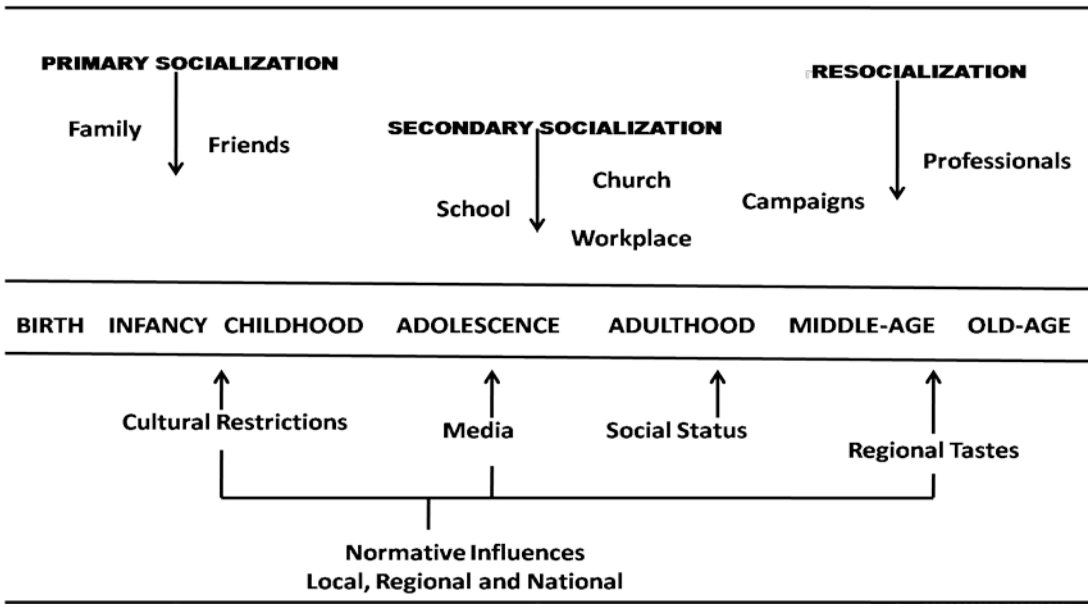


FIGURE 2.2: SOCIALISATION AND THE ACQUISITION OF FOOD HABITS (Fieldhouse, 1995:4)

Primary socialisation is important in the process of personality formation, although much of our human personality is the result of our genes. The primary socialisation process moulds it in particular directions by encouraging specific beliefs and attitudes as well as selectively providing experiences. An individual is taught cultural and socially acceptable norms by others in society especially parents, elders, teachers and friends. The general process of acquiring culture is referred to as socialisation (Fieldhouse, 1995:4). During the socialisation process individuals learn and adopt the cultural norms of the culture into which they have born. Norms are the conceptions of appropriate and expected behaviour that is held by most members of the society, while socialisation

individual according to the cultural model to become a "proper" member of society. Fieldhouse (1995:3) gives a similar description, and views socialisation as "a process by which culturally valued norms of behaviour are passed on from one generation to the next generation".

[4] "Enculturation refers to the entire incidental learning that occurs through imitation of elders and others ..." Segall (1979:187).

refers to the general process of acquiring culture. This culture, however, continues to evolve and change over time because it is a dynamic construct (Larson & Story, 2009; Ferraro 2001:352; Fieldhouse, 1995:4). Figure 2.2 illustrates the three stages of the process including the normative influences that guide each of them.

2.4.1 Primary socialisation

Primary socialisation begins at birth and continues through infancy and childhood. It is the process whereby the individual learns the attitudes, values and actions appropriate to members of a particular culture or group and this is mainly through the agency of the immediate family and friends (Levin & Kirby, 2012; Gross *et al.,* 2010, Larson & Story, 2009; Pearson, Biddle & Gorely, 2008; Fieldhouse, 1995:4; Schaefer & Lamm, 1992:113). The family is the most important institution for socialising a child. The infant and young child's physical and psychological needs are fulfilled within the family. Child-rearing practices such as eating, sleeping habits and table manners are learnt at home, because the infant and young child is dependent on adults to provide nurture and food as one of the basic mediums through which a culture's attitudes, beliefs and values are communicated and learnt (Fieldhouse, 1995:4). Children have to learn to like what is prescribed by the culinary culture in which they are raised and usually have little choice in the matter other than through the refusal to eat at all. This is because cultural food patterns influence food consumption in several ways of which the kinds of foods, when and where to eat are key issues. Hence, the appropriate or desired behaviour is then reinforced, while deviant or undesired behaviour is sanctioned. During the primary socialisation the family has the power to influence an individual's self-concept, emotions, attitudes and behaviours. Friends and peers similarly set norms and values that the individual must abide by (Gross *et al.,* 2010; Peltzer & Pengpid, 2010; Larson & Story, 2009; Fieldhouse, 1995:4).

2.4.2 Secondary socialisation

Secondary socialisation occurs at school, church and the workplace, as more formal situations. Secondary socialisation continues when primary socialisation seems to decrease in influence and importance. During secondary socialisation, food habits, which have been informally learnt at home, are either reinforced or contradicted or questioned in the formal setting of school, church and workplace or through information received from the mass media. The law of primacy implies that those habits learnt at a young age are most likely to persist in later life and are most resistant to change. Usually there is a conflict as to what is taught at school and what is taught in the home (Levin & Kirby, 2012; Pearson *et al.,* 2008; Fieldhouse, 1995:4).

2.4.3 Resocialisation

Resocialisation typically occurs through health educational and intervention programmes and campaigns designed by health professionals. This implies that former behaviour patterns have to be adjusted or discarded and new ones accepted and implemented (Fieldhouse, 1995:4).

2.4.4 Normative influences

The socialisation stages and their implied changes and development of food habits is simultaneously guided by certain normative influences as highlighted in the lower half of the model (Figure 2.2). During the process of socialisation and the acquisition of food habits an individual would therefore acquire personal and situational norms regarding their food choices (Herman & Polivy, 2005).

Personal norms are individualised rules that enable people to decide what and how much is appropriate to eat in a given situation. Personal norms are both person-specific and situation-specific in that they dictate what a person should eat in a specific situation (Herman & Polivy, 2005). A personal norm is derived initially from one's experience in the family home during primary socialisation. An example would be when guests are invited for a meal in the house and special food is usually prepared for them including a dessert, to show hospitality.

Situational norms on the other hand are derived from the eating situation or context itself. For example, a situational norm is illustrated in terms of the portion size a person is served for a meal. Social influence too can exert powerful effects on intake. When people are served a portion of food they tend to assume that the portion represents an authoritative judgement as to what they ought to eat (Herman & Polivy, 2005).

As explained in Figure 2.1, the socio-cultural environmental influences contribute to the acquisition and development of individual food habits. However, it should be kept in mind that these influences, together with those from other external environments, are also subject to change resulting from developments such as technological advancement, urbanisation and modernisation.

Due to this modernisation and urbanisation, the social environment is changing, a phenomenon that is seen in most developing African countries including Botswana. The consequences of these changes are evident in the lifestyle of the people in these societies, where a shift from the traditional lifestyle to a partially Western-orientated lifestyle is noticed (Popkin *et al*., 2011; Weatherspoon & Reardon, 2003). These changes could be attributed, amongst others, to migration, urbanisation, acculturation,

education and economic developments (Viljoen *et al.,* 2005; Satia-Abouta, Patterson, Neuhouser & Elder, 2002; Opare-Obisaw, Fianu & Awadzi, 2000). Social change from such social process inevitably influences the traditional food practices of African populations. Since the Botswana society is also undergoing social change the dietary patterns that result will be affected by increased exposure and interaction with the Western-orientated foodways[5] and food practices. Foodways refers to the connection between food-related behaviour and patterns of membership that are believed to identify the primary cultural attributes of an individual or group of individuals in cultural community, group, and society. It is the systems of knowledge and expression related to food that vary with culture (Camp, 2007).

A theoretical model to understand and explain the process of change in food practices and patterns, how they contribute to nutrition transition and the acculturation of food habits is explained in the next section.

2.5 DEVELOPMENTAL MODEL OF FOOD CULTURE

The model in Figure 2.3 will be used to explain the change process and how it contributes to nutrition transition in Botswana.

The developmental model of food culture as described by Kittler *et al.* (2011:11-12) is largely based on the model of social change and how it affects the foodways concept proposed by Sobal (2000b). It offers an explanation of how structural changes are paralleled by food culture changes. Sobal (2000b) explains that these structural and food cultural changes should be viewed as a complex system of interrelated processes that contribute to development per se, as societies move from a traditional to an urbanised modern society. In this model it is assumed that cultures progress from being underdeveloped to developed, by means of the structural changes (Kittler *et al*., 2011:12).

The developmental model of food culture will be explained and examples from Botswana given to illustrate how certain social developments contribute to changes in food culture and how it influences food availability, accessibility, choices and usage.

[5] Foodways are a study or example of a culture of a people through their dietary habits. A foodway is not only the things people do and do not eat, but why they eat them or not, not to mention the traditions and history that help define that culture (Dholakia, 2007).
In social science foodways are the cultural, social and economic practices relating to the production and consumption of food. Foodways often refers to the intersection of food in culture, traditions, and history. According to Merriam Webster dictionary definition: foodways is the eating habits and culinary practices of a people, region, or historical period.

This will be followed by a discussion on nutrition transition that is affected by these changes.

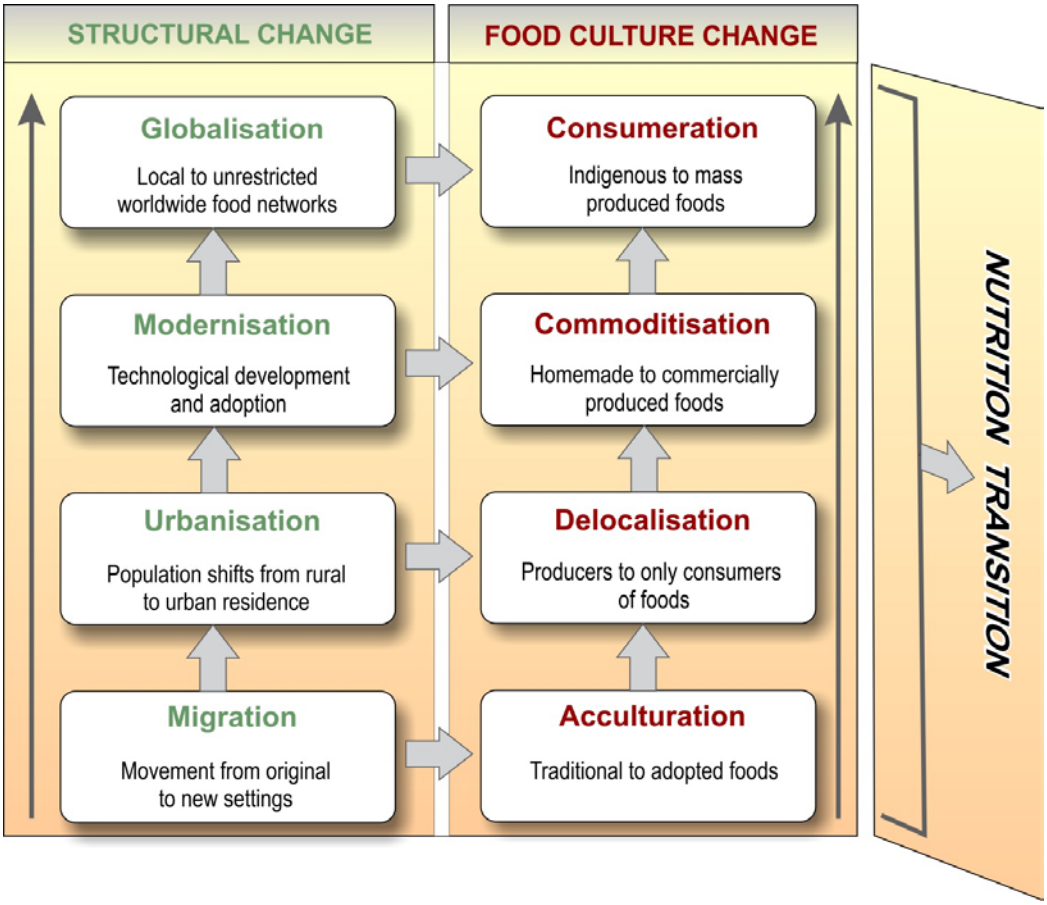


FIGURE 2.3: DEVELOPMENTAL MODEL OF FOOD CULTURE (Adapted from Kittler *et al*., 2011:11-12; Viljoen, 2009:39)

Migration, as a structural change, takes place when people move from their original place of residence to settle in a new location that could be in another region, urban area or country as a result of certain push and pull factors. The push factors are those which force a person to move, such as drought, famine, lack of work and income, over-population or civil war. Pull factors are those which encourage a person to move. These include a chance of better work and income, better education and a better standard of living (Kittler *et al*., 2011:11-12; Gwebu, 2004).

In many developing countries such as Botswana, rural-urban migration continues to increase and will probably continue as long as opportunities for economic and social advancement elude rural dwellers. People move in large numbers from rural areas to cities and towns. Gwebu (2004) indicates that in Botswana in 2001, 45% of migration was rural to urban. As a structural change migration often causes changes in cultural

patterns, including food patterns. A shift in food habits occurs because migrants are not only introduced to, but often have to adopt to the new foods that are available in their new place of residence (Kittler *et al*., 2011:11-12; Satia-Abouta *et al*., 2002). Migration thus inevitably results in a change of environment and lifestyle and it affects the food habits of these migrants as they give in to the opportunities and pressures that the new environment offers. These changes might improve or reduce the quality of the previous diet (Gwebu, 2004; Opare-Obisaw *et al*., 2000).

Migration also results in the food culture change of acculturation. Park, Paik, Skinner, Ok & Spindler (2003) defined acculturation as, "….a long-term process in which individuals modify or abandon certain aspects of their original culture as they adopt patterns of the new culture." The adoption of new foods as part of change in food habits is thus implied in the process of acculturation. The process of acculturation could therefore be regarded as a process of adaptation by specific people to a changed or changing environment (Lee, Sobal & Frongillo, 1999).

Not only are the actual foods consumed different but there are also accompanying changes in beliefs, attitudes and the social uses of foods. The degree of change experienced is related to the social context of migration that is closely associated with living conditions, new social networks and the strength of ties maintained with the place of origin. Food habits change most rapidly amongst the young, who are subject to influences from peer groups at school and work, and where there is little cultural support for the original foodways (Popkin, 2009).

Acculturation occurs at two levels. At the micro (individual) level and at the macro (group) level. At the micro or individual level, acculturation includes the psychological, and refers to changes in attitudes, beliefs, values and behaviours of individuals that result from acculturation. At the macro-level, acculturation results in physical, biological, political, economic and cultural changes in the acculturating group or in the society as a whole (Satia-Abouta *et al*., 2002). Acculturation has been shown to influence knowledge and attitudes that shape and influence health behaviours as is observed in the food choice process. The attitudes and behaviours of people from one culture are modified as a result of contact with a different culture and this implies a mutual influence in which elements of two cultures mingle and merge (Maxwell, 2009:1).This view is in accord with the ecological systems perspective and the model of acculturation proposed by Segall (1979:186) that implies reciprocity and interaction between the individual and the various environments. When dealing with the development and change of food patterns, the same interrelatedness of the different

environments applies, as change or development in one environment will eventually affect the other environments (Pelto, Goodman & Dufour, 2000:2).

In the field of nutrition the term dietary acculturation is often used when describing the acculturation process regarding food. Satia-Abouta *et al.* (2002) describe dietary acculturation as the process that occurs "when members of a cultural group adopt the eating patterns and food choices of another group". It is also important to note that the process of dietary acculturation must not be assumed to be a linear process, but should rather be seen as a non-linear trend over time (Lee, Sobal & Frongillo, 2003; Satia-Abouta *et al.,* 2002).

This process of dietary acculturation therefore takes place along a continuum of behaviour patterns that can be very fluid, in moving back and forth between traditional practices and the newly-adopted customs (Kittler *et al*., 2011:6). Dietary acculturation is thus the process through which individuals adopt only some aspects of a newly-adopted culture and associated food choices (Archer, 2005; Satia-Abouta *et al*., 2002).

For example, diets low in fruits and vegetables, dairy products (yoghurt, cheese) and high in fat (fast foods and fried foods such as French fries, pies, pizza), and the highly sugar sweetened beverages are adopted and these occur prolifically in modern urbanised societies. This trend seems to be creating a diet high in saturated fat, sugar and refined foods and low in fibre. A diet of this nature is linked directly or indirectly to obesity to diabetes, heart disease, and cancer (Popkin, 2009; Popkin, 2002; Popkin, 1993). The high consumption of these foods therefore contributes directly to increased energy imbalance whereby the global levels of obesity and the cancers caused by poor diets and inactivity are growing rapidly. This is generally regarded as an increasing burden particularly on the poor (Popkin, 2009; Madanat, Troutman & Al-Madi, 2008). Although currently people do eat fast food, the Batswana continue to eat their staple and other traditional foods as dietary acculturation is adopting only some aspects of the new culture.

The second structural change of **urbanisation** refers to the process of movement from a rural to urban residence in which the number of people living in cities increases compared to the number living in rural areas (Gwebu, 2004). This occurs when a large percentage of the population abandons the low density of rural residence in favour of higher density suburban and urban residence in search of a perceived better life (Kittler *et al*., 2011:12)**.** The rapidly increasing rate of urbanisation is one of the most striking demographic features that affect food production and consumption. This is an inevitable consequence of socio-economic development, which usually involves varying degrees of technological advancements as in modernisation and

Westernisation, which, in turn, may influence dietary habits and consumption patterns (Popkin, 2009). A study conducted by the Food and Agricultural Organisation (FAO) of the United Nations in 2003 shows that the rapidly increasing rate of urbanisation, which accounts for 5% in Sub-Saharan Africa, is one of the most striking demographic features of the last half of the twentieth century. It influences all aspects of food production and consumption (Popkin, Duffey & Gordon-Larsen, 2005; Mendez & Popkin, 2003).

Urban areas have grown rapidly in Botswana since independence. Cities are characterised by a downtown area of shops, businesses and government offices and larger villages are even becoming known as “urban villages” or “agro-towns” (Durham, 2013). There are only three towns, Francistown, Gaborone and Lobatse, and a mere 4% of the country’s population live in urban areas. By 1981 the urban population had increased to 18% of the national population while during 1991 and 2001 it had increased to 46 and 52% respectively. A recent statistic shows that 57% of Botswana’s population resides in urban areas (Dipheko, 2012; Kent & Ikgopoleng, 2011; Gwebu 2004).

In Botswana, as happens in other Sub-Saharan countries, urbanisation is characterised by a rapid rise in modern retail stores, supermarkets and hypermarkets. These retail forms replaced traditional retailers that were small general dealers and public markets. A rapid transformation of the African food retail sector over the past decade was experienced (Letsididi, 2013; Maruapula *et al*., 2011; Weatherspoon & Reardon, 2003) and appears to be continuing.

Parallel to urbanisation is the food culture change of **delocalisation**. Delocalisation, as explained by Kittler *et al* (2011:12), occurs when the consumers of food loose the connection between the cultivation, harvesting and preparation of food. This is attributed to the fact that food is processed by anonymous workers in factories, purchased from supermarkets and often meals consumed are purchased from convenience or fast food outlets.

The next structural level in the developmental model of food culture is **modernisation**. Modernisation includes technological development and the adoption of new technologies that lead to changes in the entire food chain from food production, processing up to food preparation methods and food consumption patterns. In response to modernisation major changes in cultural beliefs, values and behaviour concerning food take place (Kittler *et al*., 2011; Sobal, 2000b).

Commoditisation is the associated food culture change that arose from the modernisation of the entire food chain through the application of advanced technologies (Viljoen, 2009:40). Food became an economic object that is regarded as a marketed commodity instead of "home-prepared sustenance" (Kittler *et al*., 2011:11). The increasing numbers of supermarkets and fast food chains present in both rural and urban areas in Botswana is evidence of the acceleration of food commoditisation in this country (Emongor & Kirsten, 2009).

Globalisation is identified as the last structural change and refers to the organisation of the food system across multiple countries. It is an integration of local, regional, and national food systems into an unrestricted worldwide organisation of food production which increases the variety of food products in countries. These integration processes need the consent of governments, and the central role of politics in driving the globalisation of food production amongst countries is evident. Globalisation increases exports and imports and consequently more control of food production by large corporations is the result (Kittler *et al*., 2011:11-12;).

The structural change of globalisation leads to **consumerisation** as a food culture changing. It results in the transition of a society from being producers of indigenous foods to consumers of mass-produced foods (Kittler *et al*., 2011:11-12). Botswana no longer aspires to being self-sufficient in agriculture, but instead focuses on "food security" by incorporating regular imports of grain and processed foods (Durham, 2013). The urban consumption pattern, for example, has changed towards a demand for food products not produced in Botswana. This dismal trend of the food situation in Botswana is not an exception in Africa, as many elderly people complain that their children have forgotten that sorghum was their staple food as they now frequently eat foreign foods such as rice which is not locally produced (Mpotokwane, 2008).

In Botswana many restaurants representing food from around the world have opened in the urban areas. Fast food chains such as Kentucky Fried Chicken, Nandos, Chicken Licken, and Pie City are popular in Botswana (Durham, 2013). This is one example of how the food culture has changed from being traditional food dominated to adopting modern Western-orientated foods and food practices. Supermarkets in Botswana are another example where South African supermarkets, such as Shoprite, Checkers, OK Foods, Super Save, Spar, Pick 'n Pay, MetCash and Woolworths, dominate the retail market in Botswana. However, local supermarket chains, such as Payless and Choppies, together with smaller independent stores, such as Cash and Carry and convenience stores located at filling stations, are also important in the retail market in Botswana. As is the case in South Africa, the modern retail sector handles

about 50-60% of food retailing in major towns such as Gaborone, Francistown, Kasane and Maun and in urban villages such as Mochudi, Lobatse, Molepolole and Kanye. In the rural areas and rural villages, general dealerships continue to be more important in food retailing (Letsididi, 2013; Emongor & Kirsten, 2009).

As this study deals with nutrition transition, it is important that nutrition transition as concept be discussed further because it is taking on pandemic levels due to the rapid shift in dietary and various activity patterns such as exercise and shopping; purchasing of food into the home (Popkin, 2009).

2.6 NUTRITION TRANSITION

Nutrition transition involves a wide range of characteristic changes in dietary patterns and nutrient intake associated with social, cultural, and economic changes during a demographic transition (Misra, Singhal, Sivakumar, Bhagat, Jaiswal & Khurana, 2011; Vorster *et al*., 2005b). It usually includes a change and/or shift away from a high carbohydrate and low-fat diet to a more Western-orientated diet together with the associated sedentary lifestyle that leads to an increase in nutrition-related NCD's (Popkin *et al*., 2011; Popkin, 2006; Popkin, 2004). In contrast to the traditional diet that included a healthy balance of coarse grains high in fibre, fruits, vegetables and legumes, the adopted Western-orientated diet is high in fat, sugar, refined carbohydrates and salt with a low intake of fruit, vegetables and legumes (Popkin *et al*., 2011; Madanat *et al*., 2010; Zingoni *et al*., 2009; Madanat *et al*., 2008). The coarse high-fibre foods are replaced by processed foods. Sweetened beverages are replacing water and milk (Popkin, 2011a; Popkin, 2006b). Numerous studies document that globally this shift in eating patterns leads to the escalating consumption of energy-dense foods (Popkin *et al*., 2011; Madanat *et al*., 2010; Zingoni *et al*., 2009; Madanat *et al*., 2008; Popkin, 2006a).

Nutrition transition is also associated with shifts in the food environment, which includes where food is eaten and what is consumed. A shift away from home-cooked food to food from modern supermarkets and convenience stores in urban areas enhances the consumption of processed and lower quality foods. Increased snacking has been identified as an eating pattern that accompanies these changes (Popkin *et al*., 2011; Popkin, 2006a).

Popkin (2004) points out that the term 'nutrition' rather than 'diet' gives clearer understanding of the pace of rapid nutrition transition associated with much higher levels of many nutrition-related NCDs. This is because the term nutrition, rather than

diet, incorporates the effects of diet, physical activity and body composition, unlike diet which addresses only dietary patterns and their effects. These changes in dietary patterns and nutrient intakes generally dictate people's nutritional well-being and affect their physical and mental health (Popkin, 2006b; Popkin, 2004; Opare-Obisaw *et al.,* 2000). The pace of dietary change has accelerated to varying degrees in different regions of the world (Popkin, 2009; Popkin, 1993). At present, the changes are more complicated than this basic description of the term 'nutrition transition' and are accelerated by high urbanisation and modernisation rates (Madanat *et al*., 2010; Feeley *et al*., 2009; Zingoni *et al*., 2009; Madanat *et al*., 2008; Vorster *et al.,* 1999).

In the developmental model of food culture (see 2.5) the root causes of the nutrition transition were identified as two complex systems of interrelated processes, namely structural change and food culture change. These processes are globally associated with the rapid shifts in dietary patterns. It is emphasised that these interrelated processes of migration, acculturation, urbanisation, delocalisation, modernisation, commoditisation, globalisation and consumerisation are the contributing factors to rapid changes in dietary patterns. Since these shifts in dietary patterns are linked to nutrition-related NCDs, the costs in terms of health are high. The increases in morbidity and mortality figures are associated with the phenomenon of nutrition transition (Popkin, 2006b; Popkin, 2006a; Popkin, 2004).

The next section contextualises the eating patterns of the Batswana people and documents their development and change in Botswana from the traditional way to what is currently happening. Contextualising current Batswana meal patterns and the composition of their meals will give insight into how these two phenomena evolved over time.

2.7 BATSWANA EATING PATTERNS

The traditional eating patterns (meal patterns and meal composition) of the Batswana are contextualised against the background of how they have changed over the past 50 years as gleaned from the literature in order to appreciate the eating patterns of the study group identified in this research. What is eaten is firstly determined by where people live and what is available and accessible in their physical and natural environment in terms of food. This is described according to the ecological perspective to illustrate that multiple interacting environmental factors affect the food choice process. These are interdependent and interrelated while people act on, modify and adapt to their own environments (see 2.2).

2.7.1 Geographic location

In order to contextualise the traditional eating patterns of the Batswana, a description of the physical and natural environments is given to understand what was available in the natural environment.

Botswana's natural environment is determined by its geographical location. The country is landlocked, located in the sub-tropical high-pressure belt in the southern hemisphere in the interior of southern Africa, away from oceanic influences. Hence Botswana's rainfall is low and temperatures tend to be high. The climate of Botswana is semi-arid. The most striking characteristic of this semi-aridity is not a lack of rainfall as such, but the unpredictability of its distribution within a rainy season (Hess & Molatakgosi, 2009; Munamava, 2009:1). This is why Botswana's rainfall is unreliable for agro-pastoral food production. The rainy season could start at any date between mid-October and mid-December and end between mid-February and mid-May. Drought is thus a recurring element of Botswana's climate. Droughts have always been experienced and are still expected today. This is because the country is likely to be faced with even more frequent and intense dry extremes in future (Mogotsi, Nyangito & Nyariki, 2010:76). Though Botswana's rainfall is unreliable, the Batswana are agro-pastoralists who are able to maintain a reliable, nutritious food base even during periods of widespread, extensive drought. The soils are of low fertility, characterised by a low water-holding capacity (Munamava, 2009:1). Cultural, historical and nutritional data of the past 170 years reveal that Tswana agro-pastoralists have neither experienced widespread dietary distress nor nutritional deprivation during drought, or years with less than normal rainfall (Grivetti, 1978). This is attributed to the fact that they have been producing food under these uncompromising conditions for centuries. The majority of the population in Botswana are therefore accustomed to producing food on a subsistence basis (Selolwane, 1992).

2.7.2 Traditional food acquisition methods

In the past it was the responsibility of each household to produce its own food. Generally speaking agriculture provided the Batswana with their staple food and the traditional diet of the Batswana was greatly influenced by the natural environment (Schapera, 1952:3). Thus traditionally the people of Botswana derived their subsistence mainly from agriculture, of which the cultivation of crops (Figure 2.4), animal husbandry (keeping cattle, goats, sheep, pigs and chicken), hunting wild animals and gathering of wild fruits and vegetables were the most important activities in each household (Masibi & Coetzee, 1986:10; Schapera, 1953:21).

Within the rainy season there could be dry spells of more than a month, resulting in severe yield reduction and reduced productivity of livestock pastures. These production shortfalls often led to household food insecurity (Munamava, 2009:1; Mogotsi *et al*., 2010:76). However, available evidence suggests that, from the 1920s until independence in 1966, domestic production was fairly near self-sufficient, except in times of drought (Selolwane, 1992). It is also confirmed that in 1990 the national cattle herd size was more than twice the population, which was 1.1 million people (Vossen, 1990). It is further pointed out that, the rural agro-pastoral communities were not entirely 'helpless'. During droughts, the majority used the accumulated experience of indigenous knowledge to cope and adapt during climatic shocks and constraints (Mogotsi *et al*., 2010:78).

FIGURE 2.4: SUBSISTENCE FIELD IN BOTSWANA (ARABLE CROPS AS SOURCE OF FOOD)

https://www.google.com/search?q=ARABLE+FIELDS+PICTURES+IN+BOTSWANA&biw=1024&bih=657&tbm=isch&tbo=u&source=univ&sa=X&ei=PM_9VJ_6HoKsUfvpgdAK&ved=0CEYQ7Ak

In the next section the traditional foods and dishes prepared by the Batswana are described.

2.7.3 Traditional foods and dishes

Traditional foods (indigenous food) are considered to be part of a group's culinary heritage that have been an integral part of the eating patterns of people for some time, transmitted from one generation to another. Traditional food identifies an individual and represents a certain group with some elements of culture such as beliefs, values and attitudes thereby ensuring continuity over time (Guerrero, Claret, Verbeke, Enderli,

Zakowska-Biemans, Vanhonacker, Issanchou, Sajdakowska, Granli, Scalvedi, Contel, & Hersleth, 2010; Guerrero, Guardia, Xicola, Verbeke, Vanhonacker, Zakowska-Biemans, Sajdakowska, Sulmont-Rosse, Issanchou, Contel, Scalvedi, Granli & Hersleth, 2009). Traditional foods are those foods that originate locally or are locally grown, readily available and affordable food in an area, with respect to the country, region, district or sub-district. According to common understanding, traditional foods are those that are still in their original form - they are neither modernised nor processed and have a long history associated with particular country of origin. This description would include all food found in the area of origin such as cultivated grains (Ohiokpehai, 2003:267). The following food categories were traditionally part of the eating pattern of the Batswana: cultivated grains such as sorghum, maize and millet, legumes, melons, indigenous vegetables, indigenous fruits, meat, milk and insects. For example, a traditional staple food for the Batswana people is sorghum and its varied products (Legwaila, Mojeremane, Madisa, Mmolotsi & Rampart, 2011; Olesitse, 2010; Ohiokpehai, 2003).

Batswana traditional foods are discussed below, under the following groupings: cereals and cereal products, legumes, indigenous vegetables, indigenous fruits, cattle and other livestock, fish and insects.

2.7.3.1 Cereals and cereal products

Sorghum and maize are regarded as the staple crops for Botswana. Sorghum is the main crop grown in Botswana and still remains the most consumed cereal (Kebakile *et al*., 2003). The relative tolerance of sorghum to the adverse climatic conditions of Botswana makes it an important food crop for the local people. The traditional subsistence farming community in Botswana cultivates an average of 324 000 hectares of land annually of which 63% and 24% are dedicated to sorghum and maize respectively (Mokwena, Chimbombi & Monkhei, 2003). Most of the grains produced in Botswana are consumed by households at subsistence level making the growing of sorghum and maize the most important livelihood in Botswana's rural communities (Mokwena *et al*., 2003). Despite the consumption of sorghum that seems to be declining, it remains the cereal consumed by the majority, followed by maize and millet respectively (Kebakile, Mpotokwane, Motswagole, Lima De Faria, Dominigues & Saravia, 2003). Various cereal products coming from these cereals are used for preparing traditional food dishes that are enjoyed by the Batswana people.

2.7.3.1.1 Maize

Fresh or dried maize either in the form of grains or meal are used to prepare various dishes by Batswana people. Young immature maize (*mmidi*) is often eaten fresh while the grains are still milky. The green ears with or without the husk are roasted directly on hot ashes or on a grid over the embers. When ready they are eaten with salt as 'corn-on-the-cob' (fresh green mealies). Alternatively the maize cobs are boiled in water and removed from the husks and eaten as a snack (Mokwena *et al*., 2003). In the dried form the maize grains can be prepared as such as boiled maize kernels (*kabu*), plain samp (*setampa*), or mixed with beans to prepare dishes such as samp mixed with beans *(setampa le dinawa / dikgobe)* or as cooked dried maize kernels and beans *(lechotlho la dinawa)* (Mokwena *et al*., 2003:49).

Maize is dried and milled into maize meal (mealie-meal) then used to prepare maize meal cereal porridges. The maize meal is either cooked as stiff (thick) or soft (thin) porridges. The stiff maize meal porridges are known locally as *bogobe, phaletshe* or *pap*, and the soft porridge as *motogo wa phaletshe*. Porridge is made by adding maize meal into boiling water, stirring it into a soft or stiff paste, and then cooking it slowly at low heat till it is well done (Molewa, 2006:40; Mokwena *et al*., 2003). The ratio of boiling water to meal is 1:2 (Coetzee, 1982:133).

Mageu is another dish prepared from maize meal, it is a non-alcoholic fermented beverage prepared by fermenting soft maize meal porridge (Mpotokwane, 2008; Mokwena *et al*., 2003). *Mageu* is a nourishing beverage either served plain or with sugar if desired (Molewa, 2006:194).

Next discussed is sorghum and the dishes made from sorghum, which is also a cereal consumed by Batswana.

2.7.3.1.2 Sorghum

Mosuthwane is dehulled sorghum or cracked sorghum grains.There is *lehata* a whole grain version that is not dehulled. These dishes are part of Botswana traditional cuisine enjoyed by some Batswana (Mpotokwane, 2008:33).

Sorghum is dried and milled into sorghum meal which is cooked to make sorghum meal cereal porridges. Similar to maize meal, sorghum meal is cooked as stiff (thick) or soft (thin) porridges known locally as *bogobe ja mabele* or *motogo wa mabele* respectively. Porridge is made by putting sorghum meal into boiling water, stirring it into a soft or stiff paste, and then cooking it slowly at low heat till it is well done (Mokwena *et al*., 2003). The ratio of boiling water to meal is 1:2 (Coetzee, 1982:133). Soft

porridges made from sorghum or maize are usually served for breakfast with sugar and/or milk added, while stiff porridge is served at lunch and/or supper with vegetables, meat or milk (Mokwena *et al*., 2003). A variation of these porridges can be made by fermenting the sorghum meal (*ting*) or cooking the sorghum meal with fresh milk.

Sorghum meal is fermented in a bowl by mixing the meal with warm water and then kept covered for two or three days to become sour by fermenting (Molewa, 2006:45).*Ting* is a very popular fermented sorghum porridge, eaten either soft usually for breakfast with sugar and/ or milk added, or stiff for lunch and dinner, or on special occasions with meat and/or vegetables (Mpotokwane, 2008:32).

Fresh milk and sorghum meal porridge is another variation of sorghum meal porridge known as *logala or nthiane*. This is porridge made from cooking sorghum meal with milk and is a porridge dish commonly prepared and enhances protein levels (Mpotokwane, 2008:33; Molewa, 2006:46).

The Batswana are traditionally known for their traditional sorghum beer *(bojalwa ja Setswana)* they make. Traditional sorghum beer is still popular in the rural areas and is drunk during traditional celebrations (Mpotokwane, 2008:32; Mokwena *et al*., 2003). At traditional festivities like rain-making ceremonies, religious offerings and at the first fruit or harvest ceremonies, their exquisitely beautiful decorative clay pots and utensils are used to serve the sorghum traditional beer. Drinking pots are filled to the brim with sorghum traditional beer for the people to have a feast. Traditionally men sat on tree stumps and women on grass mats when drinking (Coetzee, 1982:84).

The third cereal eaten as a traditional food is millet and various dishes are prepared from it.

2.7.3.1.3 Millet

Millet is dried into millet meal which is cooked to make stiff millet porridge *(bogobe jwa lebelebele*) (Mokwena *et al*., 2003:49). The ratio of boiling water to meal is 1:2 (Coetzee, 1982:133). Stiff millet porridge is made by putting millet meal into boiling water, stirring it into a stiff (thick) paste then cooking it slowly at low heat till it is well done. It is usually served for lunch and/or supper with vegetables, meat or milk (Mokwena *et al*., 2003).

Melon porridge (*bogobe jwa lerotse / lekatane or thopi*) is a variation of porridge made from millet meal that is cooked by boiling it with melon pulp sauce (Molewa, 2006:45). Melon porridge is eaten with sour milk (Sydenham & Ron, 2007:2).

Legumes too are part of Batswana traditional foods.

2.7.3.2 Legumes

Various kinds of legumes and beans are grown by the Tswana including peanuts/groundnuts (*manoko*), cowpeas or black eye beans *(dinawa tsa Setswana)* and jugo beans (*ditloo*) (Sydenham & Ron, 2007:1). Legumes are boiled in water and oil and salt are added to give flavour. They are cooked until they are soft and tender and served as a relish for cereal porridges. Some are eaten plain, or alternatively some are mixed with maize kernels.

Fresh or dried groundnuts *(manoko)* can be roasted and eaten as a snack. Groundnuts are used as flavouring in some dishes. Pounded powdered groundnuts are mixed with cooked green leafy vegetables to make a dish known as *morogo wa dinawa ka manoko* (fresh/dried bean leaves with groundnuts powder) (Sydenham & Ron, 2007:2-3; Molewa, 2006:103).

Indigenous vegetables are also considered one of Batswana traditional foods, which can further be grouped as sub-groups; indigenous green leafy vegetables, melons and root vegetables that are now discussed.

2.7.3.3 Indigenous vegetables

2.7.3.3.1 Indigenous green leafy vegetables

A wide variety of indigenous green leafy vegetables such as *thepe* (pig weed/*Amaranthus*), *rothwe* (*Spider flower/cleome gynandra*) and *delele* (*Jew's mallow plant/Corchorus olitorius*) are often found on cultivated arable land. Indigenous food plants are not cultivated but grow naturally in the wild on arable crop land and in gardens around homesteads. Cultivated green leafy vegetables from legumes such as bean and pumpkin leaves are also consumed (Legwaila *et al.*, 2011). Green leafy vegetables are usually harvested at a young stage of plant development when the leaves are more tender and palatable (Legwaila *et al*., 2011; Olesitse, 2010; Ohiokpehai, 2003). The following examples of indigenous green leafy vegetables are still widely consumed when available or in season. These include fresh/dried bean leaves *(morogo wa dinawa),*fresh/dried bean leaves with groundnuts powder *(Morogo wa dinawa ka manoko), f*resh/dried pumpkin leaves (m*orogo wa lephutshi),* Pig weed/ Amaranthus *(thepe),* Spider flower/*cleome gynandra (rothwe) and* Jew's mallow plant / *Corchorus olitorius (delele).* These indigenous green leafy vegetables are fried or stewed, with a little salt and oil added and eaten with stiff cereal porridges (Legwaila *et al*., 2011).

2.7.3.3.2 Melons

Various kinds of melons known locally as *lerotse* or *lekatane* are used in various ways to complement several local dishes (Sydenham & Ron, 2007:2-3). Melons are also used in various ways such as in flavouring porridges to make melon porridge. The melon pulp can either be eaten plain or cooked when mixed with beans (*legodu la dinawa*) and eaten with fresh milk. Dried melon strips (*longangale)* can also be used to make the pulp or sauce (Sydenham & Ron, 2007:2-3). Small melons (m*akgomane)* are washed, cut into halves and cooked until soft eaten with sour or fresh milk. Another melon dish is melon and beans with fresh milk (*legodu la dinawa).* To prepare melon and beans, the beans are boiled first to cook, then very thin slices of melon are added to the beans to cook together until it is well done and eaten with fresh milk (Molewa, 2006:99).

2.7.3.3.3 Root vegetables

Root vegetables such as sweet potatoes and potatoes are examples of locally grown foods that are readily available and affordable that have become integrated into the food patterns of the Batswana. Sweet potatoes *(dipotata)* are boiled and eaten plain or served with tea for breakfast. Potatoes are either boiled or stewed together with meat and served as part of a relish with cereal porridges. Occasionally they are also roasted or fried and served as a separate dish as part of a meal.

Besides indigenous vegetables, indigenous fruits were also used to supplement the diet.

2.7.3.4 Indigenous fruits

The ripening of indigenous fruits occurs at different seasons hence fruit can be eaten fresh throughout the year (Legwaila *et al*., 2011; Motlhanka, Motlhanka & Selebatso, 2008; Amarteifio & Mosase, 2006; Mojeremane & Tshwenyane, 2004). According to Sydenham and Ron, (2007:1) some edible wild indigenous fruits are collected from the veld such as; *Mimusops zeyheri* (*Mmupudu),* marula *(Morula),* wild berry/Grewia flava (*Moretlwa/ mogwana),* wild cactus fruit (*Motoroko)*, wild oranges (*Mogorogorwana),* wild medlar/*Vangueria infausta (Mmilo), Ximenia Caffra/Americana (Moretologa), Azanza garkeana (Morojwa)* and many others.

Indigenous fruits are eaten fresh. Some are sun-dried (Sydenham & Ron, 2007:1). There are other cereal porridges that come from mixing sorghum or millet meal with other fruit pulps. These are porridges made with *morula* (*Sclerocarya birrea subsp caffra*) and *mmilo* (*Vangueria infausta*) pulp (Mpotokwane, 2008:33).

Water melon (l*egapu*) is another fruit often grown in the fields and are plentiful when in season. They are eaten as a snack in between meals (Botswana Tourism Board, 2009:7).

Meat and milk form part of the Batswana's traditional foods and dishes. These are discussed under the food group associated with cattle and other livestock.

2.7.3.5 Cattle and other livestock

High quality beef cattle are raised in Botswana and although beef is the most popular kind of meat, lamb, mutton, traditionally reared chicken (free range known as *Tswana* chicken) and goat meat are also plentiful (Botswana Tourism Board, 2009:7; Sydenham & Ron, 2007:1). Hunting wild animals was part of traditional life and done to supplement the regular meat supply that was an important relish served with porridge (Coetzee, 1982:165). However, some cultural groups believe that the meat from wild animals is not fit for human consumption and taboos are real and respected. Moreover, for the same reason, certain totem animals are never killed and even today game meat from certain wild animals is not eaten by Batswana people and avoided in their diets. Milk from cows and goats is consumed either fresh or as sour milk (Coetzee, 1982:70). Meat and milk products as traditionally consumed are now discussed.

2.7.3.5.1 Meats

The meat sub-group includes beef *(nama ya kgomo)*, mutton/lamb *(nama ya nku)*, goat meat *(nama ya podi),* pounded meat, biltong, oxtail, chicken, *Tswana* chicken, other chicken meats and offal. They are discussed in this order. Beef, mutton and goat meat are stewed or fried to eat with cereal porridges and other dishes such as samp and its variations (samp and beans). Pounded meat (*seswaa* or *chotlho*) is a very popular traditional meat dish prepared using beef, mutton or goat meat for most special occasions. It is usually cooked outdoors by men in a three-legged iron pot. The meat chunks are pounded or crushed until it shreds using a wooden stick (*loswao*). Pounded meat is simmered until soft, with only salt and water added (Botswana Tourism Board, 2009:7; Molewa, 2006:54; Ohiokpehai, 2003).

Traditionally when meat was in abundance it was preserved by cutting it in strips and sun dried. The dried meat strips is called biltong (*digwapa*) and it keeps for a long time without getting spoilt (Grivetti, 1978b). When cooking the dried meat (*digwapa*), it is rehydrated by immersing it in boiling water. Fat and a little salt are added to flavour the meat (Grivetti, 1978b). It is eaten with the staple food such as cereal porridges. Another traditional meat dish is oxtail. It is stewed and used as relish (Botswana Tourism Board, 2009:7).

Free range Tswana chicken *(koko ya Setswana)* is either stewed or fried and served as relish (Sydenham & Ron, 2007:1). Other chicken meats such as chicken feet *(menoto),* chicken intestines (m*ala a koko),* chicken heads *(dithogo tsa dikoko)*, chicken necks *(melala)* and chicken gizzards *(dintshu)* are stewed or fried as a relish to accompany cereal porridges.

Examples of offal are liver *(sebete)*, edible stomach lining of certain farm animals (tripe), pancreas *(lebete)*, lungs *(makgwafu)* and intestines *(mala a kgomo / podi / nku).* Stewed tripe and intestines (*serobe*) is another popular meat dish prepared from intestines was traditionally cooked outdoors in a three-legged pot (Molewa, 2006:55). It is cooked until soft and tender (Botswana Tourism Board, 2009:7; Sydenham & Ron, 2007:1).

This next food sub-group of milk discusses fresh milk and sour milk as milk products, which were traditionally consumed and are still very much part of the Batswana traditional cuisine.

2.7.3.5.2 Milk

Milk is readily available from goats and cows and enjoyed as fresh milk. In the past goats' milk was boiled before consumption, but cows' milk was used directly or boiled as well if desired (Grivetti, 1978b). Fresh milk was fermented in order to keep for a long time. The herd boys milked the cows and when the wooden milking pails were full they poured the milk into calabashes, cloth bags or into leather milk sacks and hung in a tree and left there to curdle or sour. During the souring process of milk the whey is removed to obtain thickened sour milk (Coetzee, 1982:69; Grivetti, 1978b). Fresh milk is served as a relish with cereal porridges whereas sour milk *(madila)* could be eaten on its own or added to porridge (Sydenham & Ron, 2007:1). This practice of uses of fresh and sour milk and how it is preserved still continues today in some rural areas.

2.7.3.6 Fish

Fishing was not widely practised in Botswana since people regarded fish as snakes (Coetzee, 1982:70). Many households do not like the smell and appearance of fish. They compared it to a snake, even though they had not ever seen a fish. Their attitude may be partially due to hearsay and the existence of a children's song in Setswana which is titled "*Tlhapi ke Noga*" which means "fish is a water snake" (Sen, 1990). When some Batswana households were asked they also stated that they did not eat fish because they did not know how to catch it. Some of these people went on to say that they did not have the time to catch fish (Sen, 1990).

Despite Botswana's climate which is hot and dry, freshwater fish is a feature of many dishes. Those who eat fish as relish would have caught them in dams and rivers using a conical basket traps especially made for this purpose (Botswana Tourism Board, 2009:7; Coetzee, 1982:121). Fish is boiled, roasted, fried and stewed with a little salt and oil added (Coetzee, 1982:70). Fresh fish is preserved by cutting it into thin flat slices or strips, salted and sun-dried. Dried fish is also cooked to relish cereal porridges (Botswana Tourism Board, 2009:7; Coetzee, 1982:1210).

2.7.3.7 Insects

Insects such as caterpillars, termites, sand crickets and locusts formed part of the traditional food of Batswana. The method of preparation is usually to squeeze out the insides of the worm and wash them and they will be ready to cook (Coetzee, 1982:169). They are generally boiled, fried, roasted in hot ashes or cooked in a stew with vegetables (Lucas, 2010:11; Sydenham & Ron, 2007:2-3).

The best known caterpillars are those feeding on the mopane tree. The mopane worm (*Imbrasia belina*) is also known by other names such as *phane or mashonja*. It is commonly harvested in Botswana (Lucas, 2010:1; Sydenham & Ron, 2007:2-3; Coetzee, 1982:169). Mopane worms are consumed both as a relish and a snack. Mopane worms are cooked in a little water or fried in their own body fat or a little oil can be added together with salt for flavouring (Coetzee, 1982:169). Cooked mopane worms by boiling, frying, stewing or roasting are served as a relish with stiff millet, sorghum or maize meal porridge. The sun-dried mopane worms and the roasted ones are eaten as a snack (Lucas, 2010:11; Sydenham & Ron, 2007:2-3; Coetzee, 1982:169).

Mopane worms are also dried to preserve them. They are first cleaned by squeezing the insides out and then boiled in salt water till done before spreading them out in the sun to dry. After drying they are collected and stored in sacks (Grivetti, 1978b; Coetzee, 1982:169). When cooking sun-dried mopane worms that were preserved they are also rehydrated by boiling in a little water with oil. No salt is added because when drying in the sun a substantial amount of salt is added for preservation (Grivetti, 1978b; Coetzee, 1982:169).

Locusts *(tsie)* are abundant and available during rainy seasons (Coetzee, 1982:169). When cooking locusts the head, wings and hind legs are removed and only the breast part is eaten. They are either boiled in a little water until soft, or if so desired, fried until brown. Another method of preparing locusts is roasting them on the coals. Salt is added for flavouring when using both methods and they served with cooked dried mealies (Coetzee, 1982:168).

Flying ants or termites and sand crickets also formed part of the traditional diet especially in the rainy season or in the summer (Coetzee, 1982:87). Large numbers of these insects were collected at night after a swarm has settled (Coetzee, 1982:168). When cooking termites and crickets their intestinal contents are also squeezed out. The head, wings and forelegs are removed (Coetzee, 1982:170). They are cleaned and fried, served as relish with stiff millet, sorghum or maize meal porridge (Coetzee, 1982:87).

2.7.3.8 Honey

Batswana traditional foods include the use of honey. Honey from bees is a delicacy in the diet of the Batswana (Coetzee, 1982:87). The bees are smoked out from their hives that usually appear on a piece of bark on a tree. The combs are removed and placed in a container. At times honey is not eaten on the spot. It is taken home and squeezed out first into another container and then eaten with a spoon as a special sweet (Coetzee, 1982:87).

2.7.3.9 Breads

Bread was traditionally not a basic part of people's diet in Botswana, but it has become popular in recent years. Some of the wheat flour bread that is baked and served includes pot bread, fatcakes (*magwinya; vetkoek in Afrikaans*), dumplings (*matemekwane*), flat bread (*diphaphatha/mapakiwa*) and a variety of other products, which can be made out of grits, meal and flour for breakfast. In each case, bread flour is prepared as dough which is divided up into sizeable cake portions that are then cooked. Each dish will take a different name, like those just named, depending on the shape of the cakes and the style of cooking, such as boiling with meat, or frying in hot oil, baking in charcoal or firewood. For example, when making dumplings the dough is usually boiled together with the meat and then served with a side dish of vegetables. All other bread types are taken with tea (Botswana Tourism Board, 2009:7; Sydenham & Ron, 2007:3).

2.7.4 Traditional eating patterns

The traditional eating patterns of the Batswana were determined by what was available and accessible in their environment. Limited information has been published on the meal patterns and meal composition of Batswana people in earlier pre-colonial times, except for the three publications by Grivetti (1976), Scroggie (1946) and another study conducted by Masibi and Coetzee (1986). Grivetti's research focused on one tribal group, called the Batlokwa or Tlokwa while Scroggie's dealt with the Ngwaketse tribal

group. Both these tribal groups live in the south near Gaborone, the capital city of Botswana.

2.7.4.1 Traditional meal pattern

Traditionally the Batswana prepared two formal meals a day. The first meal was eaten early in the morning, and the second at midday or at dusk (Scroggie, 1946:231). The evening meal was the main meal (even though food was usually prepared in the morning) because there was no other regular time for eating together as a family except in the evenings when everybody was at home (Schapera, 1953:25). There was no set time when the whole family assembled for the evening meal (Scroggie, 1946:232).

2.7.4.2 Traditional meal composition

The meals consisted of porridges prepared from the staple cereals (sorghum, maize and millet). Soft porridges were prepared for breakfast and a stiff porridge for lunch and supper. These were served with a relish or side dish. The type of relish consumed with the stiff porridges was milk (fresh or sour), a vegetable relish or legumes, and sometimes meat, fish or insects. The meal composition of meals during the week and weekends was similar, except in times when food was in abundance or on special occasions (Grivetti, 1976:1209, 1213) (Figure 2.5). In the available publications researchers were not specific regarding the meal composition and only limited information was given on food items that were eaten together.

FIGURE 2.5: COOKING IN LARGE POTS WHEN FOOD IS ABUNDANT (People served as much as they could, not the usual portion size)

*2.7.4.3 **Special occasions*** (Figures 2.6 & 2.7)

Traditionally the Batswana celebrated several kinds of events representing different milestones in the lives of people in the community such as at birth, puberty, marriage and special occasions such as religious and tribal feasts. It was custom to celebrate these occasions eating various particular traditional foods on each specific occasion specifically to serve meat and traditional beer to friends, relatives and neighbours. Traditional beer was served at all feasts, except in strictly Christian households (Scroggie, 1946:268-273). According to custom, at events such as weddings and funerals, men prepared the meat that was cooked in large cast iron pots until it shredded and this dish was called *seswaa or chotlho*. Women were responsible for the preparation of porridges and/or other grains, legumes and vegetable dishes on these occasions. Ginger beer was served at weddings and tribal feasts, while tea and fatcakes were prepared for weddings and funerals that have evening prayers that continue all-night (Durham, 2013). This practice of offering food at funerals is still done today. Other traditional foods that were served include samp mixed with beans locally known as *dikgobe* and porridges such as sorghum porridge. Traditionally a wide variety of foods including indigenous fruits were presented to the guests to eat. The formalities of beer drinking were observed (Scroggie, 1946:268). With the serving size, guests were served a heaped-up plate of food as a sign to show that they were welcome. The feast was not supposed to impose too much work on the family giving the celebration so preparations for all important feasts were catered for by the wider group of relatives who shared the responsibility (Scroggie, 1946:271-273). Today little has changed as far as such events are concerned. This study has been greatly influenced by urbanisation but some customs have remained and some have changed to a greater or lesser extent.

FIGURE 2.6: COOKING AT CEREMONIAL EVENTS

FIGURE 2.7: MEN COOKING POUNDED MEAT (*seswaa /chotlho*)

2.7.5 Change in eating patterns

Changes in eating patterns were observed after Botswana gained independence in 1966. As a result of migration, Westernisation, modernisation, communication and urbanisation eating patterns changed in several ways as explained (see 2.5). Changes due to inter-tribal migrations, migrant labour, the influence of mission churches, formal and informal education and urbanisation seemed to force the Batswana into accepting Western forms and norms. These changes have obviously been disruptive to Batswana value systems and its social structure, which include how and what is eaten (Masibi & Coetzee, 1986:10).

2.7.6 Current meal patterns and meal composition

The Batswana now prepare three formal meals each day instead of the traditional two meals a day due to the influence of Western-orientated food practices, and the availability and accessibility of foods with the development of an appropriate retail trade (Maruapula *et al*., 2011; Clausen, Charlton, Gobotswang & Holmboe-Ottesen, 2005; Weatherspoon & Reardon, 2003). Due to the availability of electricity, people now use different cooking methods. The importation of foods from other countries has increased

the availability of a wide variety of grains, breads, fruits and vegetables that are now included in meals with ease. In addition to the traditional staple food, other foods consumed include rice, salads, breads, sweets, soft drinks, condiments and spices (Letsididi, 2013; Maruapula *et al*., 2011; Emongor & Kirsten, 2009:). This is also confirmed by the Botswana Tourism Board that, nowadays a wide variety of cultivated vegetables such as cabbage, carrots, beetroot, tomatoes, onions, spinach, potatoes, and sweet potatoes are produced locally and used in many dishes during food preparation (Botswana Tourism Board, 2009:7).

The meal composition and meal etiquette has also changed. Weekend meal patterns are different to week days (Maruapula *et al*., 2011; Clausen *et al.,* 2005). These changes in composition of meals as well as the preparation methods used illustrate that Batswana eating patterns have changed and are still changing. This is due to the effects of structural changes such as migration, modernisation and urbanisation that result in food culture changes such as acculturation (see 2.5). However, traditional food habits are still retained for ritual occasions such as traditional feasts or ceremonies (Maruapula *et al*., 2011; Clausen *et al.,* 2005; Grivetti, 1978b).

The meal pattern and meal composition, and the way of celebrating at special occasions has changed due to interaction with the Western-orientated food practices (Maruapula *et al*., 2011; Emongor & Kirsten, 2009; Clausen *et al*., 2005). It is noteworthy that special occasions are now celebrated throughout the entire country a Western or modern way. Occasions such as a bridal shower, a kitchen tea party, a baby shower, a graduation party and cocktail party are commonly celebrated. The food eaten is Western (Maruapula *et al*., 2011). The way the occasions are conducted is in line with Western culture.

This last section on Batswana eating patterns has shown clearly that the Batswana used to eat traditional foods that were available and accessible in their own local physical and natural environment. They relied on crops from subsistence farming hence their source of food depended mostly on rainfall and climatic conditions that varied seasonally.

Specifics about the eating patterns of Batswana have been documented. Traditionally their eating patterns were characterised by a meal pattern that reflected adequate intake of starch from cereal products they cultivated. These cereals were eaten at all meals of the day accompanied by a limited intake of fruits and vegetables. Meat dishes provided a relish with cereal porridges and other cereal dishes such as samp. This observation is supported by Maruapula *et al.* (2011) stating that even at the time of

independence Batswana prepared their meals using maize and sorghum as staple foods.

It is not possible to say much about eating patterns, which involves the number of meals, either two meals or three meals a day that the Batswana had together with their specific meal composition. However, only limited information was available, which is in itself also not so specific in the publications reviewed. Though information is limited, when critically looking at what the Batswana ate with their families in their homes and on traditional special occasions, traditional food basically forms the basis of their eating patterns with limited fruit consumption. Therefore it is noteworthy that this area still needs further investigation now and, in the future in other locations.

2.8 CHAPTER CONCLUSION

In this chapter the human ecological perspective was introduced as theoretical perspective for the study. A review of the factors influencing the food choice process has been discussed and presented together with the developmental model of food culture and nutrition transition. Lastly how the Batswana eating patterns have changed and evolved was addressed. The next chapter will address the adolescent life stage and the food choices and eating patterns during adolescence.

Chapter 3

ADOLESCENCE AS A LIFE PHASE

3.1 INTRODUCTION

This chapter addresses adolescence as a life phase that encompasses physical and psychosocial development. Progression through all stages of adolescence is therefore determined not only by physical changes, but also by psychosocial changes that include cognitive, moral and identity development. Because adolescence is one of the most dynamic and complex transitions in the lifespan of a person, as such, it could affect food choices and eating patterns hence nutrition and health would be affected too and both the physical and psychosocial development phases need to be considered (Story *et al.,* 2002; Spear, 2002). In this research this standpoint receives attention as the implications of both food choices and eating patterns of adolescents will be addressed. Emphasis is placed on the mid-adolescence stage, because it directly pertains to the study group.

3.2 ADOLESCENT DEVELOPMENT PHASES

An overview gives a description of adolescence as a human development phase. Psychologists see this development phase as taking place in three stages namely, early adolescence (10-13 years), mid-adolescence (14-18 years), and late adolescence (19-23 years) (Louw, & Louw , 2007:279, 283; Treuth & Griffin, 2006:819; Stanner, 2004). Early adolescence marks the time that the physical and psychosocial transformation of a child into becoming a young adult begins. It is the most difficult stage in adolescence as transformation itself is characterised by rapid peaks of change. Mid-adolescence is the stage where the experiences of transformation no longer happen. A number of changes occur physically, mentally, cognitively and sexually. Late adolescence is the stage close to adulthood when a fully developed identity and more stable interests emerge (Brown *et al*., 2011:357; Sturdevant & Spear, 2002).

In the human lifespan adolescence is a developmental transition, a life phase that bridges childhood and adulthood (Louw & Louw, 2007:278; Treuth & Griffin, 2006:819). In general, it represents the second decade of life and is also referred to as the

teenage years. The relatively uniform growth of childhood is suddenly altered by an increase in growth (Spear, 2002). This sudden spurt is associated with hormonal, cognitive and emotional changes characterised by rapid and extensive physical and psychosocial changes (Louw & Louw, 2007:283; Stanner, 2004; Spear, 2002; Sturdevant & Spear, 2002). Adolescence begins at puberty when the body reaches sexual maturation and ends with the attainment of adulthood when the person meets the societal norms and expectations of being an adult (Louw & Louw, 2007:279; Sturdevant & Spear, 2002).

In the process of becoming independent, adolescent development involves transitions in all the stages (milestones) that make up the person, physical and psychosocial. Although by definition these stages always involve change, some are concentrated typically within a particular range during particular portions of life (Louw & Louw, 2007: 282, 327; Story *et al.,* 2002). Accordingly, it can be said that adolescence is the period within a person's life span when most of the developments taking place are changing from what typically is considered childhood to what typically is considered adulthood.

The physical developmental changes in adolescence will be discussed first, followed by the psychosocial changes, which include cognitive, moral and identity development.

3.2.1 Physical development in adolescence

One of the earliest and most obvious physical changes that take place during adolescence is a time of rapid growth, which begins in early adolescence. This growth in height is accompanied by an increase in weight, accumulation of skeletal mass and changes in body composition (Brown *et al*., 2011:358; Louw & Louw, 2007:283-284). These changes occur so quickly for most adolescents because this life stage is regarded as a peak time of physical growth referred to as a growth spurt. Generally the pattern of growth is similar for most adolescents (Louw & Louw, 2007:283; Spear, 2002), although the age of onset and the rate and duration of growth may vary somewhat from one individual to another (Louw & Louw, 2007:283; Rogol, Clark & James, 2000). The process of rapid physical changes in early adolescence is called puberty. Puberty is the time when the body matures from that of a child to that of a young adult (Brown *et al*., 2011:358). It starts gradually, from around eleven years for girls and thirteen for boys. This shows that, on average, girls enter and complete each stage of adolescence earlier than the boys (Louw & Louw, 2007:283; Rogol *et al*., 2000; Stanner, 2004; Spear, 2002).

During the mid-adolescence stage the body composition changes dramatically because of the high growth spurt they experience. Male adolescents have an increase in height

and muscle mass accumulation while female body fat levels peak and this may cause weight dissatisfaction. It is not surprising that, with the speed of these changes, which some adolescents experience, they become very concerned about their physical appearance. Some may need a great deal of reassurance, especially if they are not growing or maturing as quickly as their friends. Since the rapid physical changes in adolescence affect the way adolescents feel about themselves, especially regarding their own body shape and size, an important developmental task during adolescence is to encourage acceptance of a changed physical appearance. However, this acceptance is not always easy for all adolescents (Louw & Louw, 2007:285).

During the late adolescent stage nearly half of an adult bone mass peak is achieved. By the time the age of 18 in adolescence is reached more than 90% of the adult skeletal mass would have formed. Most female adolescents are fully developed whereas male adolescents continue to gain height, weight and muscle mass (Brown *et al*., 2011:360). This means that in this stage of late adolescence physical development is achieved in full.

It should be noted that the physical changes and the age at which adolescents reach physical maturity affects their psychological development as well, especially when they reach maturity either much earlier or much later than the average expected age (Louw & Louw, 2007:285). In adolescence the on-going physical development is accompanied by changes in the ways in which young people think about and see themselves and the world around them. These young people not only begin to look more like adults, they also start to think more like adults (Treuth & Griffin, 2006:819).

3.2.2 Psychosocial development in adolescence

The adolescent life phase can also be described as a time of rapid cognitive development. Psychosocial changes during adolescence are complex and include the attainment of cognitive maturity, development of morals and values, the establishment of a separate identity and social acceptance (Treuth & Griffin, 2006:819). Discussion on psychosocial development in adolescence will now be presented with reference to these three distinct areas, namely cognitive, moral and identity development.

i. Cognitive development

Cognitive development deals with changes in the processes involved in the acquisition and use of knowledge, where people show intra-individual changes in the quantitative and qualitative aspects of their cognition. Cognition refers to knowing. Although these changes and differences exist across the lifespan, many of them are especially prominent in adolescence. This is because what lies at the core of adolescent cognitive

development is the attainment of a more fully conscious, self-directed and self-regulating minds (Steinberg, 2005). When adolescents encounter something that is reasonably similar to what they already know, it is assimilated into their existing knowledge. When they encounter something that is quite dissimilar from what is already known, they either totally ignore it, or change their way of thinking about it to accommodate their knowledge of the new and unfamiliar. This is why most developmental theorists indicate that adolescents undergo a transition in style of thinking from the concrete-operational thought to the formal-operational thought (Steinberg, 2005; Sturdevant & Spear, 2002).

In Jean Piaget's theory of cognitive development, it is believed that formal-operational thought is characterised by the ability to think hypothetically and abstractly. The pace of cognitive growth in specific areas is unique to each individual adolescent. Therefore, formal operations can differ dramatically from concrete operations in which a young adolescent can think logically, but only in terms of the solid and tangible and not in terms of ideas and possibilities (Louw & Louw, 2007:299-302; Sturdevant & Spear, 2002). During the early adolescence stage concrete thinking is more dominant together with a feeling of egocentrism and engagement in impulsive behaviour. This is because abstract reasoning abilities are not fully developed which limits abstract thought processes in early adolescence. Although their thinking becomes more flexible, their understanding of complex relationships such as food intake to health and dietary issues remain limited (Brown *et al*., 2011:361).

One has to take note that cognitive growth and development may occur in some areas of thinking and not in others, depending on how slow or fast the cognitive development of the individual adolescent has been. Adolescents are often driven by their self-consciousness into the realm of possibilities and imaginary audience that take them beyond the here and now (Louw & Louw, 2007:303-306; Sturdevant & Spear, 2002).

The cognitive development level of adolescence is important. This is because as they become abstract thinkers, and, with experience they may become better able to understand complex messages and master complex problem solving and decision making (Louw & Louw, 2007:303-306; Sturdevant & Spear, 2002). For example, in the mid-adolescence stage, the development of abstract reasoning continues rapidly because during this stage physical growth and development are often completed. They now begin to understand the relationship between current dietary-related behaviours and future health. During this stage the peer group becomes more influential in issues like eating patterns and food choices (Brown *et al*., 2011:361).

Abstract thought capacity is fully developed during the late adolescence stage, when adolescents begin to realise their own abstract thinking capabilities. Piaget emphasises this by describing late adolescence as the life stage in which the individual's thoughts start taking more of an abstract form, while egocentric thoughts decrease. This allows the individual to think and reason from a wider perspective (Brown *et al*., 2011:361; Louw & Louw, 2007:303-306; Steinberg, 2005). During this stage the ability to use internal symbols or images to represent reality occurs. It helps them to think hypothetically about the future and to assess multiple outcomes as they are in a period in which independence is achieved (Christie & Viner, 2005). They acquire cognitive skills that enable them to control and coordinate thoughts and behaviour. Demonstrating thinking that reveals both improved efficiency and capacity in reasoning and information processing tends to increase with age, but not everyone reaches the formal stage of complete abstract thinking (Steinberg, 2005; Louw & Louw, 2007:303-306).

ii. Moral development

Adolescence is also a life phase filled with experiences and decisions that relate to moral development. At this phase of development, adolescents are still in the process of gaining control over cognitive processes that shape any reasonable definition of morality, including impulsivity, judgment, planning for the future and foresight of consequences. While there are many interpretations of what "moral development" is the influential theories put forth by psychologists Jean Piaget and Lawrence Kohlberg assume that 'morality goes beyond adherence to social norms and conventions.' They define morality as 'one's concepts, reasoning, and actions which pertain to the welfare, rights and fair treatment of individuals (Barnett & Moore, 2009:1). Fundamentally, it is a period in which family values and standards are compared with external standards. Some values and standards are rejected and others accepted and ultimately internalised as personal ethics. As they develop a system of values, which entails moral orientation and ideology, a strong relationship to identity emerges and helps them in making their own decisions and assuming responsibility for these choices (Louw & Louw, 2007:327). The thoughts, ideas and concepts developed during this period of life greatly influence their future life and play a major role in character and personality formation (Barnett & Moore, 2009:2; Sturdevant & Spear, 2002).

Moral development is an on-going process that occurs within the context of a person's family, community and society as a whole (White, 2000:76). As adolescents determine what is important to them, and strive to establish their own value system, the influences

of others, both positive and negative, becomes more important to them (Barnett & Moore, 2009:1).

In the early adolescence stage these young people demonstrate interest in ethics of care and justice. They respect social order although it is sometimes challenged. During mid-adolescence there is gradually more conceptual thinking. Adolescents enjoy their moral reasoning and believe principles are more important than laws. They often engage in principled morality and have increased social awareness and activism. During the late adolescence stage, adolescents have developed their personal morality and life choices. They can now express interest in moral and philosophical thinking about self and the wider world (Barnett & Moore, 2009:2).

Moral development is therefore an important part of the maturing process. It guides adolescents' behaviour giving them a greater awareness of the rules of society. Adolescents who develop reliable moral guidelines are more likely to make positive decisions and are less likely to be influenced by negative behaviours. Peers, family, community and the media all play a role as adolescents develop their own ideas about right and wrong (Barnett & Moore, 2009:2; White, 2000; Sturdevant & Spear, 2002). From psychology theories of moral development Piaget and Kohlberg believed that this phase of development helps adolescents to establish their self-identity. Relying on external rewards and punishments, adolescents develop personal values even though it is over a period of time. From there, they internalise a personal code of ethics acceptable in society (Barnett & Moore, 2009:1; Sturdevant & Spear, 2002).

iii. Identity development

Erik Erickson, an ego psychologist, believed that the central crisis during adolescence was the development of an identity formation because if it is not developed role confusion may result. Identity refers to individual's awareness of themselves as an independent, unique person with a specific place in society (Louw & Louw, 2007:309; Sturdevant & Spear, 2002). From a psychological perspective adolescence is a life phase of identity versus role confusion. Identity development is important during adolescence due to the dramatic developments in this life phase. As a transition from childhood to adulthood, adolescents are beginning to become more independent and less dependent on their parents. They begin to look at the future in terms of a career, relationships and families. It is important to them as they need to define who they are and look to what directions they want to take in life (Louw & Louw, 2007: 309; Sturdevant & Spear, 2002). Therefore, during this period, individual adolescents are attempting to figure out who they are in the realms of sexuality, relationships, careers and other things concerning their life and are keen to explore possibilities. Thus they

begin to form their own identity based upon the outcome of their explorations (Sturdevant & Spear, 2002).

The various tasks of adolescence are highly related to searching for personal identity concerning occupational choice, autonomy from parents and social acceptance (Louw & Louw, 2007:327). Social acceptance in this context of identity development is the extent to which an individual's company is regarded as rewarding by others (Brown *et al*., 2011:361; Sturdevant & Spear, 2002). Peer acceptance is distinct from other aspects of peer functioning and is most notably related to friendship and social network participation. At the most general level, peer acceptance refers to the degree to which individuals are liked or disliked by the people in their peer group. In the case of this study it would be other adolescents. Peer acceptance becomes important and the initiation of and participation in health-compromising behaviours often occur during adolescence. In this way peer groups become more influential as far as food choices are concerned than the family (Brown *et al*., 2011:361). Consequently, mid-adolescents express their ability and willingness to fit in with a group of peers by adopting food preferences and making food choices based on peer influences and by refuting family preferences and choices (Brown *et al*., 2011:361). In the light of these observations about how adolescents' food habits and eating patterns do change food intake and nutrition are now looked at in detail to note the implications of this phenomenon.

3.3 FOOD CHOICE AND EATING PATTERNS DURING ADOLESCENCE

Adolescents, as they undergo the cognitive, moral and identity developments, also have to make food choices like any other individual in society. Extensive literature shows that there is global evidence of a dietary quality decline from childhood to adolescence because eating patterns are not static. They keep on fluctuating throughout adolescence (Brown *et al*., 2011:362). Reasons for the shift in eating patterns as children move into adolescence are most likely due to their lifestyle, physical and psychosocial development and environmental changes as confirmed in several American studies (Brown *et al*., 2011:362; Videon & Manning, 2003; Story *et al.,* 2002) and South African studies (Mackeown, Pedro & Norris, 2007; Kruger, Kruger & MacIntyre, 2006).

3.3.1 Food choice during adolescence

Food choice during adolescence is particularly important because food intake not only influences current health but also future health status (Contento *et al*., 2006). It is pointed out that the dynamics of adolescence can have important influences on an

individual's nutrition both in the short term and in the post-adolescent period (Hughes, 2009). Therefore collectively food choices of mid-adolescents are cause for concern. This concern is widespread in the developed world as well as in developing African countries like Botswana, as food choices may have adverse effects on adolescents' future health (Maruapula *et al.,* 2011). It has been recognised that a healthy diet is not only vital for growth and development, but also for disease prevention both in the long- and short-term (Hughes, 2009).

Mid-adolescence is marked by increased independence regarding decisions including what to eat, where to go and how to spend money. It may thus be an important life stage during which the increased access to food affects dietary choices (Laska, Hearst, Forsyth, Pasch & Lytle, 2010). Mid-adolescence is therefore emphasised in this section since it is the population age group the study is addressing. Adolescents' dietary change and/or eating behaviour is also closely associated with their increased need to be independent and to be accepted by peers. Unfortunately this often has a negative effect on food choices and the subsequent nutrient intake (Rankin, Hanekom, Wright & MacIntyre, 2010). It is pointed out that these young people aged 12 to 17 frequently engage in unhealthy dietary behaviour that places them at risk as the possibility of an onset of a chronic disease could happen. These unhealthy dietary behaviours are also carried over into adulthood (Venter & Winterbach, 2010).

Adolescents frequently consume an energy-dense diet which is of poor quality in terms of essential micronutrients. Their diet is often low in fruit and vegetables and dairy products and high in fat as the consumption of sugar sweetened beverages remains the most popular choice for this group (Van Zyl *et al.,* 2010). This dietary pattern is associated with high levels of nutrition-related NCDs and degenerative diseases (Mackeown *et al*., 2007; Kruger *et al.,* 2006; Popkin, 2002).

3.3.2 Eating patterns during adolescence

Today adolescents lead busy lives and they spend considerable time at school (Brown *et al*., 2011:362; Kubik, Lytle & Story, 2005; Videon & Manning, 2003). Many of them are involved in extra-curricular sport and/or extra educational activities. These activities, combined with the increased need for social and peer interaction and approval and increasing academic demands as they proceed through school, leave little time for the adolescent to sit down to eat a meal. This makes snacking and meal skipping common practices amongst adolescents (Brown *et al.,* 2011:362).

In the case of adolescents it is frequently pointed out that growing independence, eating food away from home, concern about physical appearance and body weight, the

need for peer acceptance and busy schedules all have an effect on their eating patterns and food choices (Spear, 2002; Story *et al*., 2002). This marks the development of emotional and social independence from family especially parents at the time of mid-adolescence (Brown *et al*., 2011:361). Studies in some countries report on a tendency for the frequency of eating dinner with their families to decrease as children enter adolescence (Videon & Manning, 2003). This is because they spend less time with family and more time with their peers or even a friend with common characteristic. Eating away from home seems to become prevalent among adolescents (Brown *et al*., 2011:363; Spear, 2002). This is an unfortunate occurrence, as frequent family meals are associated with improved dietary intake (Brown *et al*., 2011:363). The frequent eating away from home at fast food or other outlets has a direct negative bearing on the nutritional status of adolescents as the food offered at these eating locations tends to be higher in kilojoules and fat compared to food from home (Brown *et al*., 2011:363; Rydell, Harnack, Oakes, Story, Jeffery & French, 2008; Spear, 2002).

Studies have shown that breakfast consumption is an important indicator of a healthy lifestyle (Levin & Kirby, 2012; Hallström, Vereecken, Ruiz, Patterson, Gilbert, Catasta, Diaz, Gomez-Martinez, Gross, Gottrand, Hegyi, Lehoux, Mouratidou, Widham, Astrom & Moreno, 2011). It is the most commonly skipped meal among many adolescents especially girls, older adolescents and those from lower socioeconomic groups (Levin & Kirby, 2012; Hallström *et al*., 2011; Spear, 2002). Skipping breakfast has a negative impact on the nutritional health of adolescents because it can dramatically decrease the intake of essential nutrients such as carbohydrates, protein, calcium and folate which are required for the rapid physical growth and other developmental processes in adolescence (Brown *et al*., 2011:363). In some instances skipping lunch and dinner also occurs.

3.4 IMPLICATIONS OF FOOD INTAKE ON THE NUTRITIONAL NEEDS OF ADOLESCENCE

Changes taking place in the food choices and patterns of adolescents as a result of the rapid physical growth and psychosocial development have implications for food intake and nutritional health of individual adolescents. All these changes are caused by the struggle for personal independence that characterises mid-adolescence psychosocial development, which often leads to health-compromising eating behaviours. These include excessive dieting, meal skipping, the use of unconventional nutritional and non-nutritional supplements and the adoption of fad diets. These desperate situations create a great challenge for health care professionals and even to adolescents

themselves. Treuth & Griffin (2006:819) stated that adolescent girls have nutritional deficiencies more often than boys. This is because several factors contribute to this deficit. Girls eat less, so are less likely to get the necessary nutrients. They also diet more often than boys thus depriving themselves of necessary nutrients (Treuth & Griffin, 2006:819).

The increase in lean body mass, bone mass and body fat during the adolescent phase result in higher energy and nutrient needs than is the case at any other phase of a person's lifetime. Higher energy and nutrient intake are therefore necessary to avoid retarded linear growth and delayed sexual maturation. During adolescence rapid physical growth and other developmental changes influence the adolescent's dietary habits, which are likely to persist into early adulthood (Brown *et al*., 2011:365,368; Stanner, 2004). This dramatic physical growth and development experienced by adolescents significantly increases their needs especially for energy, macronutrients, vitamins and minerals (Brown *et al*., 2011:357).

3.4.1 Energy and macronutrients

The increased energy needs of adolescence are necessary to support adolescent growth and development. In terms of gender, adolescent males experience greater increases in height, weight and lean body mass with higher kilojoule requirements than female adolescents. Carbohydrates and fats are the primary source of dietary energy needed, together with proteins, for the maintenance of existing lean body mass and for sustaining additional lean body mass that occurs during adolescent growth (Brown *et al*., 2011:367-369).

3.4.2 Micronutrients

Minerals and vitamins are also essential for the physical growth and development of an adolescent. In particular, the rapid increase in bone mass has a significant impact on the body's requirements for calcium and vitamin D. As about half of the adult skeletal mass is formed during adolescence, an inadequate calcium intake during this period has been associated with a low peak bone mass, a strong indicator of osteoporosis in later life. Although bone mass continues to increase in early adulthood, it is uncertain whether severe deficits in bone mass development during adolescence can be compensated for later (Stanner, 2004; Lytle, 2002; Spear, 2002). It is an established fact that female adolescents particularly tend to choose carbonated soft drinks frequently which would account for about 6% of their total kilojoule intake. This trend causes significant concern because high consumption of soft drinks may increase the risk of bone fractures over an individual's lifetime (Brown *et al.,* 2011:363). To add to

this, there is evidence that the decline in milk consumption is related to an increase in soft drink consumption by the youth in general (Lytle, 2002).

The rapid rate of linear growth, the increase in blood volume and the onset of menarche in females increases the need for iron and folic acid until after the growth spurt and sexual maturation. It is pointed out that, iron requirements for boys are increased in adolescence not only for expanding blood volume but also for a rise in haemoglobin concentration that occurs in sexual maturation in boys. In girls iron requirements are particularly high in order to replace menstrual iron losses (Stanner, 2004; Spear, 2002). Therefore, both genders are susceptible to iron deficiency anaemia as the high iron content requirements are not being met. There is growing evidence that the iron status in this age group is on the borderline of being only just adequate or detrimentally deficient. It can adversely affect the cognitive function with possible implications for undermining learning ability and hence academic performance. Evidence exists that, iron status has been linked to lower intelligence quotients amongst adolescent girls (Stanner, 2004; Spear, 2002). Adolescents also need to increase their consumption of fruits and vegetables to provide vitamin C that is necessary in the synthesis of collagen and connective tissues in the body (Stanner, 2004).

Not all micronutrients are discussed here although they are all also needed during adolescence particularly. It should be noted that a good diet requires micronutrients either in high or very small amounts as they are crucial for individual good health (Shenkin, 2008:e171). However, adequate intakes of these micronutrients are particularly critical in adolescence to support optimal healthy growth and development throughout adolescence into adulthood (Brown *et al*., 2011:362; Treuth & Griffin, 2006:819).

During this period when some nutrients are needed most, adolescents tend to compromise the requirements for other nutrients. For example, when the total fat intake is increased, fruit and vegetable consumption is often inadequate. This dietary pattern, together with increased prevalence of overweight, places adolescents at a higher risk for diabetes, obesity and cardiovascular disease in adulthood (Videon & Manning, 2003). Adolescents are consuming a larger proportion of kilojoules from snacking food away from home, more specifically at fast food restaurants. It is very unfortunate that the food choices adolescents make while snacking tend to be high in sugar, sodium and fat while relatively low in vitamins and minerals (Brown *et al*., 2011:362; Spear, 2002). Normally, these diets that are high in saturated fat, total fat, sodium and low in fibre are also associated with an increased risk for some types of cancer and

cardiovascular disease including hypertension. However, a diet low in fruits and vegetables is associated with cancer risk because of a variety of mechanisms, including an absence of protective nutrients, phytochemicals and other unknown compounds in fruits and vegetables (Lytle, 2002:S9). It is pointed out that, although many consume a nutritionally adequate diet, some consume fewer nutrients than the body requires. These eating-related concerns during this period of adolescence especially are likely to influence long term behaviours that occur due to changes in food choice and eating patterns (Neumark-Sztainer, Story, Perry & Casey, 1999).

It should be noted that there are major nutritional issues that affect the current health and well-being of adolescents and the associated risk of developing chronic diseases during adulthood. The relationship between the adolescent's diet and the risk of a chronic disease developing is made on the assumption that eating behaviours are learned and set during childhood and adolescence and are maintained into adulthood (Koletzko, 2008; Lytle, 2002). Therefore, adolescents need healthy role models and safe places in which to take considered risks regarding their own dietary patterns. These is because they often seek approval and test themselves, trying different lifestyles or mannerisms in search of finding out exactly where they fit comfortably as a person in their own right. For them to attain a sense of identity successfully, they have to depend on effective interaction within their own environment as an individual, more importantly in their own home, school and community and in society in general (Sturdevant & Spear, 2002).

3.5 CHAPTER CONCLUSION

In this chapter the food choices and eating patterns of adolescents in relation to the development phases they go through were discussed in relation to their physical and psychosocial development. It was shown that during mid-adolescence individuals experience a rapid succession of peaks of change as their life phase links childhood and adulthood (Louw & Louw, 2007:278; Treuth & Griffin, 2006:819). A number of implications for food intake and the nutritional needs of adolescents were reviewed in detail, looking at the relationship between their lifestyles food choices and eating patterns. An indication of eating foods high in saturated fats and low fibre foods has been shown to be associated with nutritional defects that compromise the future health of adolescents.

Chapter 4

RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter presents the plan according to which the research was executed to achieve the research aim. It outlines the research design, states the aim and objectives that arise from the problem statement and justification of this study. The conceptual framework includes the conceptualisation and operationalisation of the research and guides the study. Discussion that follows is on the measuring instrument, the sampling technique, data collection and data analysis process and ethical issues pertaining to this research.

4.2 RESEARCH DESIGN

This quantitative cross-sectional study can be described as explorative and descriptive. The research is exploratory because insight into the phenomenon of nutrition transition is sought and how it relates to the food habits and food choice behaviour of mid-adolescents in the Francistown area. It is also descriptive because it presents a picture that gives specific detail of the various situations, social settings or relationships as Neuman (2006:22) recommends. It documents how they relate to the identified food choice behaviour of the study group. The approach chosen is aimed at understanding and interpreting the study group's experiences, perspectives and meanings in a particular situation which would, in turn, relate to understanding their food habits. The researcher wanted to find out how the different environmental factors represented in the external environment (physical, economic, political and socio-cultural environments) and internal, individual environments (knowledge, attitudes, beliefs, values) affect the food habits and food choice behaviour of the study group.

This study on food habits and food choice behaviour provides the context for answering the "what" questions according to Babbie & Mouton 2001, which constitutes an exploratory research approach whereas the descriptive research approach focuses on the "how" and why" questions (Neuman, 2006:22). With regard to the selected topic, the researcher determined and described the what, why and how of the food habits of

these mid-adolescents and whether, and how, they had changed from the traditional to the Western-orientated eating patterns and food choice behaviours.

4.3 RESEARCH AIM AND OBJECTIVES

4.3.1 Aim of the study

The study aimed to determine and describe how the nutrition transition in Botswana contributes to the current food habits and food choice behaviour of mid-adolescents (15-18 years of age) in the Francistown area, and how the external and internal environments contribute to the food choice behaviour of the study group. It also investigated the various contexts and situations (i.e. family or household, friends or peer group contexts and when experiencing time constraints) that are considered for food consumption.

In order to accomplish this aim the following objectives and sub-objectives were formulated to guide the study.

4.3.2 Objectives and sub-objectives

1. To determine and describe the current food habits of mid-adolescents (15-18 years) in the Francistown area of Botswana (henceforth referred to as the study group).

    1.1 To determine and describe the current eating patterns (meal pattern and meal composition) of the study group during weekdays.

    1.2 To determine and describe the current eating patterns (meal pattern and meal composition) of the study group on weekend days.

    1.3 To determine and describe the frequency of consumption of the foods consumed by the study group.

    1.4 To determine and describe the foods consumed by the study group at special occasions.

2. To determine and describe to what extent traditional (indigenous), snack or fast foods are included in the eating patterns of the study group and their frequency of consumption and preference ratings

3. To determine and describe in which of the following contexts or situations traditional (indigenous) and/or modern (Western-orientated) foods are considered for consumption in:

- family/household context;
- friends/peer group context; and
- when experiencing time constraints.

4. To explore and describe how the various external environments (physical environment, economic and political environment, and socio-cultural environment) contribute to the food choice behaviour of the study group.

5. To determine and describe the contribution of the individual environment (knowledge, attitudes, beliefs, values) on the food choice behaviour of the study group.

6. To interpret and describe the implications of the nutrition transition on the current eating patterns of the study group.

4.4 CONCEPTUAL FRAMEWORK

The conceptual framework given in Figure 4.1, based on the human ecological perspective discussed in chapter 2 (see 2.2), was used to guide the study as it allowed for a holistic and contextual approach to investigate all the interrelated and interdependent factors in order to achieve the research aim.

This model illustrates the complex relationship that exists amongst the different factors from the external and internal environments that influence food habits and food choice behaviour. The structural environment consists of the physical (macro), economic and political (exo), and socio-cultural (meso) environments. As part of the socio-cultural environment, Culture 1 (traditional) and Culture 2 (modern) represent the two opposing cultures of the traditional and modern or Western-orientated culture. Botswana mid-adolescents are in contact with these two cultures. In both Culture 1 and Culture 2 there are rules, norms, values and customs that influence and guide the food choice and the food behaviour of this group. Ferraro (2001:30) acknowledges that cultures change by means of both internal and external factors through the processes of socialisation, enculturation, mass communication, education, migration and urbanisation. Therefore, in Culture 1 socialisation and enculturation are the guiding factors that shape the individual (internal) environment in a traditional society, whereas in Culture 2, mass communication, technological advancements, education, migration and urbanisation shape the individual (internal) environment in a modern society. Both of these cultures have an effect on the individual environment, which is, in turn, is guided by knowledge, beliefs, attitudes and values of the individual in response to the

food context or situation (Meiselman, 2008:18; King, Meiselman, Hottenstein, Work & Cronk, 2007; Rozin, 2006:19; Sobal *et al*., 2006: 7-11). The arrows in the model help to show how the environments and some forces or factors embedded in them, are interrelated. Dotted-lined arrows represent the interrelationship the individual's behaviour has with other factors, whereas the solid-line arrows represent the influences of these on the individual.

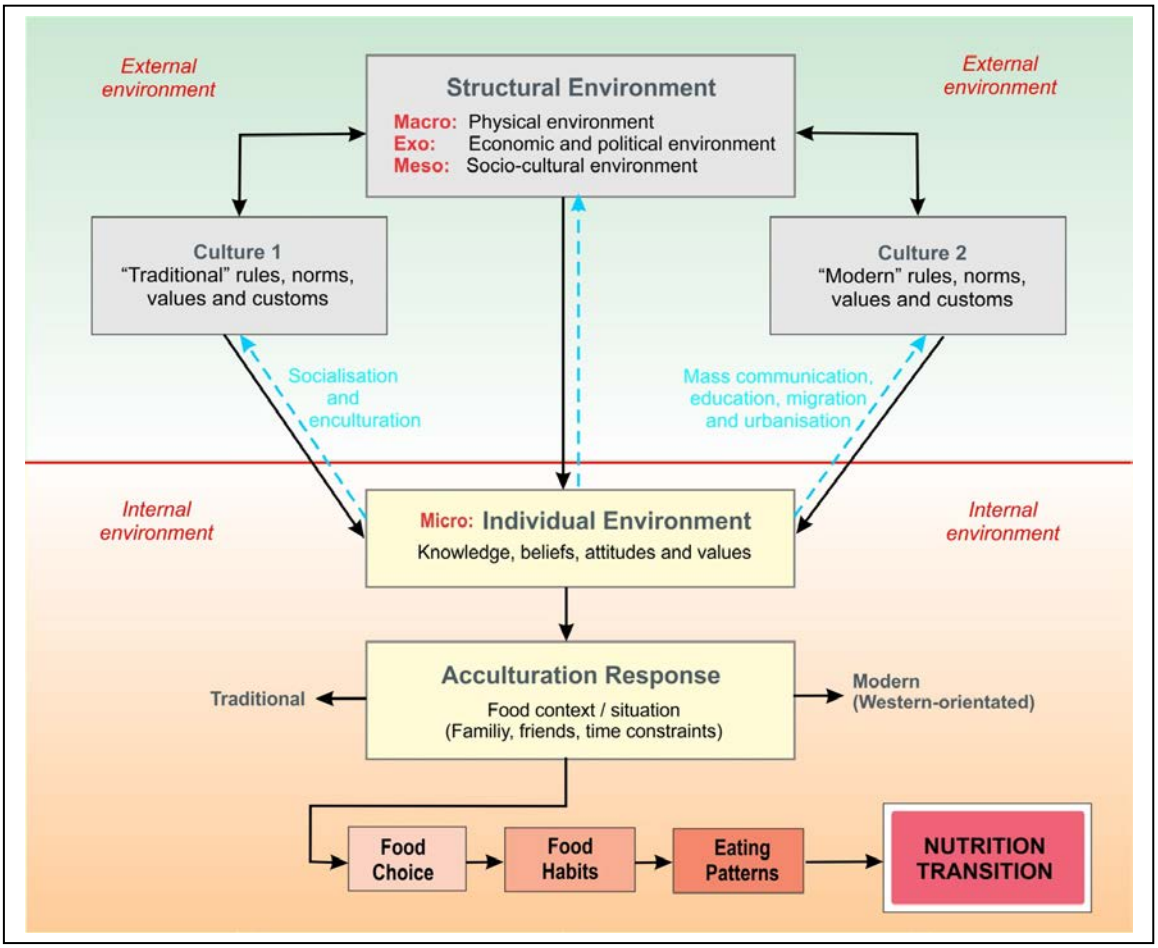


FIGURE 4.1: CONCEPTUAL FRAMEWORK (adapted from Sims, 1981:S72, Segall, 1979:186, Sims & Smiciklas-Wright, 1978:174)

The individual environment is also influenced by the structural environment where acculturation responses, as part of the internal environment, form a continuum of behaviour patterns that can be very fluid, as these can move back and forth between the traditional food practices and the newly adopted modern and Western-orientated food practices (Satia-Abouta *et al*., 2002; Segall, 1979:186). Therefore interrelated forces between the external and internal environments influence food choice behaviours of individuals and all contribute to the food habits of an individual or group. This is because the interrelatedness between the acculturation response and the individual environment either in a traditional or modern society determines the context

of food choice of an individual which leads to a change in dietary patterns influenced by various cultural, social and demographic influences (Kittler *et al*., 2011:6; Archer, 2005; Satia-Abouta *et al*., 2002; Segall, 1979:187).

4.5 CONCEPTUALISATION AND OPERATIONALISATION OF THE MAIN CONCEPTS

The main concepts of this study:

- **Nutrition transition** is a stepwise sequence of characteristic changes in dietary patterns and nutrient intakes associated with societal, economic and cultural changes during demographic transition of populations leading to increased rates of nutrition-related non-communicable diseases (NCDs) (Madanat *et al*., 2010; Zingoni *et al*., 2009; Madanat *et al*., 2008; Vorster *et al*., 2005b).

- **Food choice** refers to a set of conscious and unconscious decisions made by a person at the point of purchase, the point of consumption or any point in between (Hamilton, McIlveen & Strugnell, 2000). Food choice involves the selection and consumption of foods and/or beverages, considering what, how, when, where and with whom people eat as well as other aspects of their food and eating behaviours (Sobal, Bisogni, Devine & Jastran, 2006:1).

- **Food habits** refer to the ways in which an individual or group of individuals select, consume and utilize portions of the available food supply in response to social and cultural pressures (National Research Council, 1945:13). Individual food habits are based on food availability, accessibility, affordability and acceptability that is guided by personal food meanings and beliefs (Rozin, 2006:12-13).

- **Eating patterns** are the recurring practices in which individuals or groups of individuals choose, prepare and consume food during a period depending on what is available and acceptable for a specific meal or snack of the day at that particular point in time. An eating pattern is the temporal distribution of eating over twenty-four hours, and includes the meal size, frequency and meal location. It thus refers to the meal pattern and meal composition which includes the timing and number of eating events, as well as the alternation of hot and cold meals, snacks or beverages (Raulio, 2011; Makela, 2000).

- **Meal pattern** refers to the number, composition and distribution of meals snacks, and in-between meals through the course of a day (Fjellström, 2004; Makela, 2000). Snacking is defined as the food and drinks consumed between the three meals of the day (Bilman, Van Trijp & Renes, 2010).

- **Meal composition** refers to the food components or food items served or consumed at an eating occasion or event. It is what the meal consists of or the food components making up a meal (Raulio, 2011; Meiselman, 2008).

- **Traditional food (indigenous food)** are considered to be part of a group's culinary heritage that have been an integral part of the eating patterns of people for some time, transmitted from one generation to another. Traditional foods are often used as cultural identity of individuals and/or groups and further represent the cultural group through certain elements of culture such as their beliefs, values and attitudes, ensuring continuity over time (Guerrero *et al.,* 2010; Guerrero et al., 2009). Traditional foods often consist of locally grown, readily available and affordable food. For example, a traditional staple food for Batswana people is sorghum and its varied products (Legwaila *et al*., 2011; Olesitse, 2010; Ohiokpehai, 2003).

- **Modern/Western-orientated food** is new or contemporary food and characterised by a high consumption of fat, high sugars, cakes and drinks and low consumption of fibre, low fruit and vegetables (He, Ma, Zhai, Li, Hu, Feskens & Yang, 2009). Western food can be adopted by people outside their traditional food as it is considered to be special, a favourable response can be achieved which can be of benefit in the attainment of personal goals and not the goals of one's tradition.

- **Context/situation** involves people, food and eating in a specific location at a given time and/or represents social facilitation while eating a meal. An eating context or situation is one in which a meal is consumed and includes the food product itself, the consumer of the food and the environment in which it is consumed. These three factors need to be considered in an integrated manner because they affect each other (Meiselman, 2008:19; Gustafsson, Ostrom, Johansson & Mossberg, 2006).

- **Time constraint** is a time dimension referring to a lack of time or time pressure or a limited time being available which can lead to inconveniences (Marquis, 2005). A limitation that impacts on a task for which the planned time allocated is inadequate cannot be overridden, thus can have a negative effect. Gobbling food down in a hurry or not eating properly as you are too busy (by choice or enforcement) Used in this context time constraints can seriously influence the dietary quality of the food an individual is eating. It is a relationship between time pressure and food consumption (Patrick & Nicklas, 2005; Verlegh & Candel, 1999).

Operationalisation concerns how the researcher measures the concepts (variables) under study (Babbie & Mouton, 2001:98). The indicators and dimensions of each main concept and how it was measured is given as Table 4.1.

TABLE 4.1: OPERATIONALISATION TABLE

Objectives and sub objectives	Concepts (aspect measured)	Data collection method	Relevant section and question number
	Demographic characteristics of respondents	Questionnaire	Section A (A1 - A14)
OBJECTIVE 1: To determine and describe the **current food habits** of mid-adolescents in the Francistown area of Botswana (henceforth referred to as the study group)			
1.1 To determine and describe the **current eating patterns** (meal patterns and meal composition) of the study group during **weekdays**	Meal pattern and meal composition -**Weekdays** (Monday-Fridays)	Questionnaire	Section B (B1 - B5, B10 - B11)
1.2 To determine and describe the **current eating patterns** (meal patterns and meal composition) of the study group on **weekend days**	Meal pattern and meal composition -**Weekend days** (Saturdays and -Sundays)	Questionnaire	Section B (B6 - B9, B12 - B14) Section C (C1 - C4)
1.3 To determine and describe the f**requency of consumption** of foods consumed by the study group	**Frequency of consumption**	Questionnaire	Section C9
1.4 To determine and describe the **foods consumed** by the study group at **special occasions**	Foods consumed -**Special occasions** (weddings, funerals)	Questionnaire	Section C (C1 - C4) Section C (C1 - C4, C6)
OBJECTIVE 2: To determine and describe to what extent traditional (indigenous), snack and fast foods are included in the eating patterns of the study group and their frequency of consumption	**Familiarity** **Preference** **Frequency of consumption** -Indigenous/Traditional foods - snack and fast foods	Questionnaire Questionnaire	Section C (C7 – C8) C5

OBJECTIVE 3: To determine and describe in which of the following contexts and situations are traditional (indigenous) and / or modern (Western-oriented) foods considered for consumption - Family - Friends/ peer group - Guests, special occasion context - Time constraint - Seeking variety - Nutritional consideration	Family context Friends/peer group context Guests/ special occasion Time constraints Seeking variety Nutritional consideration	Questionnaire	Section D (D2 and D3)
OBJECTIVE 4: To explore and describe how the various external environments (physical, economic, political and socio-cultural environments) contribute to the eating patterns of the study group	Physical environment Economic and political environments Socio-cultural environment	Observation checklist, Secondary data Questionnaire, Observation checklist, Secondary data Questionnaire, Observation checklist, Secondary data	 Section A (A8) Section B (B1 - B2) Section B (B11 - B14)
OBJECTIVE 5: To determine and describe the contribution of the individual environment (knowledge, attitudes, beliefs, values) on food choice behaviour of the study group	Individual environment (knowledge, attitudes, beliefs and Values)	Questionnaire	Section C (C2, C4 - C5) Section D (D1)
OBJECTIVE 6: To interpret and describe the implications of the nutrition transition on the current eating patterns of the study group	Implications of the nutrition transition on current eating patterns	Questionnaire	_

4.6 MEASURING INSTRUMENTS

The following measuring instruments were used and each will be discussed.

4.6.1 Survey questionnaire

A survey questionnaire (see Addendum A) was compiled bearing in mind the research objectives and sub-objectives of this study. English was the language used in the questionnaire and Setswana was only used in naming the traditional food items for easy understanding. The researcher incorporated several kinds of questions and response modes in the questionnaire. Open- and closed-ended questions including the rating scales or Likert-type scales were used. Open-ended questions were included to allow respondents to give views and opinions about their food habits and food choice behaviour.

The survey questionnaire consisted of four sections namely:

Section A:	Socio-demographic information
Section B:	Usual eating patterns
Section C:	Familiarity, preference and frequency of consumption of traditional foods, snack and fast foods
Section D:	Knowledge, attitudes, beliefs, values and different contexts and situations)

Section A: Demographic information

Closed and open-ended questions were used to collect information on the demographic profile of the respondents. This included information such as age, gender, ethnic and religious group to which they belong; the educational background of their parents/guardians, their employment status and type of occupation were determined.

Section B: Usual eating patterns

In this section, questions were asked on the number of meals and what was consumed during meals as well as in-between meals in order to determine the frequency of consumption and composition of meals and snacks on weekdays, weekend days and on special occasions. Questions on how, when and with whom family meals were eaten were included. A number of open-ended questions were included to identify the

reasons why meals, if any were skipped, how weekend meals differed and with whom meals outside the home were eaten.

Section C: Familiarity, preference and frequency of consumption of traditional, snack and fast foods

In the first part of this section, the context in which traditional Batswana foods were consumed, and the attitude of the respondents towards traditional foods, was measured by means of open-ended and closed-ended questions. This was followed by measuring the familiarity, preference and frequency of consumption of selected traditional Batswana foods. A 5-point Likert-type scale was used to determine the degree of preference of various commonly known traditional Batswana foods. The frequency of consuming these foods was determined by indicating the consumption as per day, week, and month or at special occasions. The familiarity, preference and frequency of consumption of snack and fast foods were measured in the same manner, in the second part of this section. A non-quantitative food frequency (NQFFQ) was also included here to determine the frequency of consumption of modern / Western-orientated foods.

Section D: Knowledge, attitudes, beliefs, values and different context and situations

A 4-point Likert-type scale was used to measure respondents, knowledge, attitudes, beliefs and values toward healthy eating and traditional foods. In the last part of this section respondents were requested to indicate in which context or situations they associated the consumption of selected traditional and fast or convenience foods.

The questionnaire items formulated were clear and precise to maintain interest and to ensure reliability of the responses as recommended by Neuman (2000:166). Upon compilation, the questionnaire was submitted to subject experts in Consumer Science and statistical analysis to ensure content validity.

4.6.2 Pilot testing of the questionnaire

The questionnaire was piloted to test for satisfactory comprehension and readability. This was done before its final administration. The questionnaires were pilot-tested on a group of 30 Form 4 learners. It is essential that respondents participating in the pilot study comprise people for whom the questionnaire is appropriate to ensure content validity of the questionnaire (Babbie & Mouton, 2001:244-245). Based on the feedback received, corrections and improvements were made to the questionnaire. This was done in order to suit the language and level of understanding of the study sample. The

time needed to complete the questionnaire was also recorded in order to ensure that it be completed with ease in the stipulated time allowed.

4.6.3 Observation Checklist

To complement the survey questionnaire the researcher also engaged in simple observations. The use of more than one technique to measure a variable under study ensures construct validity and triangulation (Babbie & Mouton, 2001:123). It is important to note that the observations first took place in the physical environment of Francistown city and Tonota village, the areas where the schools are located. Observations were also made inside the school environment.

The researcher visited the three participating schools on different days during meal times, namely at tea breaks (10:00) and lunch breaks (13:00). Specifically the dining hall and the school tuck shop on the school premises were the places visited for the observations. The informal street food vendors, also referred to as “aunties” selling food items near the school yard, were also observed. The observation checklist (see Addendum B) was the tool used to keep records of the observations.

The checklist was used to capture certain attributes of the eating patterns of the respondents. The attributes observed were mainly on what the respondents ate; how the seating was arranged; when and how often they had their meals; to establish whether there was a distinct eating pattern or not; how their meals were served; and what each school offered on the menu at meal times.

At the school tuck shop observations were noted and compared to to what was reported by the informal street food vendors to identify what the respondents tended to buy during the break and meal times respectively. Which food items did they buy most often and on which days of the week?

4.7 STUDY AREA AND POPULATION

The locale of this study was the Francistown area, the second largest city of Botswana, located in the northern part of the country (see map of Botswana, Figure 4.2). All three senior secondary schools in the Francistown area participated in the study, since secondary schools were identified as places where mid-adolescents between the ages of 15-18 years spend most of their time on week days.

4.8 SAMPLE AND SAMPLING TECHNIQUE

The required sample size of the study was determined in consultation with the appointed statistician for this project at the University of Pretoria. The researcher went to secondary schools in Botswana to enquire about the number of learners in the schools. It was estimated that about 4 800 young people attended senior secondary schools (high school) in the Francistown area. Each senior secondary school admits about 1 600 learners, normally consist of 800 boys and 800 girls who are divided into 42 classes (streams) in each school. Of these 42 classes, 21 classes are Form 4 classes and the other 21 are Form 5 classes.

The mid-adolescents in the Francistown area have similar characteristics to the entire population of mid-adolescents in Botswana. The required number of participants estimated totalled 300 mid-adolescents respondents (aged 15 to 18 years) from the only three senior secondary schools available in the Francistown area, of which 100 learners from each school were required. Only 242 respondents obtained consent from their parents/guardians and came forward from the three schools to participate in the study.

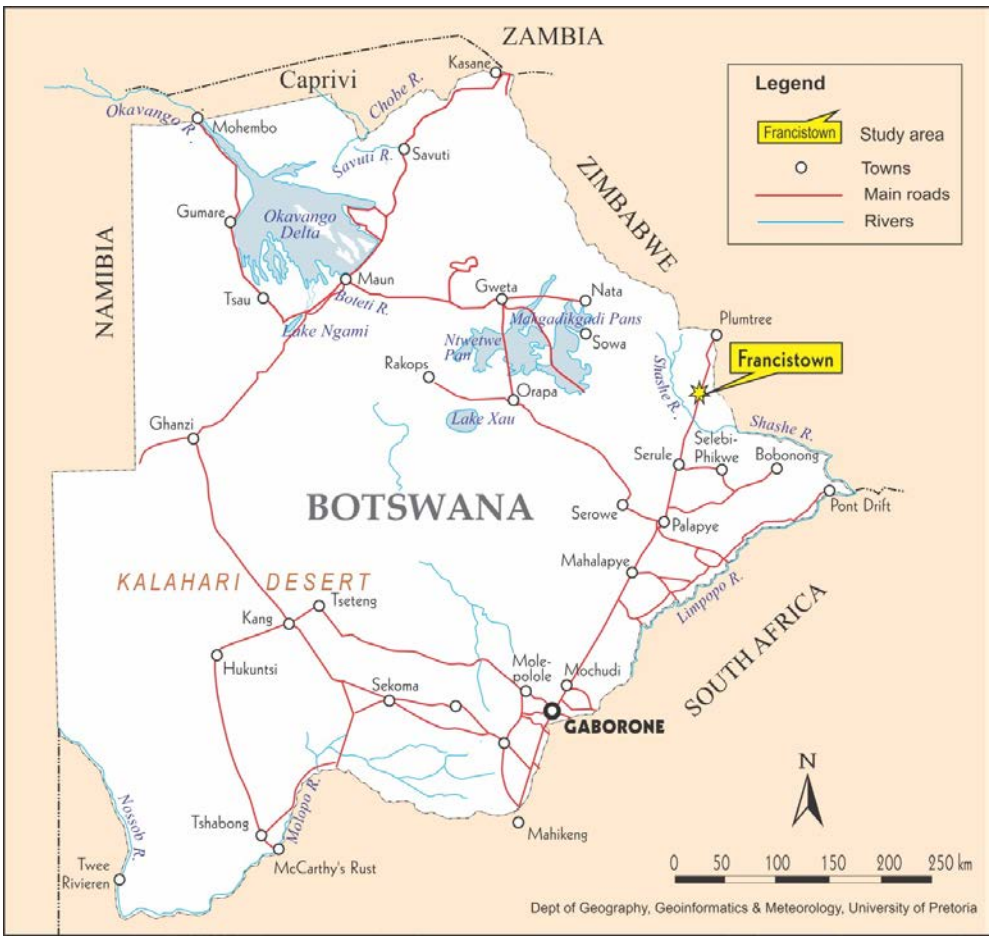


FIGURE 4.2: MAP OF BOTSWANA

Convenience sampling as a non-probability sampling technique was used to select the sample. Convenience sampling confines the sample to an accessible section of the population and was used in this study for the purpose of choosing the area and the schools as well as the learner respondents. It was chosen due to time and financial limitations yet was appropriate to use in this explorative research. The following key guiding principles were adopted to recruit the convenience sample for voluntary participation (Cluett & Bluffs, 2000:56). The researcher considered only the learners who volunteered and met the stated criteria for participation in the study. One pre-requisite for participation was that the informed consent of their parents/guardians had to be sought before participation in the study. Consent forms (see Addendum D) were issued to those learners who volunteered. Only learners with written consent from their parents/guardians were eligible to participate in the study. All survey questionnaires filled out were collected from the respondents and used in the study.

4.9 DATA COLLECTION

The procedure followed to collect the data was by means of the survey questionnaire together with observation checklists of the physical and structural environment of Francistown and the immediate school environment of the respondents. Both data collection techniques are described.

4.9.1 Procedure for administering the survey questionnaire

Data was collected during June to August 2011. Appointments with schools were made and the researcher met the learners in their respective schools and briefed them about the study. After they had volunteered they were issued with two consent forms, one for them (consent form for learners and the other one for parents (see Addendum D) in order to seek permission from their parents/guardians. The days allocated for administering the survey questionnaire were set with the help of the school personnel. The researcher personally administered the questionnaires with the help of a trained research assistant. The researcher explained the instructions to the respondents before they started filling in the survey questionnaires to facilitate the process. The questionnaires were completed in a class period of one hour. The completion of the questionnaires was supervised by the researcher and her assistant. Discussion between respondents was not allowed. The researcher and her assistant were available to answer questions or clarify instructions during the session. The respondents who completed the questionnaire were given an incentive in the form of

snacks (sweets, crispies) and stationery (ruler, pen, pencil, rubber) as token of appreciation for participating in the study.

4.9.2 Completion of observation checklist at schools

Observations were also conducted during the same months the survey questionnaire was administered to the study group. The observation checklist was used to observe the school's physical environment. It was carried out on the school premises at the dining halls, school tuck shops and where the informal street food vendor "aunties" sold items near the school grounds (see supporting photographs Addenda F and G).

4.9.3 Completion of structural environment observation checklist

The structural environment is where the participating schools are located. Observations were conducted at the malls and shopping complexes in the Francistown area to see which food outlets such as supermarkets and fast food restaurants were available, accessible and affordable to the respondents. The malls and shopping complexes in the Francistown area are not that very near to the schools though some people can access them by either using a taxi or walking.

4.10 DATA ANALYSIS

The data analysis encompassed the data coding, capturing and analysis of the completed questionnaires.

4.10.1 Data coding, capturing and cleaning

Both the open- and closed-ended questions in the questionnaire were coded for statistical analysis. Responses for the open-ended questions were compiled separately and were consolidated in separate comprehensive categories with numeric codes assigned to them.

Data was captured and entered into a Microsoft Excel spread sheet and the printed Excel worksheet was checked. Data cleaning was performed by checking the printout of the captured data against the allocated codes in the actual questionnaires. Data errors due to incorrect coding and reading errors were rectified through contingency cleaning. Data cleaning was done to determine whether data was correctly captured to eliminate processing data with errors. The data was then analysed. A Statistical Analysis Software program package (SAS) version 9.2 and BMPD was used.

Descriptive statistics and various computations including frequencies, percentages, cumulative frequency and percentages were calculated to summarise the data.

4.10.2 Quantitative data analysis

Data was further analysed using descriptive statistics. The results were quantified using numbers or variables. Descriptive statistics are those statistics whose function is to describe or indicate characteristics common to the entire sample. Descriptive statistics summarise data on a single variable, for example, the mean, median, mode and standard deviation (Mertens, 1998:332). Themes for open-ended questions and the observation data were identified and analysed descriptively.

4.11 QUALITY OF THE DATA

It is important to make sure that reliable and valid data is obtained when conducting a study (De Vos *et al.,* 2005:160) as it determines the quality of a study. The following measures were taken to ensure reliability and validity of the study.

4.11.1 Reliability

Reliability refers to the achievement of the same results if the same technique were to be repeated (Babbie & Mouton, 2001:119). Data is dependable when the measurements of the same variable remain the same and consistent results are obtained every time the same technique is applied (De Vos *et al.,* 2005:162). To ensure reliability in this study the following was done:

1. All constructs were clearly defined according to relevant theory (see Table 4.1 on conceptualisation and operationalisation).

2. Multiple indicators of a variable were included to measure each aspect of a variable (see operationalisation in Table 4.1).

3. The questionnaire was pilot-tested before the data collection process commenced to avoid the possibility of either questions or responses being ambiguous. The questions asked were clear and understandable to the target group of the study. The few questions that posed problems in comprehension were revised and reformulated to overcome the problem.

4.11.2 Validity

Validity refers to the effectiveness of a measuring technique when a specific concept is measured. Validity indicates whether an item measures or describes what it is supposed to measure or describe: in other words, if the empirical measure accurately reflects the concept it is intended to measure (De Vos *et al.,* 2005:160). The following dimensions of validity apply to the study:

- **Construct Validity** refers to logical relationships among variables (Babbie & Mouton, 2001:122-123). It is concerned with validating the theory behind the measuring instrument through construction of underlying dimension that shows a logical relationship between variables (De Vos *et al*., 2005:162). An extensive review of the literature on the theory of variables of the study was done by reading widely on other reported studies dealing with eating patterns and food choice behaviour in general and of mid-adolescents.

- **Theoretical Validity** Theoretical and construct validity both deal with conducting an extensive literature review. To enhance the theoretical validity of the study a wide range of up-to-date sources were consulted and extensively reviewed to identify relevant concepts relating to food habits including the eating patterns and food choice behaviour of mid-adolescents. Multiple measurements including rating scales and food frequency questionnaires were used together with open- and closed-ended questions to increase the validity of the responses (De Vos *et al.,* 2005:162).

- **Content Validity** deals with the content that can either be the topics or items of an instrument, whether they measure the concept intended to be measured. Content validity also ensures that all the facts that make up the concept are covered (De Vos *et al*., 2005:161). The questionnaire was also checked by subject specialists and the appointed statistician to ensure that the questions asked were reasonable, logical and valid and definitely measured what it was intended to measure (i.e. food habits, eating patterns and the frequency of consumption of certain food items). The input and the feedback from the subject specialists and pilot testing the questionnaire further enhanced construct and content validity.

- **Face validity** is a judgement by the scientific community that the indicator really measures the construct (Neuman, 2006:192). It concerns the superficial appearance or face value of a measurement procedure (De Vos *et al.,* 2005:161).To incorporate face validity, the questionnaire was compiled based on the framework of this study and with reference to questionnaires used in previous studies on food habits.

4.12 ETHICS

In order to adhere to the guidelines for ethical conduct when engaging human subjects in research, attention was paid to meeting the institutions requirements. The proposal was submitted for approval to the Ethics Committee of the Faculty of Natural and Agricultural Sciences at the University of Pretoria, before data collection commenced. Ethics clearance, reference number **EC110701-051,** was obtained from the Ethics Committee (see Addendum C).

The researcher also sought permission from the Education authorities in Botswana. These were the Ministry of Education, Department of Secondary Education, regional offices and headmasters of the senior secondary schools in Francistown. Permission to conduct the research in the secondary schools was granted and approval letters were received (see Addendum E).

Informed consent, anonymity and confidentiality were also considered and effected as protective measures for the respondents.

1. Informed consent: Informed consent refers to the accurate communication of all possible information that relates to the research project (De Vos *et al.,* 2005:59). The potential respondents were informed about the overall objectives of the study, as well as being given other important information (e.g. confidentiality and anonymity measures taken) pertaining to the study. Normally learners come from different family backgrounds and their parents may take offense to the activity thinking that the researcher was exploiting their children wanting to know the type of food they eat and how they lived. It was thus crucial that permission be sought from the parents to allow their children to participate in the study to avoid conflict between all parties concerned. Parents were required to sign information letters as indication that they knowingly granted permission for their children to participate in the study. Finally, learners were not forced to be part of the study. They were protected in this regard as participation throughout the study was totally voluntary**.**

2. Anonymity and confidentiality: Measures to ensure anonymity and confidentiality of the respondents were put in place. Respondents were protected from physical and psychological harm because the information given anonymously ensured the privacy of subjects (De Vos *et al.,* 2005:61). The information provided by respondents was treated with utmost care to protect their confidentiality and privacy**.**

4.13 CHAPTER CONCLUSION

The research strategy and methodology were executed in line with the aim of the study. The researcher used a conceptual framework to guide the study. This conceptual framework accommodated all the main concepts that contextualised the study and served as the backbone of the study. Appropriate data collection methods and techniques were formulated and effectively utilised. The following chapter will focus on the results/findings of the study. The geographic location of the respondents is described to serve as background to the rest of the findings and their interpretation.

Chapter 5

RESULTS AND DISCUSSION

5.1 INTRODUCTION

In this chapter the results of the study are presented and discussed, based on the research objectives and sub-objectives in order to determine and describe how the nutrition transition in Botswana contributes to the current food habits and food choice behaviour of mid-adolescents (15-18 years) in Francistown, Botswana. To put the study in context, a description of the study area is given first, followed by a brief description of the school environment of the respondents.

5.2 GEOGRAPHIC LOCATION AND CONTEXT OF THE STUDY (Figure 5.1)

Francistown is one of the modern cities in Botswana. Its natural environment and built infrastructures primarily contribute to what food is available and accessible for consumption. Francistown started as a gold mining area in the 1800s and was declared a city in 1997 when it celebrated being hundred years old (Maundeni, 2005:8). The city is located in north-eastern Botswana (Maundeni, 2005:8), with a small population of 83 023 people (Maundeni, 2005:13). Francistown is well positioned as a commercial and cultural centre. There are excellent road links since it is a gateway to numerous places both internally and regionally. This city is the trading, transportation and communication hub in the northern Botswana (Maundeni, 2005:8-9).

There is abundant and reliable water in Francistown from the dams such as the Shashe and Ntimbale Dams as well as from big rivers like the Ntshe and Tati Rivers. In addition, the mining sector, the airport and railway line have attracted human settlement and commercial activities to this area. The railway passes through Francistown providing passenger and freight services to other areas such as Gaborone, the capital city in the southern part of Botswana, and to other places outside the country such as Mafikeng in South Africa and to Zimbabwe in the north (Maundeni, 2005:8-9).

The town has adequate electricity for domestic and commercial use. There are shopping malls and centres with fast food outlets and supermarkets. Wholesaling, retailing, manufacturing and government are the principal economic sectors in the city. Small

businesses in the informal sector are also a common economic activity in this area. Spaza shops (informal convenience kiosk usually run from a person's home) and street vendors, respectfully called "aunties" locally, are found everywhere on the streets (Maundeni, 2005:13).

It is also important to discuss the geographic location of Tonota village because part of the sample included learners from a senior secondary school from this village. Tonota is one of the surrounding villages that makes Francistown a viable commercial centre. Tonota is a village 20 km from this city. It is a developing village with internal tarred roads and a main tarred road linking it to the city. As for infrastructure, there is a bakery, butchery, small supermarket, spaza shops and two recently opened retail supermarkets (Choppies and Shoppers) (The Voice BW Newspaper, April, 2013; Mmegi Online Newspaper, November, 2012). There are no fast food outlets, people from Tonota come to town to do their groceries shopping as well as to dine at the fast food outlets and restaurants in Francistown, either on weekdays or weekends.

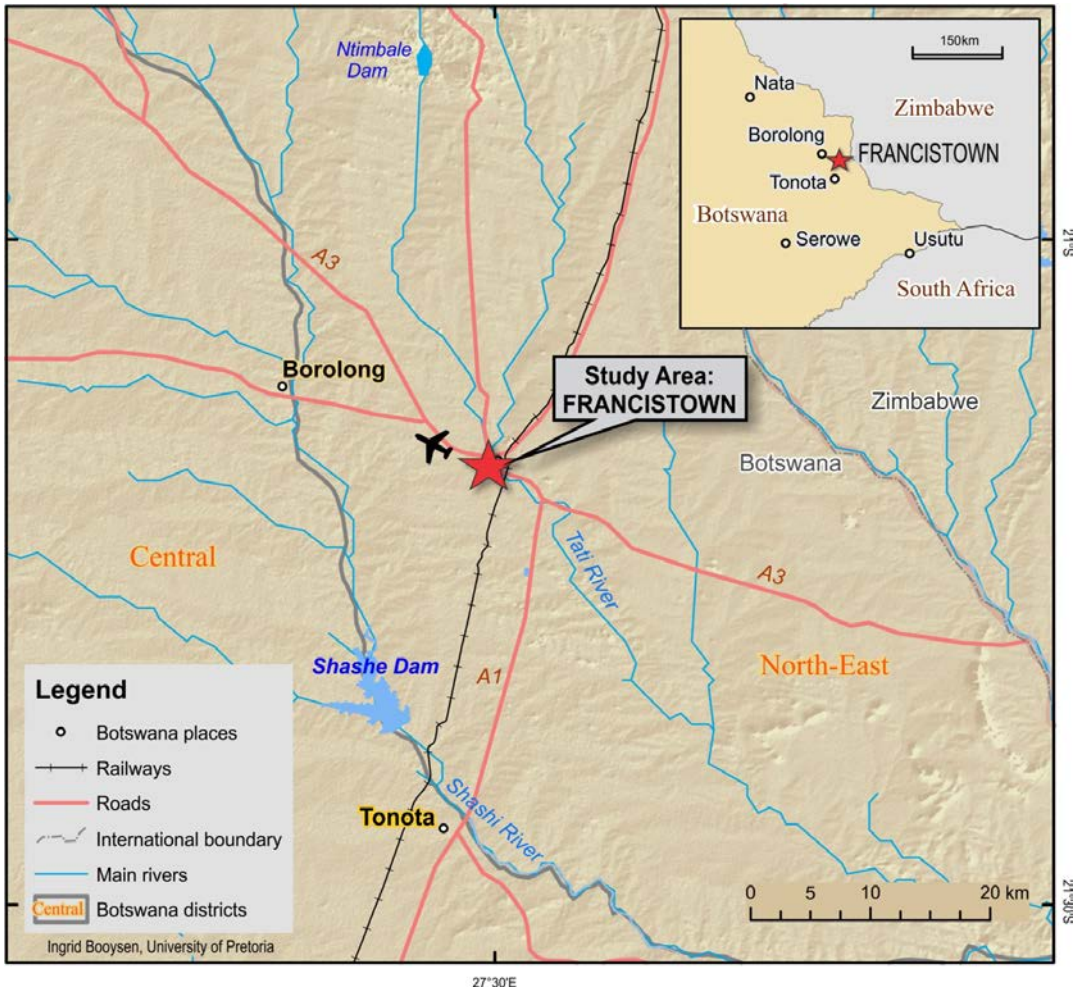


FIGURE 5.1: MAP OF FRANCISTOWN AND SURROUNDING AREAS

5.2.1 School environment

The study involved respondents from two senior secondary schools (Francistown Senior Secondary School and Mater Spei College) in Francistown and one in Tonota village (Shashe River School). According to Botswana government policy all government schools should provide the learners with meals (i.e. breakfast, lunch and/or supper) whether they are boarding or not. These meals are funded by government resources and funds (Mosie, 2004:2-3). From Mondays to Fridays during the school term, meals are served at school at 10:00 and 13:00 because learners spend the largest part of their day at school. Learners enter the school premises at 06:30 and leave for home late afternoon at 17:00.

Some schools have boarding facilities and the learners reside at the institution. Boarders are provided with all four meals in school, which involves early breakfast at 06:00, another breakfast at 10:00, lunch at 13:00 and supper at 18:30. This study dealt with learners who are non-boarders. These are learners who commute to and from school on a daily basis. Non-boarders are provided with only two meals a day at 10:00 and at 13:00 and they are excluded from early breakfast at 06:00 and supper at 18:30 (Mosie, 2004:2-3).

Afternoon school studies end at 15:00 and learners then roam around the school premises or attend scheduled activities up to 17:00. This is the time when non-boarding learners are allowed to leave the school premises and return home. At this time the school tuck shop opens again for learners to buy food. They buy savoury snacks and sweets to eat and beverages then some walk to take taxis home, while the others walk home. Outside the school gate, there are street vendors who operate their informal businesses. Learners also buy snacks from them to eat on their way home. These savoury snacks consists of products such as potato crisps, cheese puffs, nick-nacks, biscuits, popcorn, peanuts and raisins, sweets and chocolates. Some vendors even offer fast food or convenient type of foods for sale such as fresh fried potato chips, pies, fat cakes, Russian sausages, polony, hot dogs, burgers, pizza and cream buns.

5.3 SAMPLE AND DEMOGRAPHIC PROFILE OF RESPONDENTS

A total number of 242 mid-adolescents learners formed the sample of the study. The demographic information of the respondents was obtained from both closed and open-ended questions (see questionnaire Addendum A, section A). The demographic profile of the respondents is given in Table 5.1.

5.3.1 Demographic information

The demographic information of respondents entailed gender, age, form/class, home language, religion, family structure and the total number of people living in the household.

TABLE 5.1: Demographic information (n= 242)

	Frequency (n)	Percentage (%)
Gender		
Male	84	35
Female	158	65
Age		
15 years	2	0.83
16 years	44	18.18
17 years	119	49.17
18 years	76	31.4
19 years	1	0.41
Form/class		
Form 4	160	66
Form 5	82	34
Home language		
Setswana and its dialects	228	94
Ikalanga, Sezezuru, Zulu,	5	2.07
Shona	4	1.65
English	4	1.65
Religion		
Christianity	211	87
Islam	2	1
None	29	12
Family structure		
Nuclear family	123	51
Extended family	61	25
Single parent family	54	22
Child-headed family	2	1
Other	2	1
Total number of people living in the household		
2-4 members	88	36
5-7 members	124	51
8-16 members	30	12

Gender, Age and Form / Class of the respondents. More females (n = 158, 65%) than males (n = 84, 34%) participated in the study. A possible explanation for this tendency is that there are more females than males in the general school population in Botswana schools although basic education is free and compulsory for all (Otinwa, 2009; UNICEF Education Statistics, Botswana, 2008:3). Furthermore, female learners were generally

more willing than the males to participate as respondents in this study. The ages of the respondents ranged from 15 to 19 years with the majority being 17 years old (n = 119, 49%). Two-thirds of the respondents were Form 4 learners (n = 160, 66%) because one of the three participating schools only allowed their Form 4 learners to participate in the survey.

Home language. The language of the Batswana people is Setswana, derived from the name of the country Botswana. It is important to realise that the country has several ethnic groups speaking different Setswana dialects and other minority languages such as Ikalanga (Andersson & Janson, 1997:10). Ikalanga is one of the most widely spoken minority languages in the north-eastern parts of the country (Andersson & Janson, 1997:57). Setswana and its dialects was the home language of the majority of the respondents (n = 228, 94%). Other languages also spoken were Ikalanga, Sezezuru, Zulu, Shona and English. Setswana and English are spoken all over the country as Setswana is Botswana's national language, acknowledged as the mother tongue and English is the official language and medium of instruction in schools (Andersson & Janson, 1997:21, 27).

Religion. The majority (n = 211, 87%) of the respondents indicated that they were Christians who belong to different church denominations, 12% (n = 29) did not belong to any church and 1% (n = 2) were Muslims.

Family structure. Approximately half (n = 123, 51%) of the respondents lived in nuclear families followed by extended families (n = 61, 25%), and single parent families (n = 54, 22%). Although in the minority (n = 2, 1%) the results also show that the Botswana society today, includes other forms of family structures, such as child-headed families.

Number of people per household. The total number of people in the household varies between two to sixteen members. The majority of the households (n = 124, 51%) consisted of five to seven members.

5.3.2 Residential areas and socio-economic status

Respondents were also asked in an open-ended question to name the area in Francistown where they lived. From the results these places were grouped according to socio-economic status categories into which specific settlement areas fell. Table 5.2 gives this information.

The residential areas in the city of Francistown were grouped according to socio-economic status to ease the discussion of results: low-middle status; low-middle-high status; middle-high status; and high. The most of the respondents were from the middle-

high socio-economic status areas (n = 97, 41%) and the low-middle-high status areas (n = 52, 21%) respectively. The low- middle socio-economic status respondents were in the minority (n = 8, 3%), together with the 1% (n = 3) of the respondents who resided in the high socio-economic status areas. The majority of the respondents resided in middle socio-economic status areas. The villages around Francistown formed a separate group, and represented villages that were within a radius of 20 km from Francistown. Nearly a third (n = 83) of the respondents resided in these villages.

TABLE 5.2: Socio-economic status of settlements areas in Francistown (n = 242)

Area	**Frequency (n)**	**Percentage (%)**
Low-middle status		
Kgaphamadi, Maipaahela, Madzibalori, Somerset East, Somerset west	8	3
Low-middle-high status		
Aerodrome, Blue Town, Riverside, Monarch, White City	20	8
Extension, Minestone, Satellite	17	7
Gerald Estates	14	6
Total:	**51**	**21**
Middle-high status		
Area A, Area G, Area H, Area L, Area S, Area W, Railways	21	9
Blocks (1,2,3,4,5,6,7,8,9,10)	43	18
Phase 4, Phase 5, Phase 6	2	1
China Town, Donga, Selepa, Coloured-New stance	31	13
Total:	**97**	**41**
High status		
Molapo Estates, Ntshe	3	1
Villages within a 20 km radius of Francistown		
Borolong, Matshelagabedi, Shashe Mooke, Tati siding, Tonota, Shashe, Semotswane, Pelotelele	83	34

5.3.3 Breadwinners educational level and employment

Table 5.3 shows who are the breadwinners in the respondents' households, together with information on their parents' educational level and the type of employment in which they are engaged.

TABLE 5.3: Breadwinners educational level and their type of employment (n = 242)

	Frequency (n)	Percentage (%)
Breadwinners		
Father	56	23
Mother	101	42
Both parents	34	14
Other relatives	51	21
Mother's educational level		
Tertiary education	92	39
High school/Secondary school	94	40
Primary school	38	16
Not gone to school	14	6
Father's educational level		
Tertiary education	96	45
High school/Secondary school	80	37
Primary school	28	13
Not gone to school	10	5
Type of employment of breadwinner		
Professional (lawyer/ doctor / nurse/ teacher/ accountant/ manager/ social worker/ police officer/ soldier/ prison officer/ architect)	109	45
Business (taxi / self-employed/ driver/ mechanic)	37	15
Administration (typist / clerk / assistant / office worker/ receptionist/ secretary)	26	11
Contract worker (contract worker/ miner/ carpenter/ panel beater/ builder/ security guard)	23	10
Informal sector and domestic workers (hawker / shopkeeper/ car washer / gardener/ farmer/ hairdresser/ cleaner/ domestic worker)	30	12
Unemployed and pensioners	17	7

Many (n = 101, 42%) of the respondents indicated that their mothers were the breadwinners of the households, compared to 23% (n = 56) who revealed their fathers as the breadwinners. Only 14% (n = 34) mentioned both their parents as the breadwinners and 21% (n = 51) indicated relatives such as a sister, brother or grandparents as the breadwinners.

Education. The majority of the respondents' parents had attended school and or had had a tertiary education. A very small number of parents had not attended school, 5% (n = 10) of the fathers and 6% (n = 14) of the mothers. This of course shows the effect of promoting education for boys and girls at school and equity in higher education too, an issue Botswana is strong about.

Employment. Some breadwinners were in full-time jobs and some in part-time jobs; some were in formal work and some in the informal sector. The types of employment of the breadwinners were grouped into six groups. Starting with the one with a higher percentage they were engaged in professional work (n = 109, 45%), business (n = 37, 15%), informal or domestic work (n= 30, 12%), administrative or clerical work (n= 26, 11%) and contract work (n= 23, 10%) respectively. For only 7% (n = 17) of the respondents the breadwinners in their families were not working. The reasons for not working were that they had either resigned or were pensioners, were unemployed or housewives at home.

5.3.4 Household appliances

Respondents were asked to mark from a list they were given the major household appliances available in their households. Possession of appliances confirms the socio-economic status and affluence of the respondent's household (Ovwigho, 2009; Isaac, 2010:1). The appliances available at respondents' households are shown in Table 5.4.

Gas stoves are widely used, as indicated by 80% (n = 193) of the respondents. This was followed by electric stoves that were used by 54% (n = 131) and 3% (n = 7) of the respondents who used primus stoves. It seems as if primus stoves have become outdated and their usage fading away. Fifty six per cent of the households (n = 135) had microwave ovens. This could be regarded as moving with the times since microwave ovens are seen as advanced labour saving technology for use in food preparation. A significant number of the households, 85% (n = 205), had a refrigerator whereas a deep freezer, a less necessary and expensive extra facility, was only owned by 39% (n = 95) of the respondents. Regarding communication and information media, 93% (n = 224) of

the respondents households had a radio and 92% (n = 222) a television. This shows that most families could watch television and listen to the radio.

Respondents were also asked to indicate the person mainly responsible for preparing meals in their homes. Older children (n = 128, 53%) in the household were mainly responsible for meal preparation for the family. The mother (n = 98, 41%) also prepared meals and in some households domestic workers (n = 16, 7%) were responsible for preparing meals in the household.

TABLE 5.4: Appliances available in households (n = 242)

Appliance	Frequency (n)	Percentage (%)
Gas stove	193	80
Electric stove	131	54
Primus stove	7	3
Refrigerator	205	85
Deep freezer	95	39
Microwave oven	135	56
Television	222	92
Radio	224	93

In the next section the results of the first objective dealing with the current food habits of the study group are presented and discussed. This will be given in the order of the formulated sub-objectives. Thus the eating patterns on weekdays and on weekend days are presented first, followed by the discussion of the food consumed at special occasions and to what extent traditional and Western-orientated foods are included in the eating patterns.

5.4 CURRENT EATING PATTERNS OF THE RESPONDENTS

Current eating patterns refer to the meal patterns and meal composition during the week and over weekends as well as what is consumed on special occasions. Respondents were asked to indicate how many meals a day they consumed on weekdays and whether they ate breakfast. In addition they were also requested to list the foods and

beverages they consumed on weekdays (Mondays to Fridays). They were to list those food items and beverages according to the following times: breakfast (06:00-09:00), in-between breakfast and lunch (09:00-12:00), lunch (12:00-15:00), in-between lunch and supper (15:00-17:00), supper (17:00-20:00) and after supper (20:00 and later). Results related to the meal patterns are presented in Table 5.6. They also had to indicate what they eat over weekends.

Table 5.5 shows that the majority (n = 114, 48%) of the respondents had three meals a day and 85% (n = 205) of them ate breakfast. The most important reason given for eating breakfast were to get strength or energy for the day (n = 130, 63%). This was followed by the reason that it is the most important meal of the day (n = 42, 20%). The respondents (n = 36, 15%) who indicated not eating breakfast gave the following reasons for not eating breakfast: there is no time for breakfast (n = 12, 32%); followed by

TABLE 5.5: MEAL PATTERNS DURING WEEKDAYS (n = 242)

Meal pattern	**Frequency (n)**	**Percentage (%)**
Number of meals eaten a day		
1 meal	7	3
2 meals	49	20
3 meals	114	48
More than 3 meals	70	29
Eating breakfast		
Yes	205	85
No	36	15
Important reasons for eating breakfast		
To get strength or energy for the day	130	63
It is the most important meal of the day	42	20
Force of habit	4	2
Because I am hungry	17	8
Breakfast is prepared and available	12	6
Important reasons for not eating breakfast		
Too early, I cannot eat so early	9	24
No time for breakfast	12	32
I become nauseous when eating breakfast	4	11
Not hungry	5	13
Breakfast is not prepared	8	21

it is too early; and that they cannot eat so early (n = 9, 24%). Studies such as those by Levin and Kirby (2012), Mosie (2004) and Spear (2002) have documented that a small

percentage of adolescents in Botswana and other South African countries do tend to skip breakfast.

The results on the type of food consumed on weekdays will be reported first, followed by weekend eating patterns. Thereafter the non-quantitative food frequency results and what is consumed on special occasions will be given.

5.4.1 Current eating patterns on weekdays

The eating patterns on weekdays of the respondents were determined by the number of meals eaten per day during the week, from Monday to Friday. Three meals (breakfast, lunch and supper) were consumed per day with in-between meal snacking, similar to the Western meal pattern. Figure 5.2 portrays the meal composition on weekdays.

Breakfast. Tea with bread was enjoyed by most (n = 134, 42.14%) of the respondents at breakfast on weekdays between 6:00-9:00, followed by 23.27% (n = 74) who ate soft porridge, which is a cooked cereal gruel prepared from either sorghum or mealie meal. Having a fruit for breakfast was a habit of only a small number of respondents (n = 9, 2.83%).

A similar trend of having a tea and bread-based meal at breakfast was reported in the National Food Consumption Survey among South African children where tea was the most frequently consumed item (Labadarios *et al*., 2005). And in line with other studies conducted amongst black Southern Africans it was specified that tea and bread were popular food items for breakfast in their meal patterns (Matla, 2008:73; Tshiwanambi, 2007:86; Viljoen *et al*., 2005, Labadarios *et al*., 2005; Kgaphola & Viljoen, 2000; Viljoen & Gericke, 1998).

Lunch. The main meal of the day was eaten at lunchtime. At school, lunch is served during the lunch break which is normally at 13:00, when learners have finished their formal lessons and are waiting for the scheduled afternoon study time. Pap (stiff mealie meal porridge) and meat (n = 144, 24.37%) as protein is consumed more often, compared to the other food items, followed by rice and meat or chicken (n = 112, 18.95%). A vegetable relish[6] or side dish that could be either fried cabbage, coleslaw or beetroot salad, was consumed by some respondents (n = 138, 23.35%). The tuck shop is also open during lunch break, where learners can buy prepared food or types of

[6] Relish or side dish: in the African cuisine context a relish or side dish is consumed with the staple food. The relish or side dish could be eaten as protein accompaniment such as meat, milk or legumes, or served as a vegetable stew or vegetables as such (Bender & Bender, 1995:309; Medved, 1990:267).

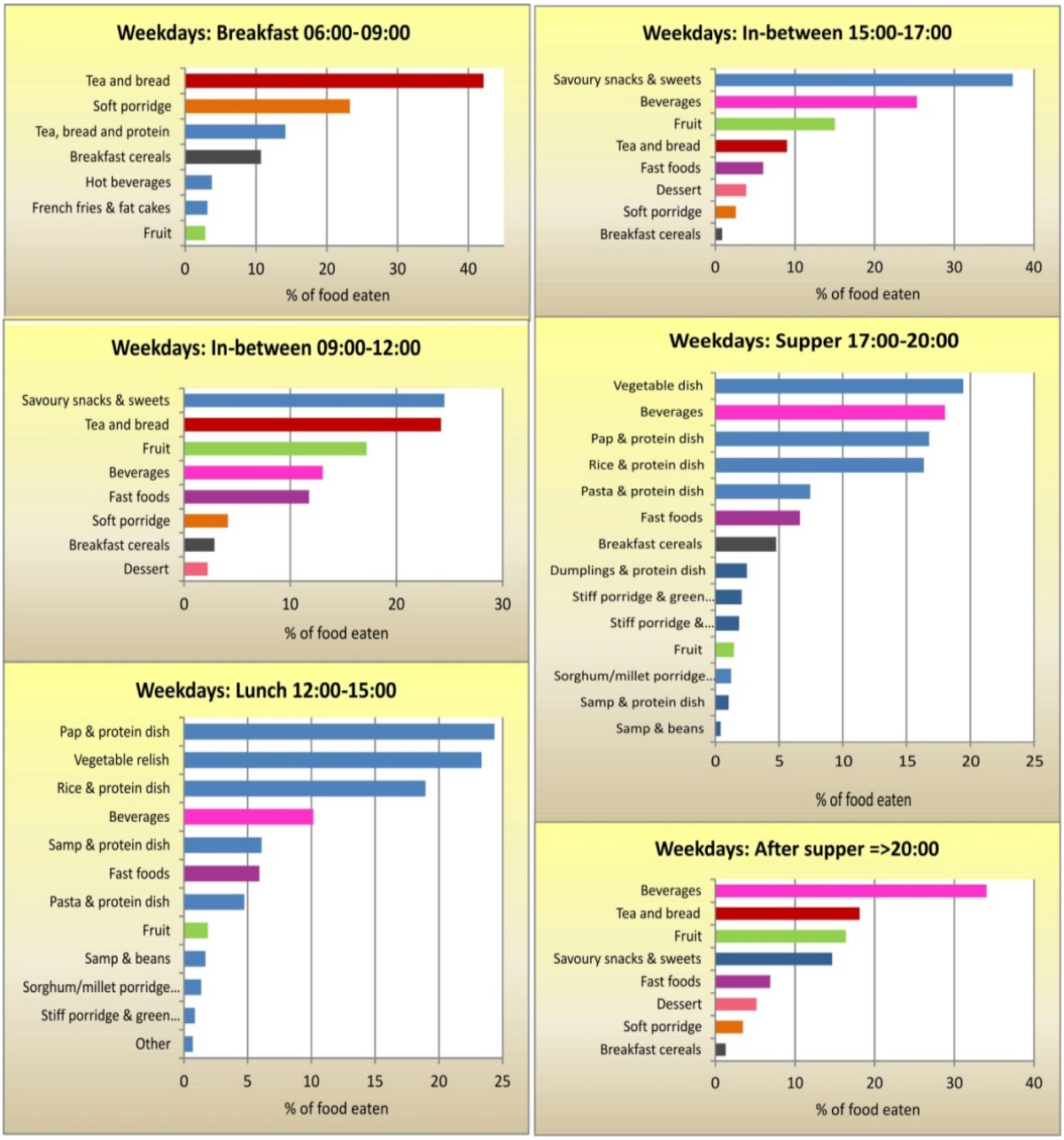


FIGURE 5.2: WEEKDAY MEAL PATTERNS (n= 242)

convenience food. Only a small number of respondents (n = 35, 5.92%) made use of this option.

A possible explanation for the more frequent consumption of meat, specifically beef, is because it is more available and accessible in both urban and rural areas of Botswana as a food item, unlike in the past when the Batswana reared cattle mostly to reflect their wealth only (Botswana Tourism Board, 2009:7; Sydenham & Ron, 2007:1; Masibi & Coetzee, 1986:10; Schapera, 1953:21). A similar conclusion was reported in a study

conducted in Swaziland on the increased frequency of consumption of meat (Kunene & Fossey, 2001).

Supper. At suppertime the respondents are usually at home with their families. Similar food items are eaten for lunch and supper on weekdays. Apart from the 16.77% (n = 81) who ate pap (stiff mealie meal porridge) and a protein dish of either chicken or beef, other respondents, 16.36% (n = 79), consumed rice and a protein dish of either chicken or beef. A vegetable relish was included by 19.46% (n = 94) of the respondents for this meal. Beverages were consumed by 18.01% (n = 87) of the respondents at the evening meal. Other food items consumed by the minority were pasta, sorghum/millet porridge, dumplings, samp and beans, fruit, or fast foods.

After supper. For an after supper snack, 34.05% (n = 79) of the respondents drank beverages and 18.1% (n = 42) consumed tea and bread. Other foods eaten at this time were fruits (eaten by 16.38% (n = 38), savoury snacks and sweets by 14.66% (n = 34). Other foods that were mentioned by less than 10% of the respondents included fast foods by 6.9% (n = 16), dessert by 5.17% (n = 12), soft porridge 3.45% (n = 8) and breakfast cereal such as cornflakes 1.29% (n = 3).

In-between meals. Respondents also had to indicate what they ate in the mid-mornings and mid-afternoons. What they eat at this time was determined by what was available on the school premises only, such as at the dining hall or at the school tuck shop. From 10:00 to 10:30, it is the official school break time. Tea and bread are served at the dining hall. Savoury snacks and sweets were the most popular (n = 77, 24.52%) followed by tea and bread (n = 76, 24.2%). Some (n = 54, 17.2%) mentioned that they consumed fruit at this time. Other food items were fast foods or convenience foods, for example, fried potato chips (French fries), pies, fat cakes and Russian sausages as mentioned by 11.78% (n = 37) respondents who would purchase these at the school tuck shop. A fair number of the respondents (n = 41, 13.06%) drank beverages such as fizzy drinks and fruit juices.

For the afternoon in-between meal snack on weekdays most (n = 87, 37.34%) of the respondents ate similar items to those eaten in the morning breaks. They mainly consumed savoury snacks and sweets purchased from the school tuck shop. In comparison to the morning break more respondents indicated that they consumed beverages in the afternoons as 25.32% (n = 59) revealed this. Savoury snacks that the learners bought and enjoyed were potato crisps (chips), cheese snacks or puffs, nick-nacks, biscuits, popcorn, peanuts and raisins, sweets and chocolates. The fast food or convenience foods eaten were similar to those mentioned for the mornings and included

French fries, pies, fat cakes, Russian sausages, polony, hot dogs, burgers, pizzas and cream buns.

It can be concluded that the majority of respondents consumed tea and bread for breakfast and starches such as rice and pasta at lunch and supper together with stiff mealie meal porridge. Vegetable relish was more popular for lunch (n = 138, 23.35%) than for supper (n = 94) 19.46%). This, together with an average fruit consumption of 18% by the respondents, reflects a very low consumption of fruit and vegetables at all the three main meals and the in-between meal times. Savoury snacks and sweets were more frequently eaten in-between meals and as after supper snack.

This concludes the section on the weekday meals. The meal composition for weekend days is discussed separately in the following section.

5.4.2 Current eating patterns during weekend days

Respondents were asked if their eating patterns were different over weekends (Saturdays and Sundays) and 60.74% (n = 147) of the total sample indicated that there was.

Figure 5.3 shows the meal composition on Saturdays.

5.4.2.1 Eating pattern on Saturdays

Breakfast. Saturday breakfast typically consisted of tea and bread (n = 54, 33.13%) for most of the respondents, followed by soft sorghum porridge (n = 52, 31.9%). Tea and bread were also eaten in combination with protein-rich food such as eggs, cheese and/or Russian sausages by some (n = 34, 20.86%). It is evident that, protein-rich food items are consumed by the minority of the respondents at breakfast on a Saturday.

Lunch. Saturday lunch compared to weekday lunch varied, in terms of the variety of starchy foods, meats and vegetables that were eaten. The percentage of responses for vegetable relish was similar to weekdays and is high as many of the respondents (n = 62, 23.85%) indicated that they consumed it. The respondents mentioned a variety of vegetables consumed as part of the Saturday lunch that included green leafy vegetables such as spinach, chomolia vegetable and rape greens. This is followed by rice and a protein dish (n = 49, 18.85%), and pap and a protein dish (n = 36, 13.85%). Interestingly other starch dishes mentioned by some respondents included items such as samp, pasta, dumplings as well as sorghum or millet porridge that were consumed each with a protein dish. Beverages were included by only 11.54% (n = 30) respondents. Other combination dishes such as samp and beans (n = 10, 3.85%), stiff maize meal porridge with green leafy vegetables (n = 6, 2.31%), stiff maize meal porridge with fresh or sour milk (n = 5, 1.92%) were also included by a small number of respondents.

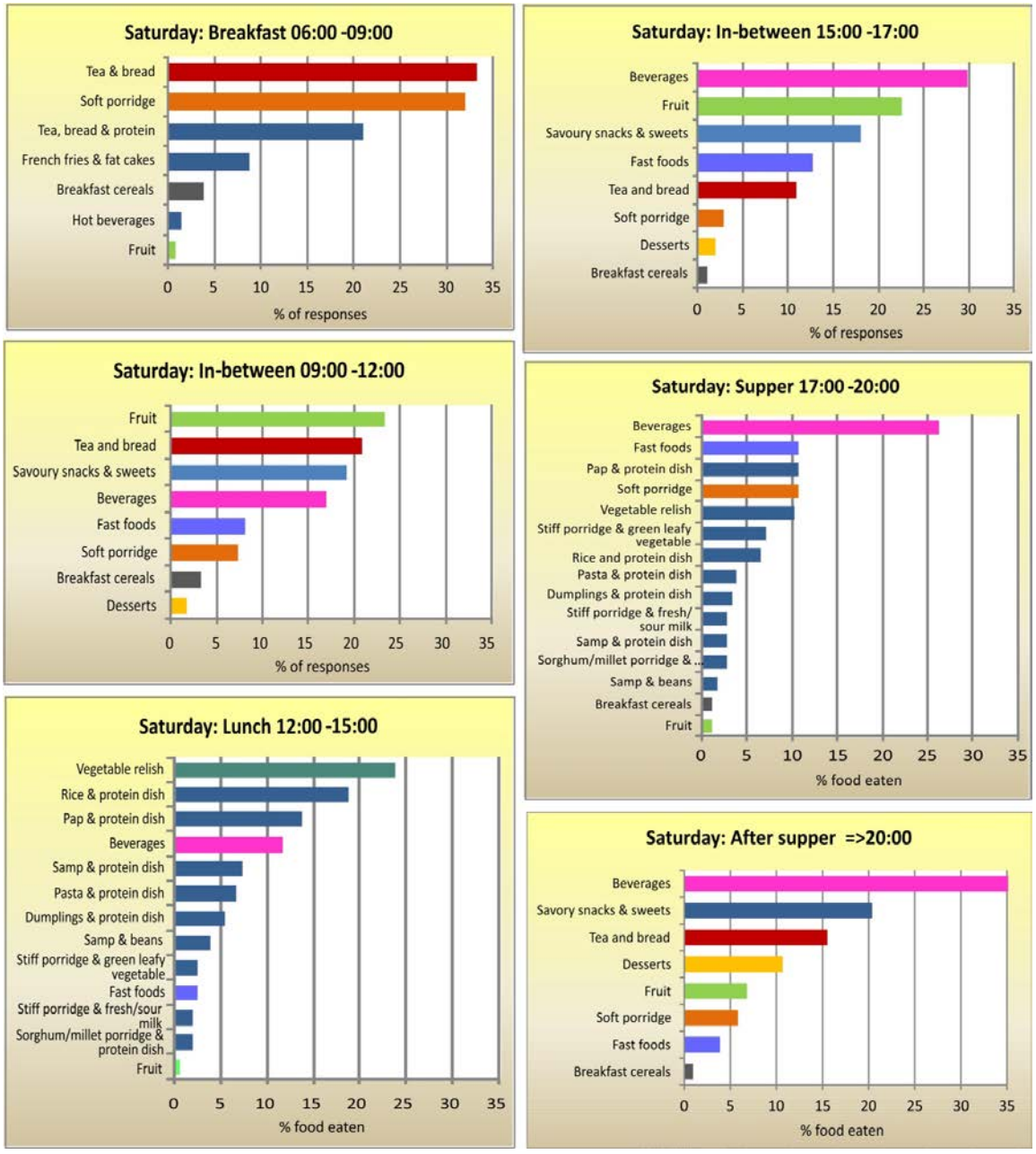


FIGURE 5.3: SATURDAYS MEAL PATTERN

Supper. Similar dishes as given for lunch were included for supper, although the numbers of responses were in comparison to lunch, less for supper. The exceptions were beverages, fast foods and soft porridge. In comparison to lunch more respondents included beverages for supper than lunch ((n = 49, 26.06%). Similarly fast foods were also included by more respondents (n = 20, 10.64%) at this meal in comparison to lunch when far fewer did (n = 6, 2.31%).

After supper. Although more respondents indicated that they consumed beverages (n = 37, 35.92%), sweets and savoury snacks (n = 21, 20.39%) as well as fast foods (n = 4, 3.88%), after supper on Saturdays the items were the same as those mentioned as being eaten during the week.

In-between meals. Interestingly fruit was consumed by more respondents between meals on Saturdays than was the case on weekdays. Fruit was mentioned by 23.2 % (n = 29) as snacks in the morning and by 22.52% (n = 25) as afternoon snacks. More beverages (n = 33, 29.73%), savoury snacks and sweets (n = 20, 18.02%) as well as fast foods (n = 14, 12.61%) were consumed on Saturday afternoons as in-between meal snacks in comparison to weekdays.

On Saturdays most people in big cities in Botswana visit shopping malls and shopping centres and eat out. From the results it is evident that the majority consume savoury snacks and sweets on Saturdays between 09:00-12:00 as in-between meal snacks.

5.4.2.2 Eating pattern on Sundays

Figure 5.4 shows the eating pattern on Sundays.

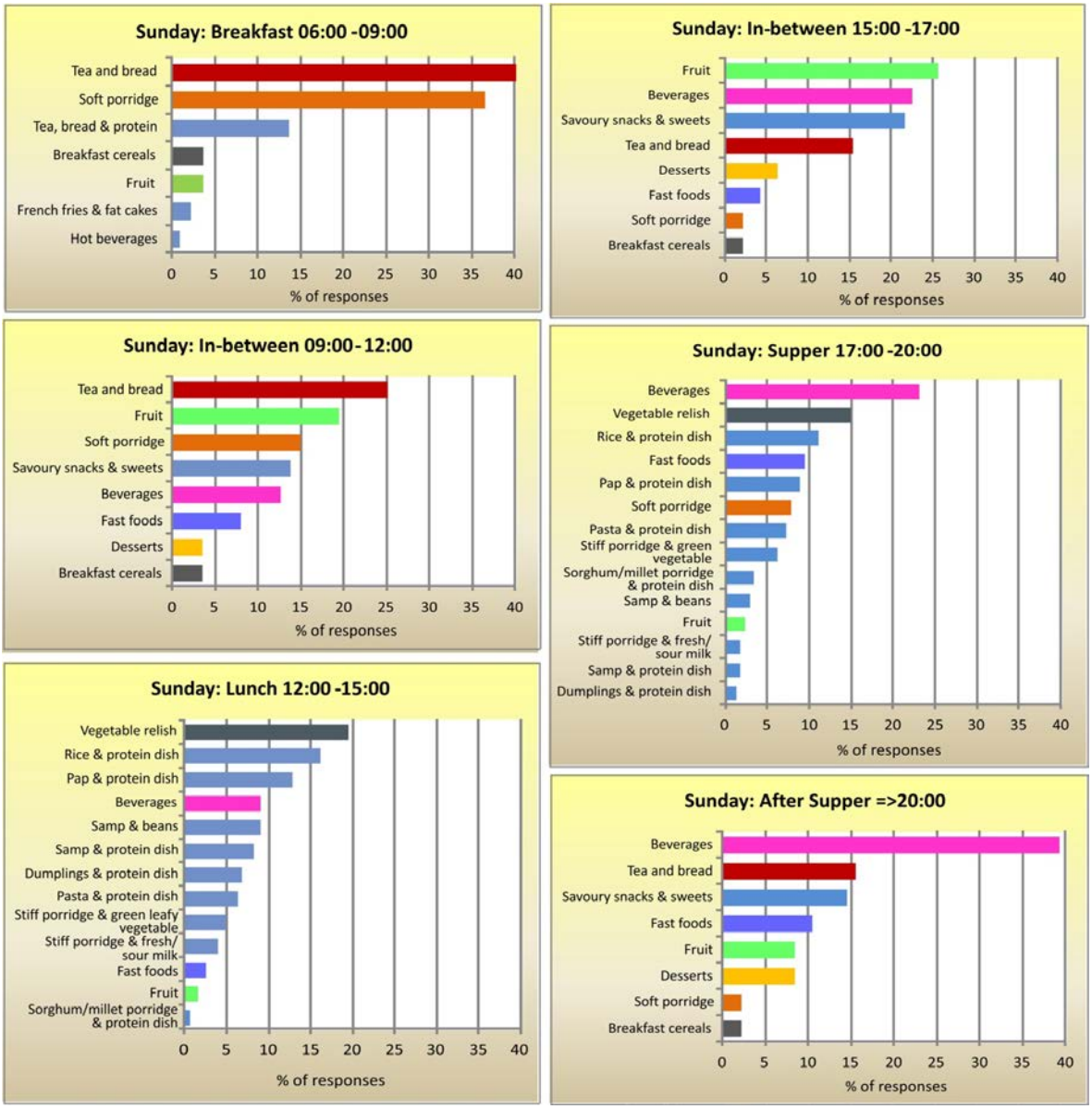


FIGURE 5.4: SUNDAYS MEAL PATTERN

Breakfast. A similar meal pattern to the Saturday and weekdays breakfast composition is reported by those who ate breakfast on Sundays. Most of the respondents had either tea and bread (n = 56, 40%) and/or soft sorghum porridge (n = 51, 36.43%) for breakfast. Again, including breakfast cereals and fruit is not a common practice as only five respondents (3.57%) indicated they consumed them at this meal.

Lunch. Lunch on Saturdays and Sundays had a similar meal composition. The main dishes were a vegetable relish (n = 41, 19.34%) and meat, such as beef and chicken as the protein dish, served with starchy foods such as rice, pap (stiff mealie meal porridge), samp and pasta. The majority indicated rice with a protein dish was more popular (n = 34, 16.04%) than pap (stiff mealie meal porridge) and a protein dish (n = 27, 12.74%). An explanation for this occurrence could be the fact that on Sundays around the lunch hour many people are still at church and hence skip the lunchtime meal. Fewer respondents indicated that they had this meal on Sundays when compared to those who generally did have lunch on Saturdays.

Supper. The composition of meals for supper and lunch on Sundays was similar, with the exception that more fast foods than soft porridge were eaten (9.29% (n = 17); 7.65% (n = 14) respectively) for supper, and beverages were far more important than they were at lunchtime.

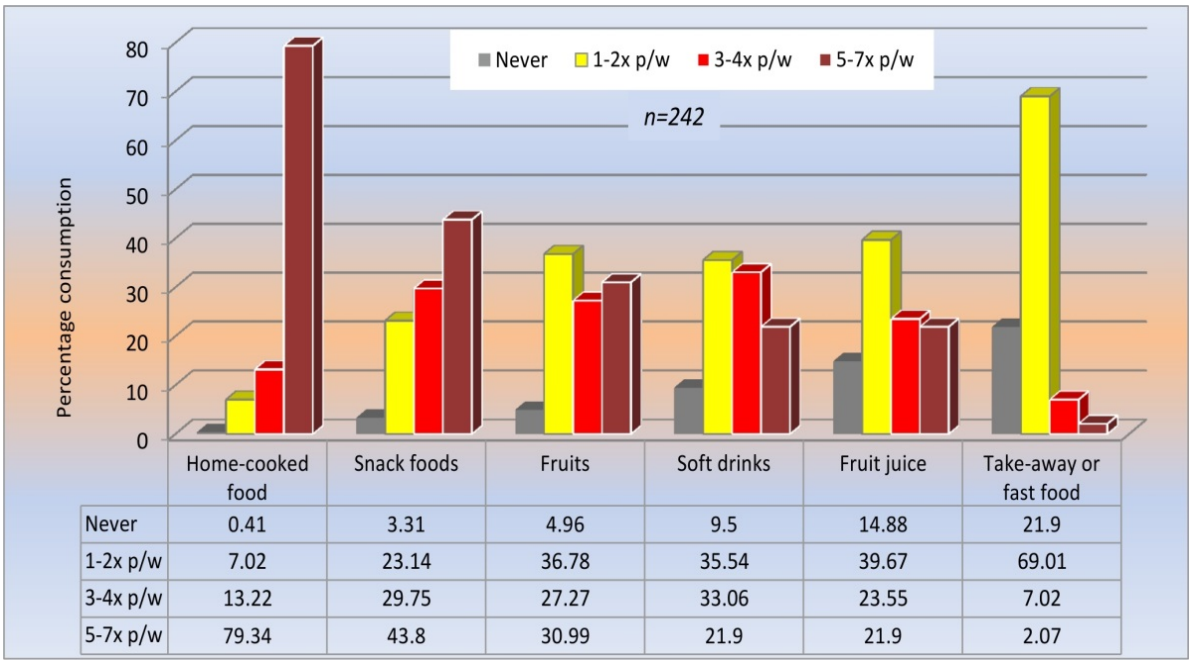
After supper. A similar trend in the results as for after supper on Saturdays was reported.

In-between meals. Again, the same type of foods were eaten between meals on Sunday as those on Saturdays. Most of the respondents mentioned that they enjoyed tea and bread (n = 22, 25%), fruit (n = 17, 19.32%), soft sorghum porridge (n = 13, 14.77%), savoury snacks and sweets (n = 12, 13.64%) and beverages (n = 11, 12.5%) as in-between meal snack foods.

Regarding the daytime meal patterns over weekends it can be concluded that the Saturday and Sunday patterns are similar. Breakfasts on both weekend days closely resembled those of weekdays. Whereas the lunch, supper and in-between meals composition differed from those reported for weekdays. A positive trend noted was the inclusion of fruit as an in-between meal snack which was higher than the consumption reported for weekdays. On the other hand, the inclusion of sweets and savoury snacks and fast foods was also higher.

Respondents were also asked to indicate, on a four-point scale how often they consumed home- cooked food, take-away or fast foods, snack foods, fruits, soft drinks

and fruit juice (Figure 5.5). This was also used as a check and for triangulation purposes to measure weekday and weekend day eating patterns. The four-point scale ranged from never to 1-2 times per week, 3-4 times per week and 5-7 times per week.



	Home-cooked food	Snack foods	Fruits	Soft drinks	Fruit juice	Take-away or fast food
Never	0.41	3.31	4.96	9.5	14.88	21.9
1-2x p/w	7.02	23.14	36.78	35.54	39.67	69.01
3-4x p/w	13.22	29.75	27.27	33.06	23.55	7.02
5-7x p/w	79.34	43.8	30.99	21.9	21.9	2.07

FIGURE 5.5: FREQUENCY CONSUMPTION OF DIFFERENT TYPES OF FOOD AND BEVERAGES

The majority (79.34%, n = 192) of the respondents indicated that home-cooked food was consumed five to seven times a week. This result complements the fact that most of respondents (n = 167, 69.01%) said that they consumed take-away or fast foods only once or twice a week and only a minority marked three to four times a week (n = 17, 7.02%), with very few (n = 5, 2.07%) doing so regularly, five to seven times a week. Only 21.9% (n = 53) of the respondents indicated that they never consumed fast food. This data shows that home cooking is very definitely part of these families' daily routine with a small number never having home-cooked food. A very small number (n = 8, 3.31%) of the respondents never consumed snack foods while many of them (43.8%, n = 106) did so as often as five to seven times a week.

The frequency of consumption of fruit is generally low with about 5% never eating fruit and about a third of the respondents (n = 89, 36.78%) having fruit only once or twice a week and the rest varying about equally between five to seven times a week (n = 75, 30.99%) and three to four times a week (27.77%). Soft drinks and fruit juice were consumed by 35.54% (n = 86) and 39.67% (n = 96) once or twice a week respectively. However, very few respondents never consumed soft drinks and fruit juices: more did

not have fruit juices (n = 36, 14.88%) than those who did not have soft drinks (n = 23, 9.5%).

Respondents were also requested to describe the setting for family meals. The majority (73.97%, n = 179) indicated that all members of the household ate together at the table, while only 26.03% (n = 63) still adhered to the tradition of different age groups eating separately. Traditionally the Batswana formed groups according to age and gender as part of their meal etiquette (Scroggie, 1946:231). It seems as if this custom is fading away.

Respondents were also asked to indicate how often they enjoyed meals in the presence of family members and how often they ate meals in other places than home. Figure 5.6 presents these results.

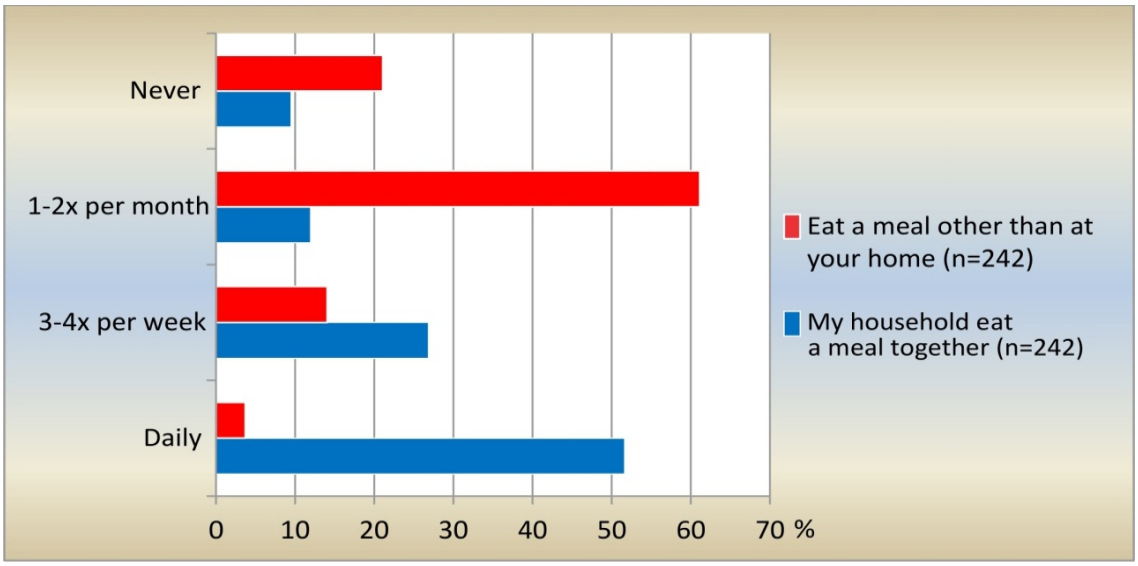


FIGURE 5.6: FREQUENCY CONSUMPTION OF MEALS

Many of the adolescent respondents (51.65%, n = 125) indicated that their family/household members eat a meal together daily, while 26.86% (n = 65) do so three to four times a week and only 11.98% (n = 29) once or twice a month. Those respondents who never eat a meal with their family members comprised less than ten per cent of the sample (9.5%, n= 23). Eating meals in places other than home once or twice a month was a fairly common practice (n = 148, 61.16% of the respondents) whereas only a small number did so on a daily basis (n = 9, 3.72%).

Where food consumption away from home or school took place was also determined (Figure 5.7). It is interesting to note that nearly 44% of the respondents marked the three outlets where deep fat-fried or grilled chicken is offered on the menu. Most popular (n = 32, 16.5%) was Kentucky Fried Chicken (KFC), followed by Nandos (15.5%, n = 30)

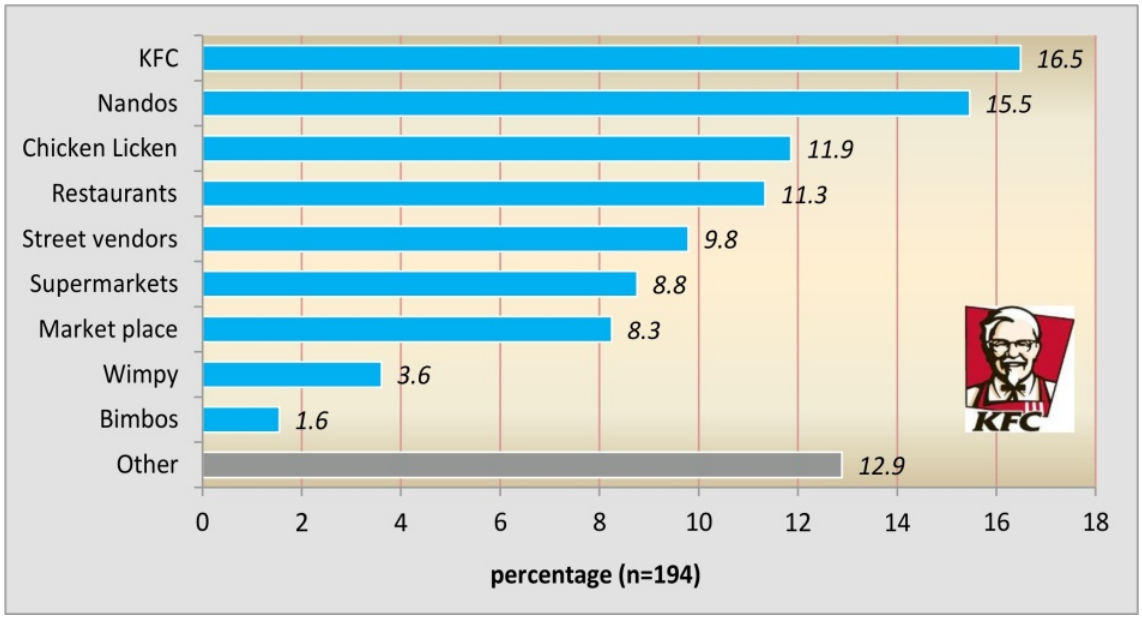


FIGURE 5.7: EATING AWAY FROM HOME / SCHOOL (FOOD OUTLETS)

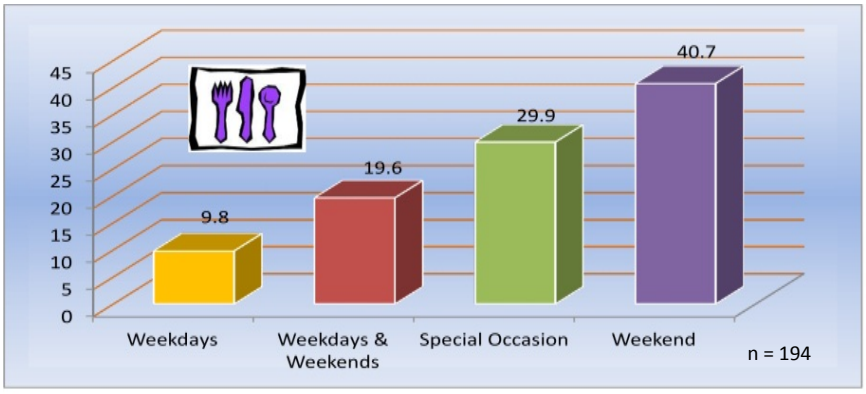
and Chicken Licken (11.9%, n = 23). Less popular were Wimpy and Bimbos. Fewer than 10% indicated that they eat food away from home that was bought from street vendors, supermarkets or the market place. The option 'other' was marked by 12.9% (n = 25) of the respondents and included restaurants such as The Braai Place, Hungry Lion, and Barcelos and food outlets selling pizzas such as at Debonairs and Pizza House.

To find out when the respondents ate out, a closed question had to be answered followed by an open-ended question that asked with whom they enjoyed such meals away from their homes. Figure 5.8 portrays these results.

Most (n = 79, 40.7%) of the respondents ate out over weekends and on special occasions (n = 58, 29.9%), whereas only very few 9.8% (n = 19) did so on weekdays. The majority (n = 124, 64%) of respondents eat out with family and friends (n=124, 64%; n=67, 34% respectively). Those who eat out alone were very definitely in the minority (3, 2%).

It is significant to relate the results of the current eating patterns which comprise weekdays and weekends days with those of the non-quantitative food frequency questionnaire. Respondents have shown a similar trend that three and more meals are consumed in a day enjoyed with relish/side dish which can either be meats (beef/chicken) or vegetables. This similar trend is also shown with regard to the difference in meal pattern and composition on weekdays and over weekend days. This is similar to other countries because it is evident in the literature that, in some South African studies (Viljoen, 2009; Viljoen *et al*., 2005; Viljoen & Gericke, 2001) three and

more meals are also consumed in a day enjoyed with relish/side dish which can either be meats or vegetables. Bread and tea are frequently consumed in contrast with other food items for breakfast. Consumption of a fruit is very low both on weekdays and weekend days as well as in the non-quantitative food frequency questionnaire. The results demonstrate that though there are different types of food and beverages available such as snack foods and fast foods, home-cooked food is still consumed by many respondents. Though traditional foods are still consumed at this juncture the eating pattern in this study could be described as Western-orientated.



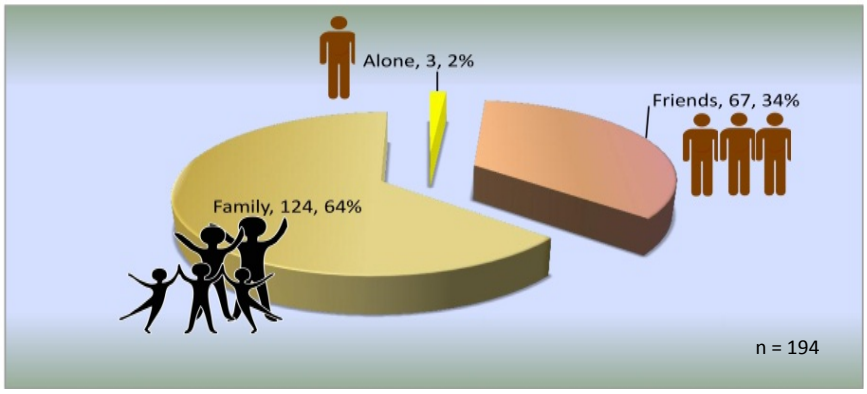


FIGURE 5.8: WHEN MEALS ARE CONSUMED AND WITH WHOM

A non-quantitative food frequency questionnaire was used to gather data and also as a check and to apply triangulation as a method to endorse validity of the information about what foods the respondents consumed and how often. The food frequency questionnaire had thirteen food groups namely: bread and bread products, spreads or accompaniments to bread, cereals, vegetables, tubers, fruits, meat, fish, other proteins, dairy and dairy products, beverages, puddings and baked products.

5.4.3 Non-quantitative food frequency (NQFF) results

In the non-quantitative food frequency questionnaire, foods were listed according to the groups outlined below in this section (5.4.3). The respondents had to indicate the frequency of consumption of each of the food items according to the following scale: daily, 3-4 times a week, once a week, less than three (<3) times a month, on special occasions and never. The results of this technique are presented according to the food groups used on the questionnaire.

5.4.3.1 Bread and bread-like products

The frequency of consumption of bread and bread-like products are given in Figure 5.9. This group includes brown and white bread together with traditional bread-like products such as dumplings, fat cakes, pot bread and flat bread. Rusks, buns, bread rolls and scones were also included.

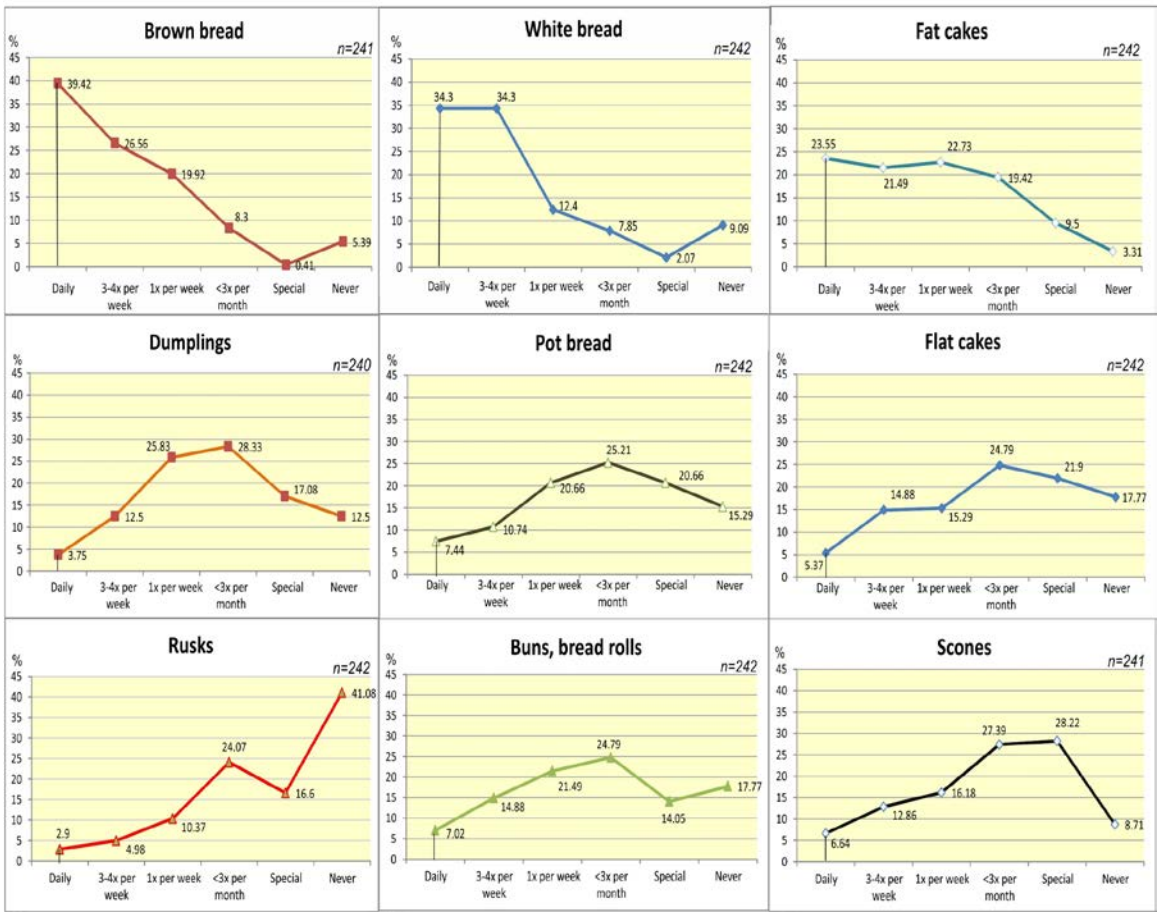


FIGURE 5.9: FREQUENCY CONSUMPTION OF BREAD AND BREAD PRODUCTS

Brown and white bread in comparison to the other bread-like items in this group were consumed daily by the majority of the respondents. The results on the frequency of consumption for brown and white bread were 39.42% (n = 95) and 34.3% (n = 83) respectively, followed by 26.56% (n = 64) and 34.3% (n = 83) who consumed them 3-4 times a week. Traditional bread-like products such as flat bread (*diphaphatha/ mapakiwa*), pot bread and dumplings (*matemekwane*) were not consumed daily by the majority of the respondents. The majority of the respondents indicated that they consumed them less than three times a month. However, traditional fat cakes (*magwinya*) were indicated by more than 60% of the respondents to be consumed at least once or more times a week, as about 20% of the respondents indicated that they respectively consumed them daily, 3-4 times a week or once a week.

Other baked products such as rusks, buns, bread rolls and scones were not frequently consumed. As expected, rusks which are not a traditional Tswana food item, were never consumed by the majority of the respondents (n = 99, 41.08%), although some indicated that they consumed them less than three times a month. Buns, bread rolls and scones were not frequently consumed as the frequency of consumption was given as either less than 3 times a month, on special occasions only or never by the majority of the respondents.

5.4.3.2 Spreads or accompaniments to bread

The results on the frequency of consumption of bread spreads or accompaniments to bread are given in Figure 5.10.

Many (n = 92, 38.33%) of the respondents used margarine daily followed by 21.55% (n = 51) who used it 3-4 times a week. Butter and peanut butter were used at least once a week by half of the respondents as bread spreads. Butter was used daily by 25.52% (n = 61), 3-4 times a week by 18.41% (n = 44) and once a week by 14.23% (n = 34). A similar pattern was reported for peanut butter. That it was used by 22.18% (n = 53) daily, 23.01% (n = 55) 3-4 times a week and 15.06% (n = 36) once a week. Jam, honey or marmalade was used less than three times a month by about a quarter of the respondents (n = 59, 24.58%), with 15% or slightly more than 15% of the respondents consuming it either daily, 3-4 times a week or once a week. Many respondents (n = 72, 30.64%) indicated that they never used cheese as an accompaniment to bread.

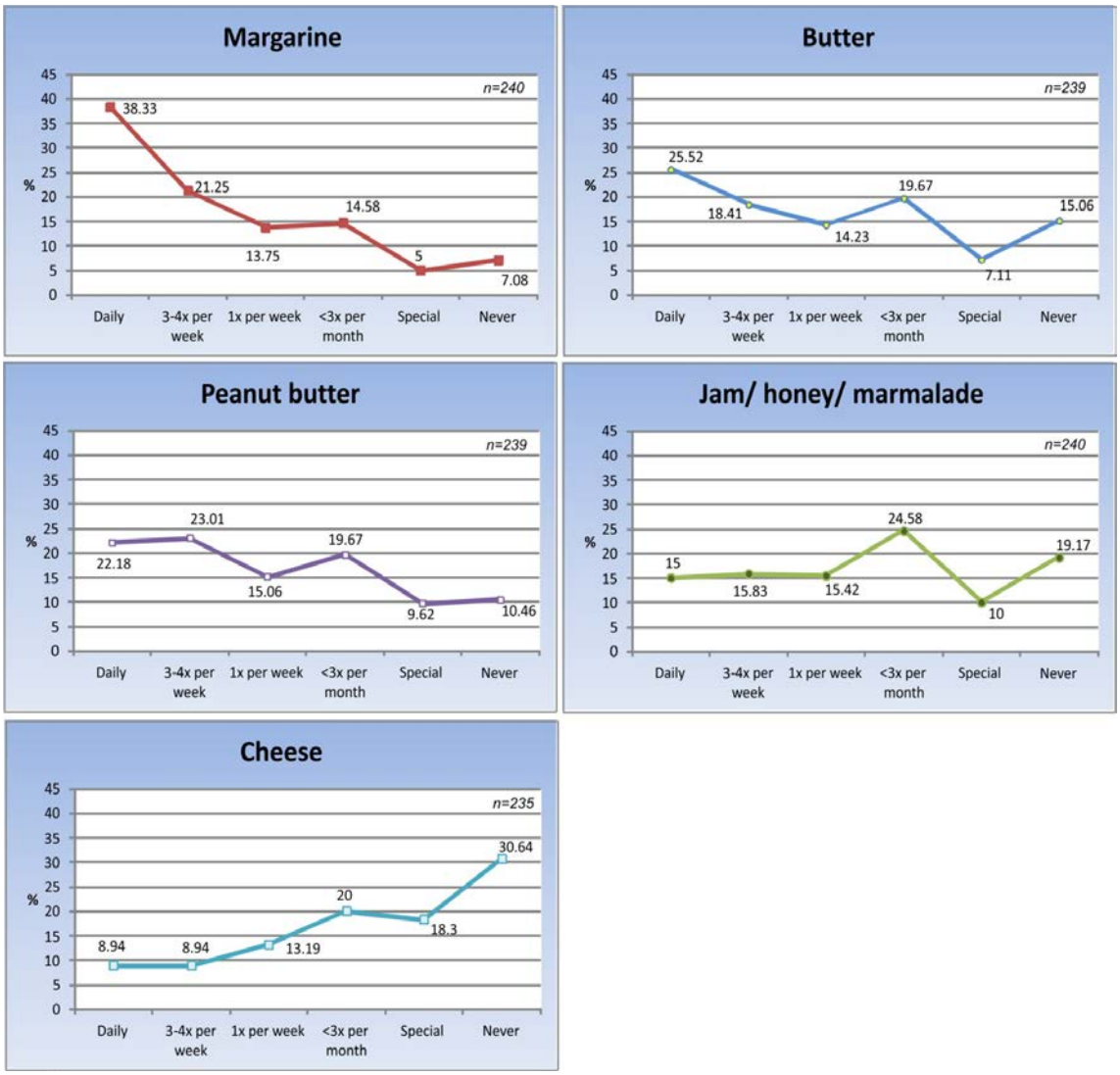
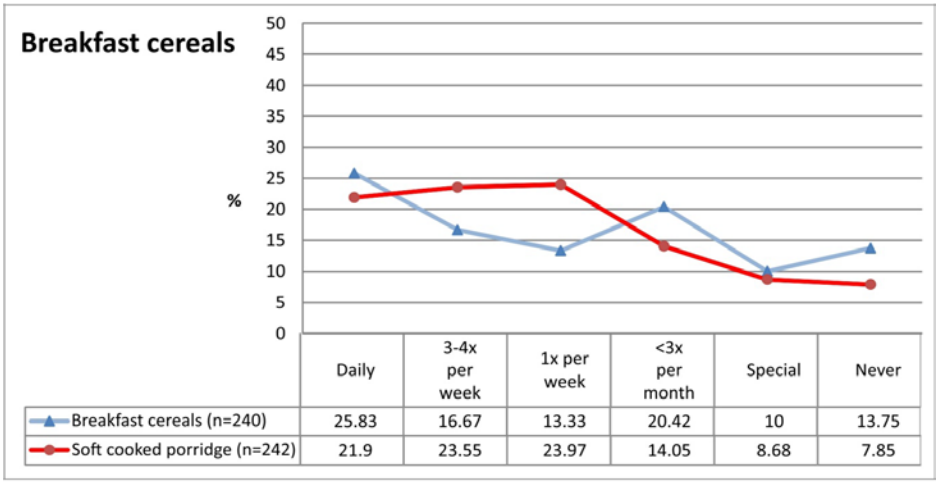


FIGURE 5.10: FREQUENCY CONSUMPTION OF SPREADS OR ACCOMPANIMENTS TO BREAD

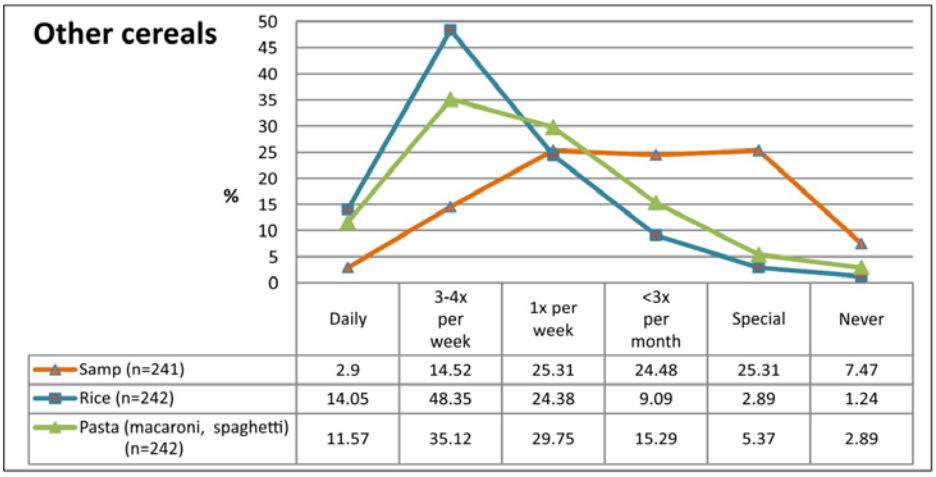
5.4.3.3 Cereals

Figure 5.11 presents results on breakfast cereals, other cereals and stiff porridges. Breakfast cereals such as cornflakes, All Bran flakes, Rice Krispies, and Weetbix were consumed daily by many (n = 62, 25.83%) of the respondents. Soft cooked porridges such as oats, mealie meal or sorghum soft porridge were consumed by most of the respondents either three or four times a week or once a week as 23.55% and 23.97% of them indicated. The daily consumption of soft cooked porridge was marked by 21.9% of the respondents as their habit.

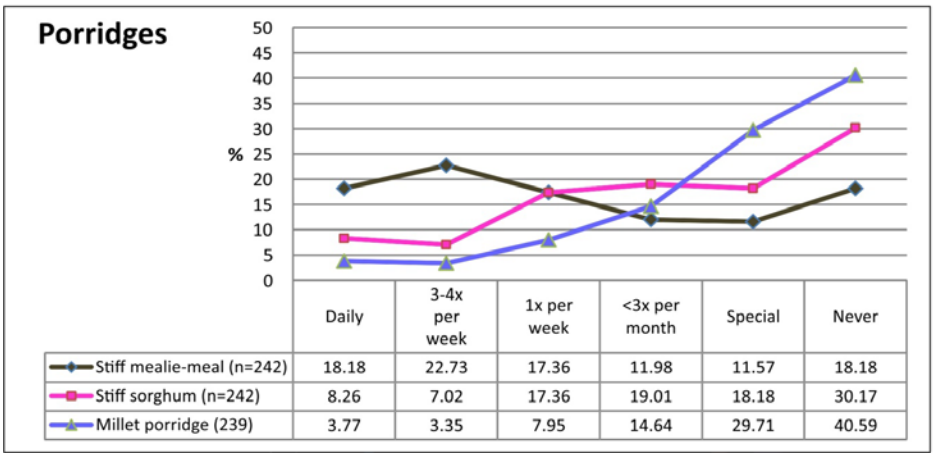
Other cereals included samp, rice and pasta (macaroni and spaghetti). Most of the respondents consumed rice and pasta three to four times a week, as 48.35% (n = 117)



	Daily	3-4x per week	1x per week	<3x per month	Special	Never
Breakfast cereals (n=240)	25.83	16.67	13.33	20.42	10	13.75
Soft cooked porridge (n=242)	21.9	23.55	23.97	14.05	8.68	7.85



	Daily	3-4x per week	1x per week	<3x per month	Special	Never
Samp (n=241)	2.9	14.52	25.31	24.48	25.31	7.47
Rice (n=242)	14.05	48.35	24.38	9.09	2.89	1.24
Pasta (macaroni, spaghetti) (n=242)	11.57	35.12	29.75	15.29	5.37	2.89



	Daily	3-4x per week	1x per week	<3x per month	Special	Never
Stiff mealie-meal (n=242)	18.18	22.73	17.36	11.98	11.57	18.18
Stiff sorghum (n=242)	8.26	7.02	17.36	19.01	18.18	30.17
Millet porridge (239)	3.77	3.35	7.95	14.64	29.71	40.59

FIGURE 5.11: FREQUENCY OF CONSUMPTION OF CEREALS

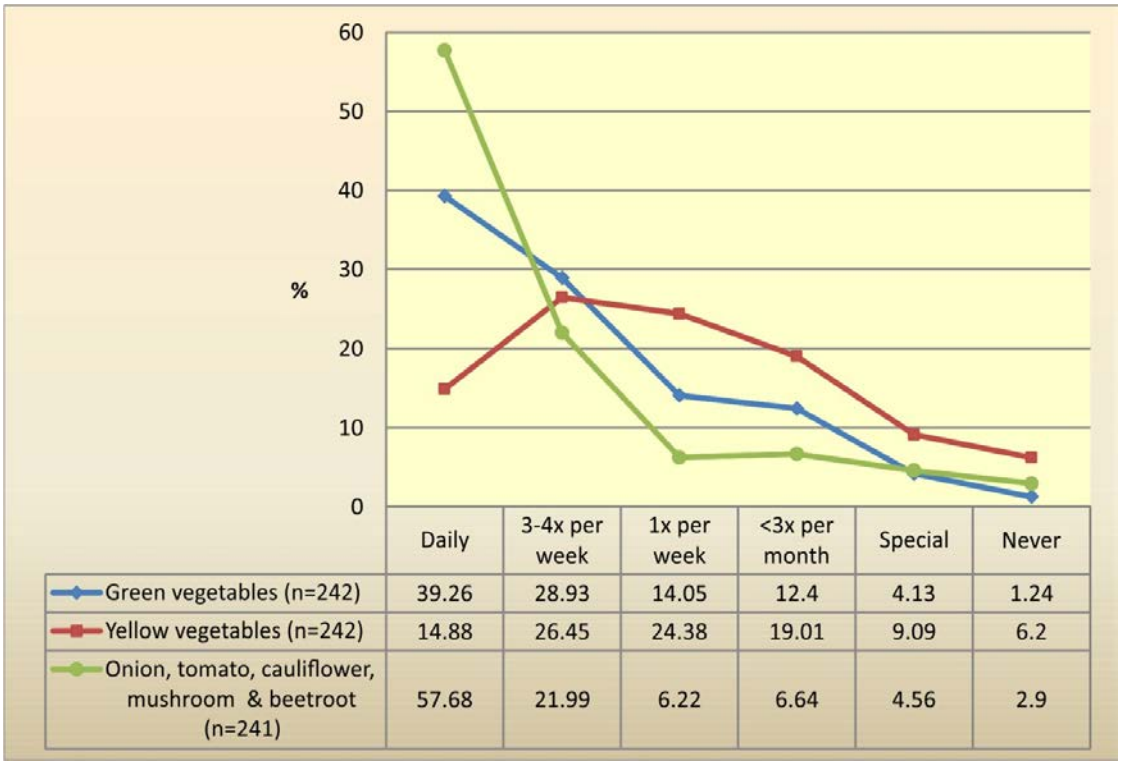
and 35.12% (n = 85) of them respectively indicated. This was followed by a large percentage of respondents who indicated that they frequently consumed rice and pasta once a week as 24.38% (n = 59) and 29.75% (n = 72) of the respondents respectively marked this option. For samp, a quarter (n = 61, 25.31%) of the respondents indicated that they consumed it once a week, followed by 24.48% (n = 59) and 25.31% (n = 61) who respectively indicated a consumption frequency of less than three times a month and only at special occasions.

The frequency of consumption of the stiff porridges (millet porridge, stiff sorghum, and stiff mealie-meal porridge) indicates that stiff mealie-meal porridge is consumed daily by 18.18% (n = 44) of the respondents as opposed to stiff sorghum porridge consumed by 8.26% (n = 20) and millet porridge 3.77% (n = 9). Stiff mealie-meal porridge is consumed by most (n = 55, 22.73%) of the respondents three to four times a week. The frequency of consumption of millet porridge was indicated by nearly a third (n = 71, 29.71%) of the respondents on special occasions. The results indicate that the frequencies of consumption of cereals are changing. Similar to other Southern African studies an increased frequency of consumption of starches such as rice and pasta products were noted (Viljoen *et al.,* 2005: Kgaphola & Viljoen, 2004).

On the other hand the results confirm that many of the respondents still follow the traditional custom of enjoying cooked porridges prepared from maize as reported similarly in studies conducted in South Africa, Botswana's neighbouring country, and in Swaziland (Viljoen *et al.,* 2005: Kgaphola & Viljoen, 2004; Huss-Ashmore & Curry, 1991; Ogle & Grivetti, 1985; Kuper, 1980; Jones, 1963:66; Beemer, 1939).

5.4.3.4 Vegetables

The frequency of consumption of vegetables is given in Figure 5.12.



	Daily	3-4x per week	1x per week	<3x per month	Special	Never
Green vegetables (n=242)	39.26	28.93	14.05	12.4	4.13	1.24
Yellow vegetables (n=242)	14.88	26.45	24.38	19.01	9.09	6.2
Onion, tomato, cauliflower, mushroom & beetroot (n=241)	57.68	21.99	6.22	6.64	4.56	2.9

FIGURE 5.12: FREQUENCY CONSUMPTION OF VEGETABLES

Vegetables were listed in four groups namely; yellow vegetables (butternut, carrots, pumpkin), green vegetables (spinach, broccoli, green beans, green peas) and a third group of vegetables (onion, tomato, cauliflower, mushroom, beetroot). An option of "other" (please specify) was also given in the questionnaire. The frequency of consumption of vegetables confirms the results of the usual eating patterns, as a low frequency of consumption was reported for all the groups of vegetables listed. Although a daily consumption was indicated for some vegetables, the percentage of respondents who included vegetables daily in their diets was concernedly low. Only 39.26% (n = 95) and 14.88% (n = 36) of the respondents respectively consumed green and yellow vegetables daily. The majority of the respondents 57.68% (n = 138) consumed vegetables from the third group (that included tomatoes, onions, cauliflower, beetroot and mushrooms) daily. This is understandable as many of the traditional vegetable relishes and dishes use onions and tomatoes as flavouring ingredients. A large percentage of the respondents indicated that their frequency of consumption of vegetables is either 3-4 times a week or even once a week. The majority of the respondents consumed yellow vegetables either 3-4 times a week (n = 64, 26.45%) and once a week (n = 59, 24.38%), whereas green vegetables were indicated as consumed by 28.93% (n = 70) and 14.05% (n = 34) respectively 3-4 times a week or once a week.

5.4.3.5 Tubers

In the tuber group of vegetables only potatoes and sweet potatoes were listed in the NQFF. The frequency consumption of tubers is given in Figure 5.13.

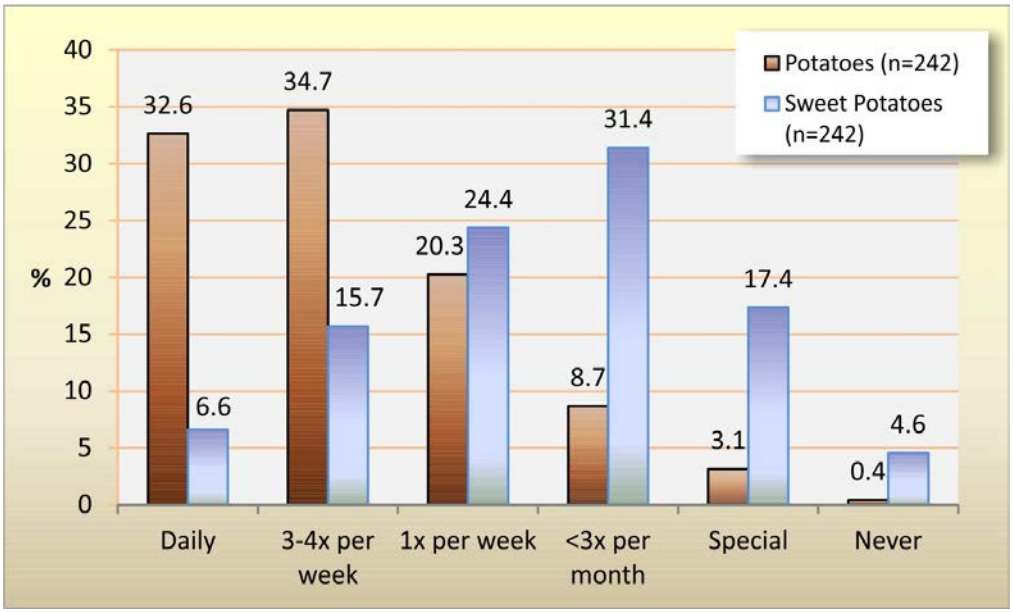


FIGURE 5.13: FREQUENCY CONSUMPTION OF TUBERS

The frequency of consumption of potatoes and sweet potatoes varied. Most of the respondents indicated the frequency of consumption of potatoes as daily (n = 79, 32.6%) or 3-4 times a week (n = 84, 34.7%). Sweet potatoes on the other hand, were consumed by nearly a third of the respondents (n = 76, 31.4%) less than three times a month or once a week (n = 59, 24.4%).

5.4.3.6 Fruit

The frequency consumption of fruit is given in Figure 5.14.

Fruit were grouped in the questionnaire as citrus (oranges, lemons, naartjies), vitamin A-rich (yellow peaches, mangoes, paw-paw, pineapple, plums) and others (grapes, bananas, apples, pears and litchis). Dried fruit (raisins) and canned / tinned fruits were also listed.

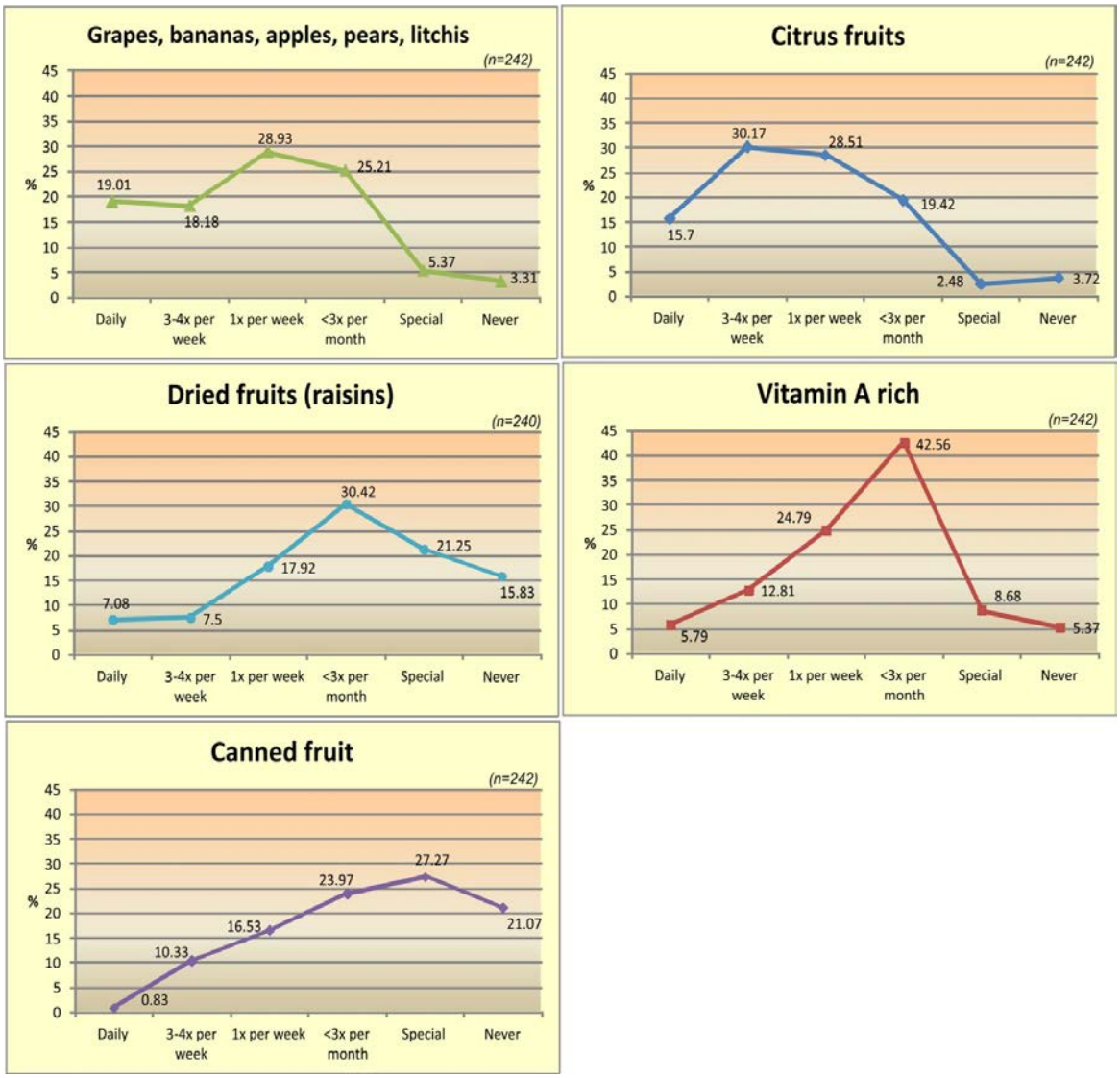


FIGURE 5.14: FREQUENCY CONSUMPTION OF FRUITS

Daily consumption of all types of fruits is not frequent as reflected in the graphs by the low percentage of respondents who indicated to have consumed a fruit daily. The daily frequency consumption of other fruit such as grapes, bananas, and apples as well as for citrus fruits were indicated by 19.01% (n = 46) and 15.7% (n = 38) respondents respectively. A daily consumption of dried fruit, Vitamin A-rich and canned fruit were indicated by less than 10% respondents. Many of the respondents consumed these fruits less than three times a month. The majority (n = 66, 27.27%) of the respondents marked canned fruit as an item consumed on special occasions.

It is evident that fruit was also not consumed frequently. The low fruit and vegetable consumption is a matter of concern. Studies in other countries have also reported similar low consumption patterns of fruits and vegetables, and attributed it to various environmental factors such as a lack of availability, affordability, food preferences and familial influences and experiences (Jack, Neckerman, Schwartz–Soicher, Lovasi, Quinn, Richards, Bader, Weiss, Konty Arno, Viola, Kerker & Rundele, 2013; Phipps, Stites, Wallace & Braitman, 2013; Molaison, Connell, Stuff, Yadrick & Bogle, 2005; Baxter & Schröder, 1997).

5.4.3.7 Meat and meat products

Meat and meat products including processed meats were also listed in the non-quantitative food frequency questionnaire. The frequency of consumption of meat is presented first in Figure 5.15.

Nearly half (n = 113, 46.69%) of the respondents indicated that they consumed beef daily and 35.12% (n = 85) that they consumed it 3-4 times a week. Beef is widely eaten in Botswana compared to other meats, such as goat meat, chicken, pork and mutton or/lamb (Botswana Tourism Board, 2009:7; Sydenham & Ron, 2007:1; Coetzee, 1982:165). Most (n = 89, 36.78%) of the respondents consumed chicken 3-4 times a week, followed by 23.55% (n = 57) who consumed it daily and 20.66% (n = 50) once a week. Goat meat was consumed on special occasions according to many of the respondents (n = 96, 39.83%) and hardly at all in everyday life as ≤ 13.69% of the respondents indicated that they consumed it once a week or more than once a week. Neither pork nor mutton were consumed as frequently as beef and chicken. Although these were consumed by some, the majority indicated that they never consumed pork (n = 122, 50.62%) or mutton (n = 111, 45.87%). A possible explanation for these results could be that mutton and/or lamb are expensive, and some people refrain from eating pork for religious and/or cultural reasons. However, a large percentage of respondents indicated that they consumed mutton/lamb and pork on special occasions, as 19.42%

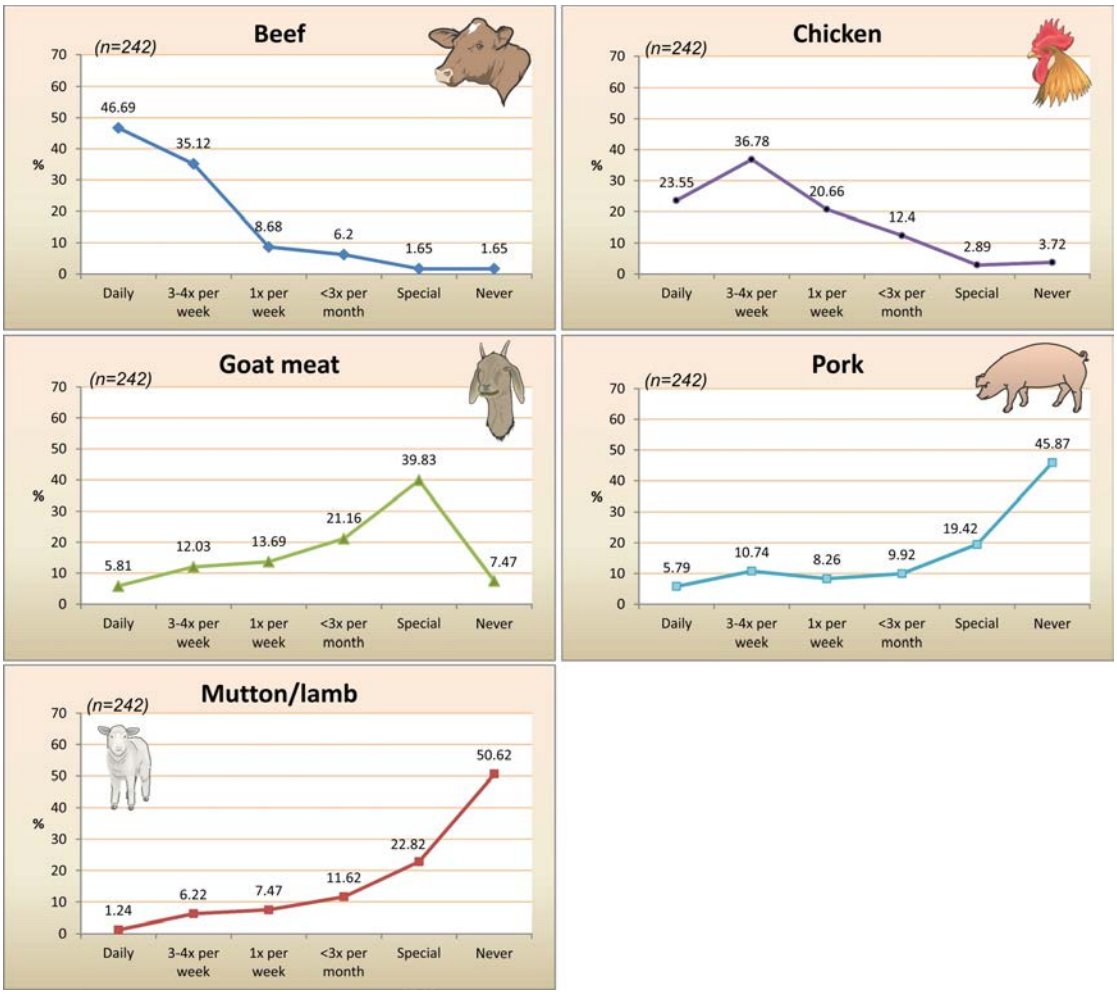


FIGURE 5.15: FREQUENCY OF CONSUMPTION OF MEAT

(n = 47) and 22.82% (n = 55) of the respondents respectively marked this option for pork and mutton.

A category for processed meat such as polony, Vienna sausages, Russian sausages, boerewors, ham and bacon, was included in the food frequency questionnaire.

The results are shown in Figure 5.16.

Although the frequency consumption for the various processed meats varied they were not frequently consumed by most of the respondents. However, the exception was polony. More than half of the respondents gave their frequency of consumption for polony as at least once a week. A large percentage (n = 66, 27.62%) marked the frequency of consumption as less than three times a month. Although Vienna sausages, Russian sausages and boerewors were consumed at least once a week by some, the majority of the respondents indicated the frequency of consumption of Vienna sausages and Russian sausages as less than three times a month. Most (n = 59, 24.38%) of the respondents indicated that boerewors was consumed once a week. Pork processed

meat such as ham and bacon reflected an overall low frequency of consumption as the majority of the respondents indicated that they never consumed these items.

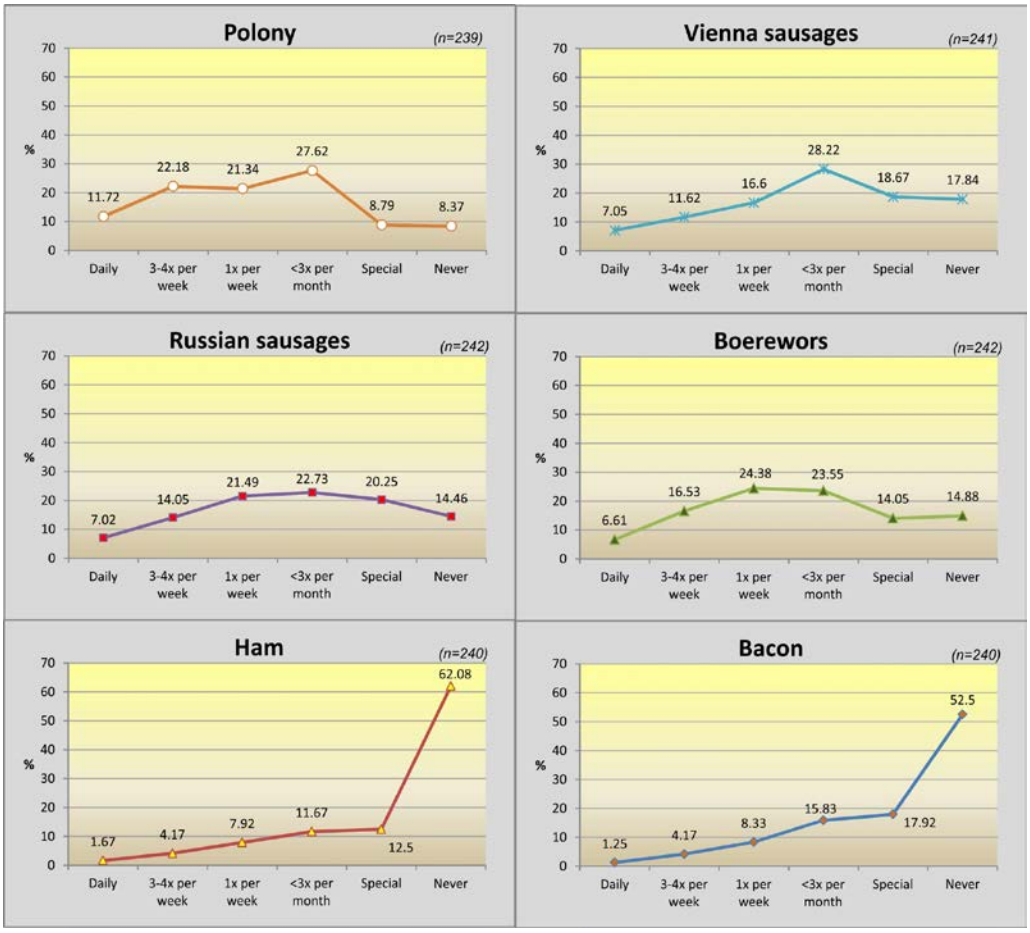


FIGURE 5.16: FREQUENCY OF CONSUMPTION OF PROCESSED MEAT

5.4.3.8 Fish

The fish group included fresh fish, fried fish, canned/tinned fish and dried fish whereas "other" was for hake fillets and fish cakes which were frozen and packaged.

Figure 5.17 presents frequency consumption of fish.

The study group did not consume fish frequently, as the majority indicated that it was consumed less than three times a month. A large percentage of the respondents indicated that they consumed fried fish and canned/tinned fish once a week, as 20.75% (n = 50) and 21.07% (n = 51) of the respondents respectively indicated this. The frequency of consumption for dried fish was lower in comparison to the other fish items listed and most (n = 114, 47.7%) of the respondents indicated that they never eat it. A possible reason for this low consumption of dried fish could be that some people never

ate it due to sensory attributes such as the strong smell and due to the seasonal supply from local rivers hence the imported one is more expensive.

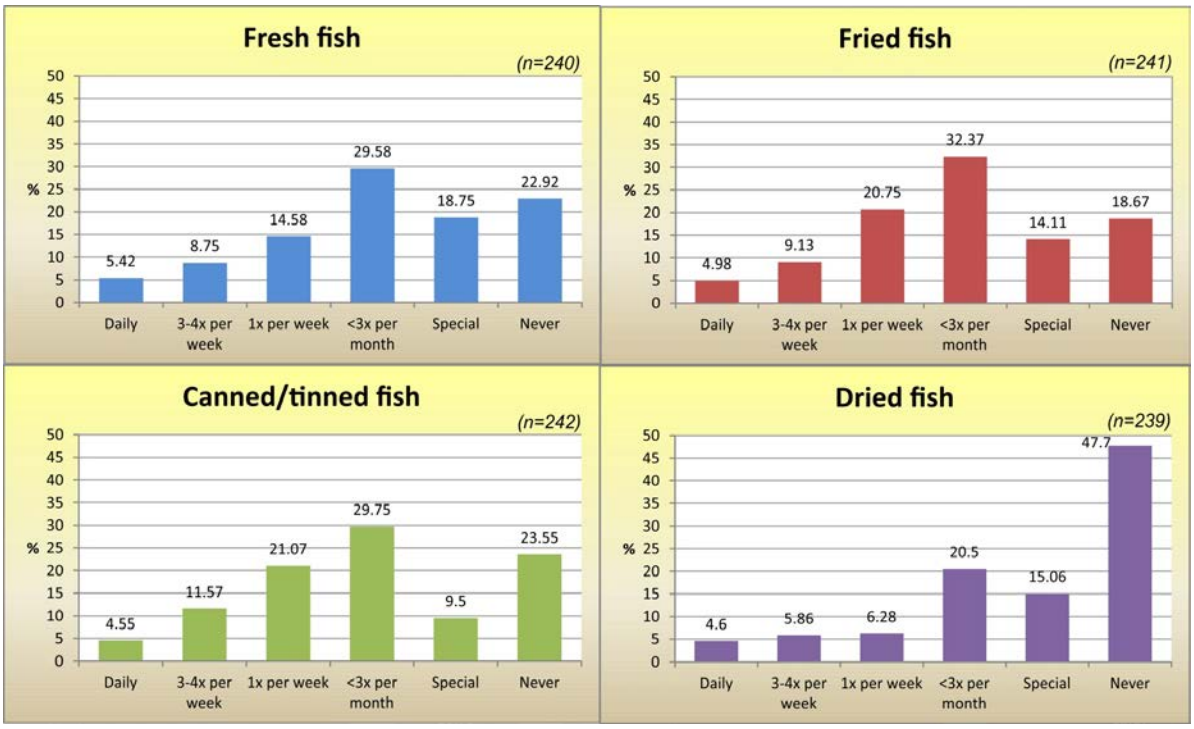


FIGURE 5.17: FREQUENCY OF CONSUMPTION OF FISH

5.4.3.9 Other protein dishes

Other protein dishes included cooked cheese dishes, eggs and egg dishes. Those respondents who marked “other” (n=3) were for soya as a protein dish. The main results are given in Figure 5.18.

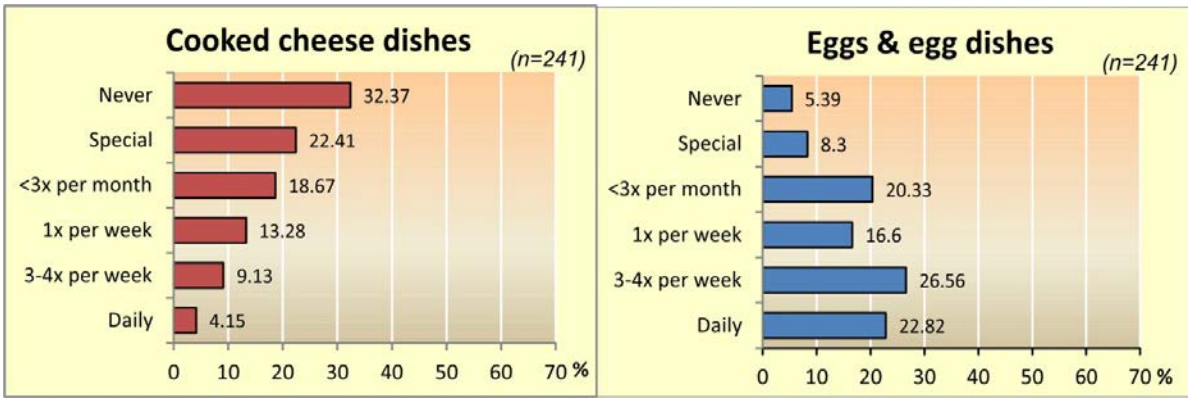


FIGURE 5.18: **FREQUENCY OF CONSUMPTION OF OTHER PROTEIN DISHES**

Almost a third (n = 78, 32.37%) of the respondents had never eaten cooked cheese dishes such as macaroni and cheese although about a quarter (n = 54, 22.41%) had only had it on special occasions whereas, for some (n = 45, 18.67%), it was a meal served fairly infrequently, about three or fewer times a month. However, a small group (13%), far less than a quarter of the respondents, indicated that they ate cooked cheese dishes at least once a week. These results on the frequency of consumption of cheese concur with the results on cheese as accompaniment to bread (see 5.4.3.2).

The frequency of the consumption of eggs and egg dishes shows that eggs figure in these adolescents' eating patterns (n = 64, 26.56%) quite regularly, about three to four times a week; although quite a number (n = 55, 22.82%) have eggs either daily or once a week (n = 40, 16.6%) in some form or another. The frequent inclusion of eggs and egg dishes confirms that the traditional taboo on the consumption of eggs by young people is no longer strictly enforced. This is because nowadays more people are more broadly educated and know that the exclusion of some food items just because they are food taboos can impact negatively on the nutrition of certain age groups in particular and, in fact, the entire community at large. It is just a myth that when eggs are consumed by girls they will reach puberty earlier. Meyer-Rochow (2009:9) points out that it is important to realise that numerous societies impose restrictions on acceptable food even though it is freely available in the natural environment, thereby, in most cases minimising the use of potential food in a given environment. Therefore certain food restrictions can negatively affect the nutritional status of a community or a subsection within it.

Soya given as "other" was consumed once a week and 3-4 times a week, by two and one of the respondents respectively. A possible explanation for low consumption of soya by respondents is that it is not commonly consumed but the Botswana government has now taken an initiative that soya be used in improving cereals such as sorghum for its nutritious benefits. Soya weaning foods (*Tsabana*) is been produced for feeding babies and a fortified soy sorghum blend (*Tsabotlhe*) for adults. These are the products with soya Batswana people consume (Seleka, Makepe, Kebakile, Batsetswe, Mmopelwa, Mbaiwa & Jackson, 2008: 17-19).

5.4.3.10 Dairy and dairy products

Dairy and dairy products such as fresh milk, yogi-sip and/or yoghurt, sour milk and cheese were included in the questionnaire (NFFQ) and the results are presented in Figure 5.19.

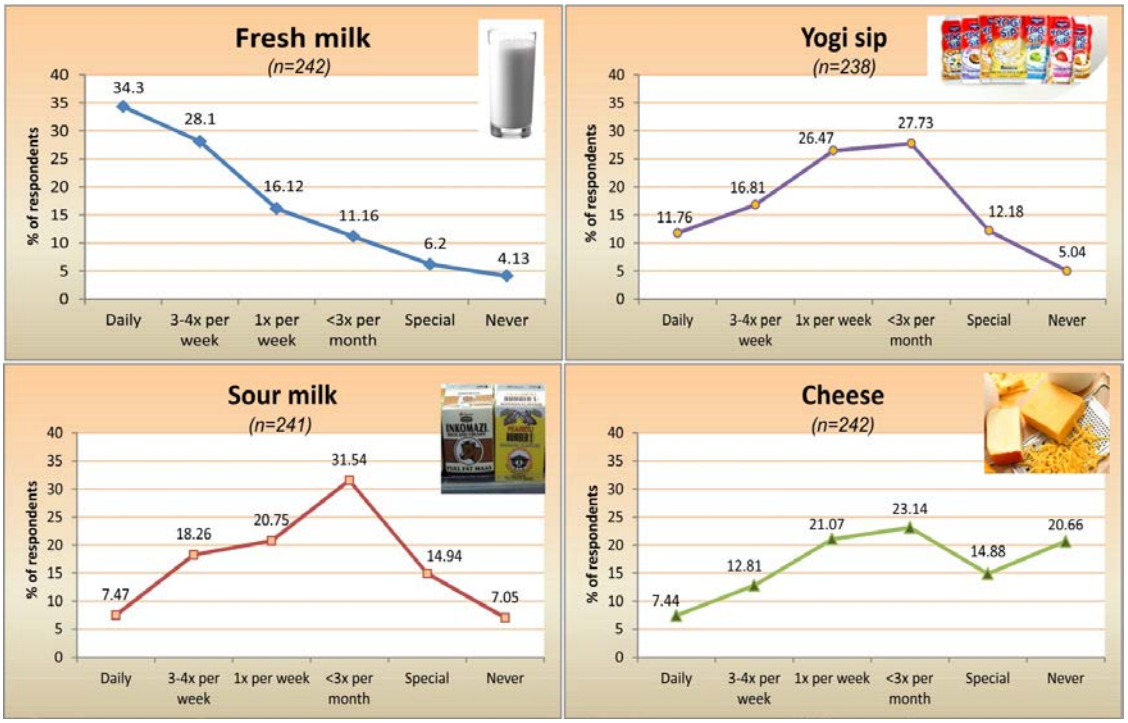


FIGURE 5.19: FREQUENCY OF CONSUMPTION OF DAIRY AND DAIRY PRODUCTS

5.4.3.11 Beverages

The list of beverages included water, coffee, tea, milk, fizzy drinks, fruit juices, ginger beer, *mageu* and herbal tea. Figure 5.20 presents the results on the frequency of consumption for beverages.

Nearly 80% of the respondents indicated that they frequently consumed fresh milk at least once a week. Just over a third (n = 83, 34.3%) of the respondents had fresh milk daily, followed by 28.1% (n = 68) who did so 3-4 times a week and 16.12% (n = 39) once a week. Although more than half of the respondents indicated that they consumed yogi-sip/yoghurt at least once a week, most (n = 66, 27.73%) of the respondents only had them less than three times a month.

Sour milk is a popular item in the adolescents eating patterns and nearly half of the respondents drink it at least once a week, yet quite a few, about a third (n = 76, 31.54%) have it as a treat but only three or fewer times a month. Observing the results from the analysis of the answers given to questions on the questionnaire, it seems that most respondents do not have fresh milk and sour milk (*madila)* as a relish with starchy foods but prefer to have meat and vegetables with their staple porridges, hence the low consumption of dairy and dairy products particularly milk and sour milk. The results concerning the frequency of the consumption of cheese confirm those already given. Concerning the consumption of milk the results are contrary to what happened in the

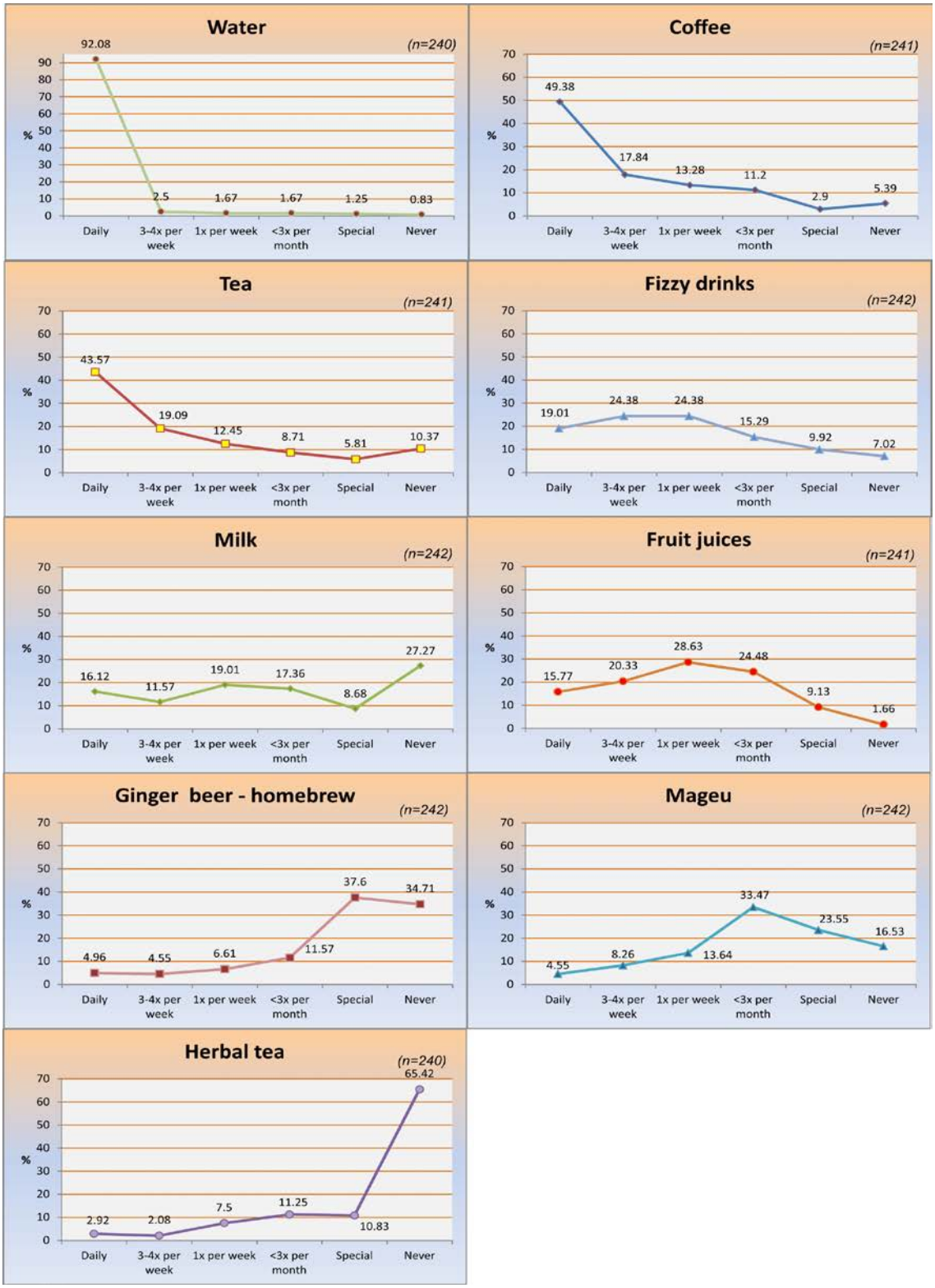


FIGURE 5.20: FREQUENCY CONSUMPTION OF BEVERAGES

additive to porridge. Sour milk was also eaten on its own (Botswana Tourism Board, 2009:7-10; Grivetti, 1978b). A frequency of consumption of at least once a week was given by 21.07% (n = 51) of the respondents with almost a quarter (n = 56, 23.14%) who past where milk was readily available at the cattle post and consumed while fresh as a

beverage. Milk was also fermented and drained to make sour milk, which was a favourite marked a frequency of consumption of less than three times a month. The majority of the respondents indicated that they consumed water, coffee and tea daily and the following results were recorded. A daily frequency of consumption of water was marked by 92.08% (n = 221), coffee by 49.38% (n = 119) and tea by 43.57% (n = 105) of the respondents respectively. Coffee and tea were also consumed 3-4 times a week by a large percentage of respondents as 17.84% (n = 43) and 19.09% (n = 46) respectively indicated this. A daily consumption of fizzy drinks was given by 19.01% (n = 46) of the respondents. Some respondents indicated that they consumed these at least once a week as 24.38% (n = 59). Another 24.38% (n = 59) indicated their frequency of consumption of fizzy drinks at 3-4 times a week. Fruit juices reflected a similar consumption pattern as fizzy drinks, and more than a quarter of the respondents marked that they consumed it at least once a week (n = 69, 28.63%).

Milk as beverage is not frequently consumed as ≤ 19.01% (n = 46) of the respondents indicated that they frequently consumed milk as beverage. Fresh milk was not traditionally consumed as a beverage by the Tswana people, and mostly used as a relish in the form of sour milk with cereal porridges (Sydenham & Ron, 2007:1).

The frequency of consumption of *mageu* was indicated by a third (n = 81, 33.47%) of the respondents as less than three times a month, followed by 23.55% (n = 57) of the respondents who only consumed it at special occasions. A possible explanation for the low frequency of consumption of *mageu* might be because it is a fermented non-alcoholic beverage which is time-consuming to prepare (Mpotokwane, 2008; Molewa, 2006:194; Mokwena *et al*., 2003). Home-brewed ginger beer was similarly not consumed frequently as 7% or less of the respondents recorded that they consumed it daily, 3-4 times a week or once a week. Many (n = 91, 37.6%) of the respondents enjoyed it on special occasions. Herbal tea was also a speciality enjoyed by a few as the majority of the adolescents (n = 157, 65.42%) never drank it.

5.4.3.12 Puddings, baked products and confectionery

Frequency consumption of puddings and baked products were also measured on the NFFQ and included puddings, baked products and confectionery. The results are given in Figure 5.21. Nearly a third (n = 77, 31.82%) of the respondents indicated that biscuits were consumed at least 3-4 times a week. While 22.73% (n = 55) and 21.9% (n = 53) of them respectively indicated daily and once a week. The minority (n = 12, 4.96%) marked the consumption of biscuits on special occasions only, while only 0.83% (n = 2) never consumed biscuits, which is not surprising for young people. In comparison to biscuits,

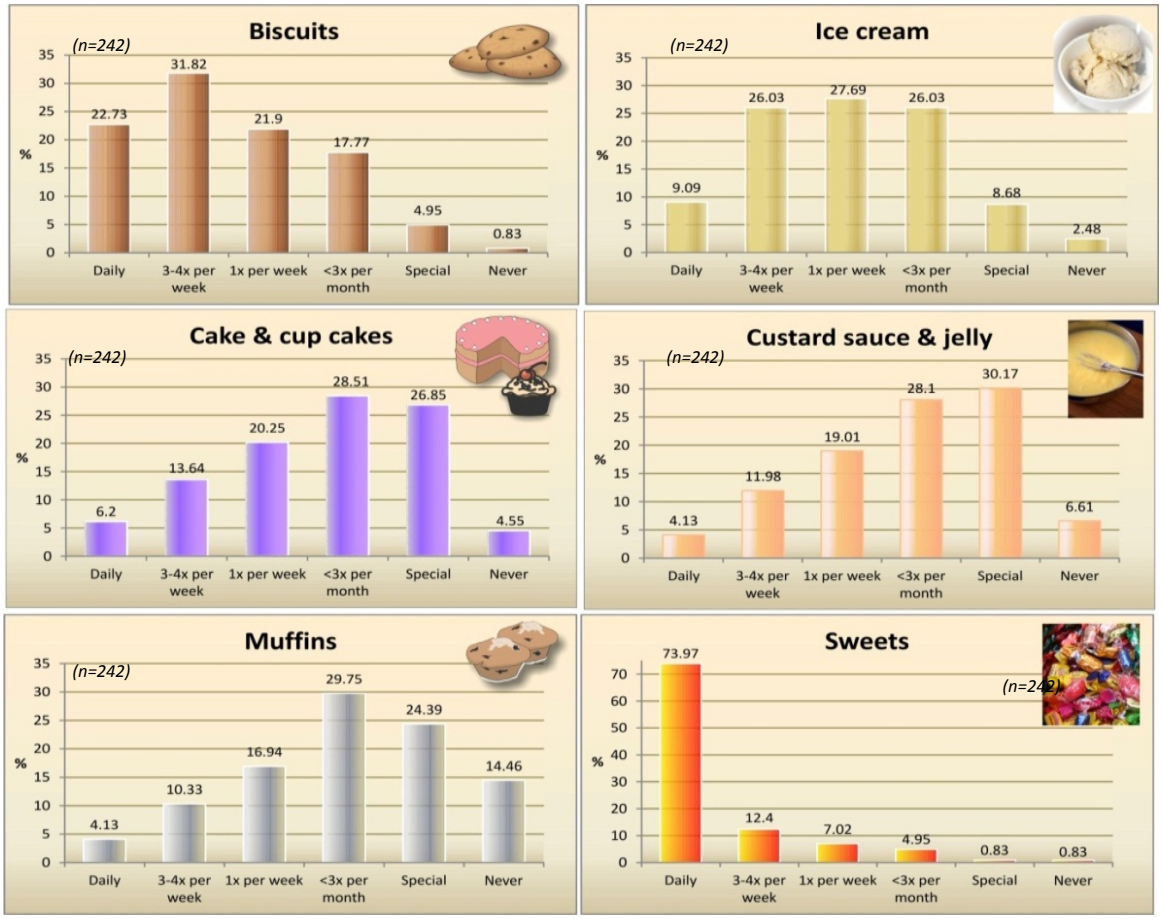


FIGURE 5.21: FREQUENCY CONSUMPTION OF PUDDINGS, BAKED PRODUCTS AND CONFECTIONARY

the majority of the respondents indicated the frequency of consumption of cakes/cupcakes and muffins as less than 3 times a month, as 29.75% (n=72) and 28.51% (n=69) respectively marked this option. Just over a quarter (n=67, 27.69 %) of the respondents consumed ice cream at least once a week. The frequency of consumption for jelly and custard sauce was marked by nearly a third (n=73, 30.17%) of the respondents as at special occasions. Sweets were indicated by the majority (n=179, 73.97%) of the respondents as items that they consumed daily.

5.4.4 Special occasions

This part deals with the food consumed at special occasions as the fourth sub-objective on the current eating patterns of the study group. Respondents were asked to give a list of the foods that are usually served at special occasions they participated in. Respondents were requested to list the foods served at these special occasions regardless of whether they have eaten it or not, in order to determine the foods eaten at special occasions.

The celebratory occasions in which the respondents participate at are those associated with the rites of passage such as ritual ceremonies, weddings, birthdays, graduations and funerals as well as those associated with holidays such as Christmas, Easter and new year's day. However, in this study special occasions were grouped into two categories, namely traditional and modern. Traditional special occasions were regarded as those that were part of the celebrations of the respondents for generations, and included those associated with the rites of passage such as ancestral worship or veneration (*phekolo*) and traditional weddings (*patlo le bogadi*) and funerals or tombstone unveiling. Modern special occasions were regarded as those that have become popular during the lifetime of the parents and grandparents of the respondents and were thus associated with those introduced in the recent past. This included birthday parties and civil weddings.

Figure 5.22 presents the food consumed at both traditional and modern special occasions.

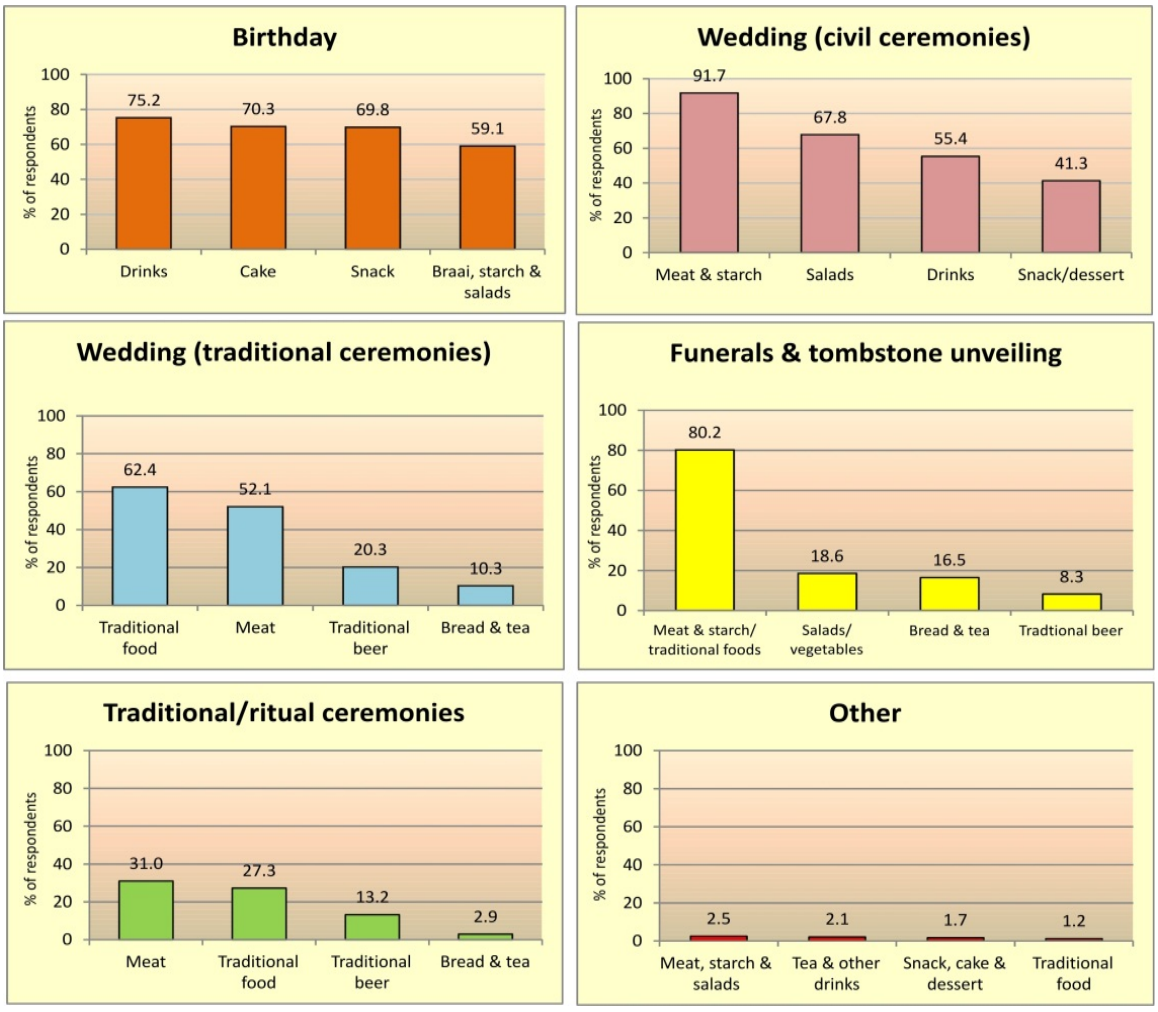


FIGURE 5.22: FOOD AT SPECIAL OCCASSIONS

5.4.4.1 Traditional special occasions

Traditional foods are the most commonly consumed at traditional special occasions. Traditional foods such as sorghum or millet porridge, samp and beans, leafy vegetables, traditional beer and meat (beef) were listed by the majority. The meat eaten at these traditional ceremonies is usually pounded and known as pounded meat (*seswaa*). Meat prepared for special occasions had to be shredded/pounded and cooked in big three legged pot on fire by men to make *seswaa.* Meat was traditionally considered a prestigious food and was mainly consumed at special occasions (Kuper, 1980; Grivetti, 1976: 1209; Jones, 1963:84; Scroggie, 1946:268-273). The results illustrate that 52.1% (n=126) of respondents indicated that pounded meat (*seswaa*) was consumed at traditional weddings with 31.0% (n=75) of the respondents who indicated that it was also served at traditional ritual ceremonies. Tswana traditional sorghum beer was the beverage most commonly consumed at these traditional ceremonies. Tswana traditional sorghum beer was mentioned by 20.3% (n=49) as beverage served at traditional weddings, by 13.2% (n=32) at ritual ceremonies and 8.3% (n=20) at funerals or tombstone unveiling. Tea and bread was also served especially at funerals or tombstone unveilings (n=40, 16.5%) and at a traditional wedding (n=25, 10.3%).

5.4.4.2 Modern special occasions

Figure 5.21 also illustrates that, at birthday parties and civil wedding ceremonies, Western-orientated food is consumed. The following items were listed by the respondents; 75.2% (n=182) mentioned carbonated drinks, 70.3% (n=170) cake, 69.8% (n=169) snack, and 59.1% (n=143) braai and salads respectively. The 69.8% that indicated snack food listed items such as crisp chips, popcorn, biscuits, sweets, peanuts and raisins. The majority (n=222, 91.7%) of respondents indicated that, meat and starch (rice, macaroni, spaghetti) and salads (n=164, 67.8%) are part of the main course of the meal, accompanied by fruit juice and fizzy drinks (n=134, 55.4%) and a snack or dessert (n=100, 41.3%). Salads included beetroot salad, coleslaw, green salad and butternut.

A provision in the questionnaire was made as an open-ended question to indicate which “other special occasions” are celebrated. “Other special occasions” celebrated could also be regarded as modern ones namely; baby showers, dinner parties, graduation parties, Christmas and New Year’s Eve party.

Although the respondents were including modern/Western-orientated food in their eating patterns, traditional foods continued to be consumed on both weekdays and weekend days, as well as at special occasions. Their eating patterns could be described as

moving more towards modern/Western-orientated eating patterns. In Addendum J photographs of people eating food at different special occasions are given.

5.5 CONSUMPTION OF TRADITIONAL TSWANA FOODS

Traditional food is an important element of the cultural heritage of all cultures and, apart from being staple grains, they are usually consumed and associated with specific celebrations and/or seasons (Guerrero *et al*., 2010:225; Guerrero *et al*., 2009:345). It is significant to point out that sorghum, maize and millet are important staple grains in Botswana (Chite, 2008:26; Moji, 2008:23). These grains are cultivated to produce a meal that is used to prepare a variety of dishes, although is mainly used for the preparation of soft or stiff porridge. These cereal grains and the porridges prepared from them are served as the most important or core component for breakfast, lunch and supper in Botswana households (Mpotokwane, 2008:32; Ellwood, 2008:39). They are usually enjoyed with side dishes prepared from melons, legumes, traditional green leafy vegetables, indigenous fruits or meat and chicken.

To determine the extent of the inclusion of traditional Tswana foods in their eating patterns, respondents were asked to indicate if they ate traditional Tswana food or not, and to give reasons for their answers. Respondents were also asked to give their opinions on how they felt about traditional Tswana food in an open-ended question.

The majority (n = 231, 96%) of the respondents indicated that they do eat traditional Tswana food. They mostly eat traditional Tswana foods when they are available (n = 169, 70%), particularly over weekends (n = 55, 23%) but also on weekdays (n = 49, 20%) and on special occasions (n = 37, 15%).

The respondents were also asked to give the reasons for eating traditional Tswana food. Traditional Tswana food was eaten by the majority of the respondents because they indicated that one becomes full and traditional food are healthy and nutritious (n = 122, 50%). The 29% (n = 70) of the respondents who indicated that they liked traditional Tswana food for its taste, gave reasons such as it is delicious, appealing, appetizing, fun, interesting and/or enjoyable to eat. Another 19% (n = 46) revealed that they eat traditional Tswana food because it is part of Tswana culture and they do not want to see their culture fade away. They felt proud and comfortable about eating traditional Tswana food and preserving their heritage. Then there were others who ate traditional Tswana food because of its availability (n = 35, 14%) and because it is “cheap to buy” and “easy to cook” but they were in the minority (n = 2, 1%).

The respondents were asked to give their personal opinions about how they felt about traditional Tswana foods. A number of responses were given and these were grouped into the following positive attributes as revealed by the results: 66% (n = 159) of the responses indicated that traditional foods are healthy and nutritious; 50% (n = 121) liked traditional Tswana foods because they are tasty, appealing and appetizing; and 32% (n = 78) of the positive responses related to cultural heritage. Negative comments were also found as 20% (n = 49) of the respondents disliked traditional Tswana food and had a negative attitudes towards it. Some responses, 16% (n = 38), related to availability, affordability and the fact that they are easy to cook.

The next section reports on the results of objective 2 that concerned the extent to which the respondents consumed traditional Tswana foods, snack and fast foods. The results related to these three groups will be discussed in this order with reference to the familiarity, food preferences and frequency of consumption.

5.6 FAMILIARITY, PREFERENCE RATING AND FREQUENCY OF CONSUMPTION OF TRADITIONAL TSWANA FOODS

The extent to which traditional (indigenous) Tswana foods were still included in the eating patterns of the study group was further measured. Traditional Batswana foods were listed and the respondents were asked to indicate the familiarity, preference and frequency of consumption for each food item.

A selected total of 57 traditional Batswana foods, were listed and grouped into eight groups. These included cereal and cereal products, melon dishes, legumes, indigenous vegetables, indigenous fruits, roots, meat as well as insects. Respondents first had to decide if they were familiar with and had eaten a food item. Only those foods that had been eaten were evaluated on a five–point hedonic Likert-type rating scale, where 1 represented “dislike it very much” and 5 “like it very much”, to indicate their preference rating. The respondents also had to indicate their frequency of consumption of each food item by marking how often it was consumed i.e. daily, 3-4 times per week, one time per week, less than three (<3) times a month or on special occasions. The results on the preference rating and frequency of consumption reflect only those of the respondents who were familiar with the food items.

Further calculations were done to rate the respondents’ preferences for traditional foods. The median and mode values were calculated to indicate the preference rating of each food item, as either a low, neutral or high preference item. Smirnoff, Lillefors and Shapiro-Wilk tests for normality were done to compare the distribution of the responses

to a normal distribution. This was done to check whether the distribution of the responses differed from a normal distribution. The results, however, confirm that for traditional foods a negative skewed distribution was obtained for food items' disliked' to 'dislike very much', whereas a positive skewed distribution was obtained for traditional food items 'liked' to 'like it very much'. The majority of the traditional foods did not display normal distributions (an indicator of a neutral preference food item). Preference ratings were therefore grouped as high, neutral and low; high preference is denoted by three asterisk (***), neutral preference by two asterisk (**) and a low preference rating by one asterisk symbol (*).

5.6.1 Cereal and cereal products

Cereal and cereal products included cereal porridges prepared from either maize, sorghum or millet and other traditional dishes from cooked cereal grains prepared from maize and sorghum.

5.6.1.1 **Cereal porridges**

Table 5.6 presents the respondents' familiarity, preference ratings and frequency of consumption of traditional cereal porridges.

Familiarity. The results show that, the majority ≥ 90% of respondents were familiar with cereal porridges prepared from the staple grains, maize and sorghum, namely stiff sorghum porridge (*bogobe ja mabele*), sorghum soft porridge (*motogo wa mabele*), sour sorghum porridge (*ting- mabele*) and stiff maize meal porridge (*phaletshe*/pap). All respondents were familiar with sorghum porridge, however, 4.55% (n = 11) had never eaten it. A large number indicated that they had never eaten millet (*lebelebele*) and sorghum porridge cooked with fresh milk (*logala/nthiane*), as 20.08% (n = 48) and 19.09% (n = 46) of the respondents respectively indicated this.

Preference rating. The majority of the respondents gave the cereal porridges a high preference rating. The exceptions were stiff sorghum porridge, millet porridge and soft maize meal porridge. Stiff sorghum porridge was rated as a neutral preference item, and millet and soft maize meal porridges as low preference food items.

Frequency of consumption . As a staple food *phaletshe* (maize meal porridge) was consumed frequently as most (43.58%, n = 95) indicated that they consumed it 3-4 times a week, 32.57% (n = 71) did so on a daily basis and 13.76% once a week. The other staple grain, sorghum was similarly often consumed as stiff, soft and sour sorghum porridges at least once a week by a large percentage of the respondents as 48%, 74% and 65% of the respondents respectively indicated this. Melon porridge (*bogobe ja*

lerotse / thopi), millet porridge (*lebelebele*) and maize or sorghum porridge cooked with fresh milk (*logala/nthiane*) were more often consumed at special occasions as 57.92% (n = 117), 50% (n = 77) and 48.05% (n = 74) of the respondents respectively indicated that, they consume these dishes only at special occasions.

TABLE 5.6: FAMILIARITY, PREFERENCE RATING AND FREQUENCY OF CONSUMPTION OF CEREAL PORRIDGES

	Familiarity		Preference			Frequency of consumption				
	Unknown	Never eaten	Median	Mode	Rating	Daily	3-4 x per week	1 x per week	<3 x per month	Special occasions
Stiff sorghum porridge *(bogobe ja mabele)*	_	4.55	3	3	Neutral **	3.38	13.53	30.92	30.92	21.26
Sorghum soft porridge *(motogo wa mabele)*	0.41	4.15	4	4	High ***	15.09	28.3	30.66	21.23	4.72
Sour sorghum porridge *(ting)*	1.24	11.98	4	4	High ***	17.2	23.66	24.19	25.27	9.68
Millet porridge *(lebelebele)*	4.6	20.08	3	1	Low *	3.25	6.49	16.88	23.38	50
Stiff maize meal porridge *(phaletshe)*	0.42	0.84	4	4	High ***	32.57	43.58	13.76	8.26	1.83
Soft maize meal porridge *(motogo wa mabele)*	1.24	14.94	2	1	Low *	4.85	7.27	25.45	49.7	12.73
Melon porridge *(bogobe ja lerotse)*	3.31	6.61	4	5	High ***	1.49	3.96	12.87	23.76	57.92
Sorghum porridge cooked with fresh milk *(logala/nthiane)*	9.96	19.09	4	5	High ***	3.25	8.44	9.74	30.52	48.05

Cereals/grains. Table 5.7 presents the results on the familiarity, preference rating and frequency consumption of dishes prepared from cereal grains.

Familiarity. With the exception of two dishes prepared from dried maize and sorghum the majority of the respondents were familiar with and had eaten the dishes prepared from them. Both cooked dried maize kernels and beans (*lechotlho la dinawa*) and

TABLE 5.7: FAMILIARITY, PREFERENCE RATING AND FREQUENCY OF CONSUMPTION OF CEREAL GRAINS

	Familiarity		Preference			Frequency of consumption				
	Unknown	Never eaten	Median	Mode	Rating	Daily	3-4 x per week	1 x per week	<3 x per month	Special occasions
Fresh mealies *(mmidi)*	0.83	4.13	4	5	High ***	3.7	8.8	16.67	33.33	37.5
Cooked Samp *(setampa)*	0.42	1.67	3	4	High ***	2.34	13.08	28.5	25.7	30.37
Samp and beans *(setampa le dinawa/dikgobe)*	-	3.32	4	4	High ***	3.7	19.44	27.31	28.7	20.83
Cooked dried maize kernels and beans *(lechotho la dinawa)*	25.62	27.69	3	3	Neutral **	4.9	1.96	6.86	30.39	55.88
Maize kernels *(kabu)*	8.82	18.91	3	4	High ***	2.6	3.25	5.19	29.22	59.74
Cracked cooked sorghum grains *(mosuthwane)*	20.66	26.86	3	1	Low *	2.75	2.75	4.59	32.11	57.8

cracked cooked sorghum grains (*mosuthwane*) were unknown to 25.62% (n = 62) and 20.66% (n = 50) of the respondents respectively. A large percentage of the respondents similarly indicated that they had never eaten these two dishes as 27.69% (n = 67) and 26.86% (n = 65) respectively. Fresh mealies, samp and samp and beans and maize kernels were familiar to ≥ 91% of respondents and ≥ 81% had eaten it.

Preference rating. Fresh mealies (*mmidi*), cooked samp (*setampa*), samp and beans (*setampa le dinawa / dikgobe*) and maize kernels (*kabu*) were all rated high preference items. Cooked dried maize kernels and beans (*lechotho la dinawa*) was rated a neutral preference item and cracked sorghum grains (*mosuthwane*) a low preference item.

Frequency of consumption. The staple maize continues to be widely consumed. Understandably fresh mealies, due to their seasonal availability, was indicated by most (n = 81, 37.5%) of the respondents as eaten on special occasions. Although cooked samp and samp and beans were consumed at least once a week by 41.58% and 46.75% of the respondents respectively, a large percentage of the respondents only consumed them on special occasions. Cooked dried maize kernels

and beans (*lechotho la dinawa*), maize kernels (*kabu*) and cracked sorghum grains (*mosuthwane*) were consumed by the majority of the respondents either less than three times a month or only on special occasions, 55.88% (n = 57) and 57.8% (n = 63) respectively indicated that they also consume this food items on special occasions.

5.6.2 Melon and melon dishes

Table 5.8 presents results for familiarity, preference and frequency consumption of melon and melon dishes.

TABLE 5.8: FAMILIARITY, PREFERENCE RATING AND FREQUENCY OF CONSUMPTION OF MELON AND MELON DISHES

	Familiarity		Preference			Frequency of consumption				
	Unknown	Never eaten	Median	Mode	Rating	Daily	3-4 x per week	1 x per week	<3 x per month	Special occasions
Small melons *(makgomane)*	4.96	13.64	4	4	High ***	2.22	2.78	10.56	42.22	42.22
Dried melon strips *(longangale)*	22.36	46.84	3	1	Low *	8.33	3.33	6.67	28.33	51.67
Melon and beans with fresh milk *(legodu la dinawa)*	35.12	38.84	3	1	Low *	1.82	3.64	7.27	38.18	49.09

Familiarity. Although small melons (*Makgomane*) were familiar to the respondents, dried melon strips (*longangale*) and the dish prepared from melon and beans (*legodu la dinawa*) were unknown to 22.36% (n = 53) and 35.12% (n = 85) of the respondents respectively.

Preference rating. Only small melons were rated as a high preference item. Dried melon strips and melon and beans received a low preference rating.

Frequency of consumption . Melons and melon dishes such as melon and beans (*legodu la dinawa)* were consumed by the majority of the respondents fewer than three times a month and on special occasions only, probably due to the natural seasonality of melons.

5.6.3 Legumes

Table 5.9 presents the results of the familiarity, preference rating and frequency of consumption of legumes.

Familiarity. The majority of the respondents were familiar with the legumes listed and have eaten them. The exception was mung beans (*letlhodi*) also known as China beans which was unfamiliar to 27.92% (n = 67) of the respondents and had never been eaten by 34.17% (n = 82).

Preference rating All legumes and legume dishes received a high preference rating.

TABLE 5.9: FAMILIARITY, PREFERENCE RATING AND FREQUENCY OF CONSUMPTION OF LEGUMES

	Familiarity		Preference			Frequency of consumption				
	Unknown	Never eaten	Median	Mode	Rating	Daily	3-4 x per week	1 x per week	<3 x per month	Special occasions
Black eye beans/cowpeas *(dinawa tsa Setswana)*	3.73	9.54	3	4	High ***	2.6	8.85	16.67	39.06	32.81
Sugar beans *(dinawa)*	2.07	7.44	4	4	High ***	2.94	9.31	18.63	44.61	24.51
Mung beans/china beans *(lethodi)*	27.92	34.17	3	4	High ***	3.7	7.41	11.11	30.86	46.91
Jugo beans *(ditloo)*	3.32	4.56	4	4	High ***	0.96	4.31	10.53	44.98	39.23
Groundnuts *(manoko)*	0.83	2.92	5	5	High ***	7.31	12.33	15.07	42.47	22.83

Frequency of consumption. Most of the respondents indicated that they consumed legumes less than three times a month or only on special occasions. A consumption frequency of less than three times a month was revealed by 39.06% (n = 75) of the respondents for cowpeas, 44.98% (n = 94) for jugo beans (*ditloo*), 44.61% (n = 91) for sugar beans (*dinawa*) and 42.47% (n = 93) for groundnuts (*manoko*). A large percentage of the respondents on the other hand, reported that they consumed mung beans

(*letlhodi*), jugo beans and cowpeas only at special events, as 46.91% (n = 38), 39.23% (n = 82) 32.81% (n = 63) respectively marked this option.

5.6.4 Traditional green leafy vegetables

Table 5.10 presents the results on the familiarity, preference rating and frequency of consumption of traditional green leafy vegetables.

TABLE 5.10: FAMILIARITY, PREFERENCE RATING AND FREQUENCY OF CONSUMPTION OF TRADITIONAL GREEN LEAFY VEGETABLES

	Familiarity		Preference			Frequency of consumption				
	Unknown	Never eaten	Median	Mode	Rating	Daily	3-4 x per week	1 x per week	<3 x per month	Special occasions
Bean leafy vegetable *(morogo wa dinawa)*	0.42	5	3	4	High ***	8.17	21.63	26.92	32.69	10.58
Bean leafy vegetable with groundnuts powder *(morogo wa dinawa ka manoko)*	5.39	21.16	3	5	High ***	5.23	9.8	16.99	27.45	40.52
Pumpkin leaves *(morogo wa lephutshi)*	19.5	44.4	2	1	Low *	2.86	1.43	15.71	28.57	51.43
Pig weed *(thepe)*	5	23.33	3	1	Low *	3.50	3.5	16.78	33.57	42.66
Spider flower *(rothwe)*	7.47	29.88	2	1	Low *	2.44	5.69	10.57	35.77	45.53
Jew's mallow plant *(delele)*	3.33	23.33	3	5	High ***	5.96	5.96	18.54	39.07	30.46

Familiarity. The majority (≥93%) of the respondents were familiar with the traditional green leafy vegetables listed with the exception of pumpkin leaves (*morogo wa lephutshi*). However, with the exception of bean leaves that were often eaten, many respondents (44%) had never eaten pumpkin leaves as vegetables.

Preference rating. Pig weed / *Amaranthus* (*thepe),* spider flower / *Cleomegynanda* (*rothwe) and* pumpkin leaves were rated as low preference. On the other hand, Jew's mallow plant / C*orchorus olitorius* (*delele*), bean leafy vegetable (*morogo wa dinawa*)

and bean leafy vegetable with groundnut (*morogo wa dinawa ka manoko*) were rated as high preference food items.

Frequency of consumption. Traditional green leafy vegetables are continually consumed. The frequency of consumption is however, not on a daily basis, as most of the respondents indicated that they consumed it less than three times a month or only on special occasions. The exception was bean leaves, where more than half of the respondents indicated that they consumed it at least once a week.

5.6.5 Root vegetables

Table 5.11 presents results for familiarity, preference and frequency consumption of root vegetables.

TABLE 5.11: FAMILIARITY, PREFERENCE RATING AND FREQUENCY OF CONSUMPTION OF ROOT VEGETABLES

	Familiarity		Preference			Frequency of consumption				
	Unknown	Never eaten	Median	Mode	Rating	Daily	3-4 x per week	1 x per week	<3 x per month	Special occasions
Sweet potatoes *(dipotata)*	-	2.48	5	5	High ***	7.89	11.84	15.79	44.3	20.18
Potatoes *(ditapole)*	-	0.42	5	5	High ***	27.51	29.69	19.21	17.03	6.55

Familiarity. All the respondents were familiar with the two root vegetables, sweet potatoes *(dipotata)* and potatoes *(ditapole)*. Only 2.48% (n = 6) of the respondents indicated that they had never eaten sweet potatoes.

Preference rating. Both root vegetables received high preference ratings.

Frequency of consumption . The majority (73%) of the respondents consumed potatoes more than once a week in comparison to 35% who consumed sweet potatoes at least once a week. Most (n = 101, 44.3%) of the respondents consumed sweet

potatoes less than three times a month or only at special occasion events (n = 46, 20.18%).

5.6.6 Indigenous fruits

Table 5.12 presents results for familiarity, preference and frequency consumption of indigenous fruits.

TABLE 5.12: FAMILIARITY, PREFERENCE RATING AND FREQUENCY OF CONSUMPTION OF INDIGENOUS FRUITS

	Familiarity		Preference			Frequency of consumption				
	Unknown	Never eaten	Median	Mode	Rating	Daily	3-4 x per week	1 x per week	<3 x per month	Special occasions
Watermelon *(legapu)*	0.41	7.85	4	5	High ***	3.5	8.5	11.5	37	39.5
Mimusops zeyheri (mmupudu)	19.92	38.17	4	5	High ***	2.2	2.2	7.69	38.46	49.45
Marula *(morula)*	1.26	14.23	3	3	Neutral **	3.55	2.96	9.47	40.24	43.79
Wild berry *(moretwa/mogwana)*	0.41	3.31	4	5	High ***	2.29	6.88	9.17	41.74	39.91
prickly pear *(motoroko)*	14.64	41.84	3	1	Low *	4.6	3.45	11.49	28.74	51.72
Wild oranges *(mogorogorwana)*	9.58	27.5	4	5	High ***	4.38	5.84	8.03	30.66	51.09
Wild medlar *(mmilo)*	10.37	23.24	4	4	High ***	5.33	2.67	6.67	39.33	46
Ximenia Caffra (Moretologa)	3.73	11.62	3	3	Neutral **	2.72	3.26	7.61	40.22	46.2
Azanza garkeana (Morojwa)	1.67	9.21	4	4	High ***	3.63	8.81	5.18	41.97	40.41

Familiarity. The indigenous fruits, Mimusops zeyheri, locally known as *mmupudu* and the wild cactus fruit / prickly pear (*motoroko*) were unfamiliar to 19.92% (n = 48) and 14.64% (n = 35) respondents respectively. A large percentage of the respondents

indicated that they had never eaten wild cactus fruit (n = 100, 41.84%), while 38.17% (n = 92) revealed to have never eaten *mmupudu*.

Preference rating. The majority of indigenous fruits listed received a high preference rating, with the exception of marula (*morula*), *moretologa* (*Ximenia caffra*) and wild cactus fruit (*motoroko*) that were rated as neutral and a low preference fruit respectively.

Frequency of consumption. Indigenous fruits continued to be consumed when in season. The majority of the respondents reported that they consumed them less than three times a month or on special occasions.

5.6.7 Meat

Table 5.13 presents results for familiarity, preference and frequency consumption of meat.

TABLE 5.13: FAMILIARITY, PREFERENCE RATING AND FREQUENCY OF CONSUMPTION OF MEAT

	Familiarity		Preference			Frequency of consumption				
	Unknown	Never eaten	Median	Mode	Rating	Daily	3-4 x per week	1 x per week	<3 x per month	Special occasions
Beef *(nama ya kgomo)*	-	2.07	4.5	5	High ***	40.79	32.46	11.84	10.96	3.95
Mutton/lamb *(nama ya nku)*	1.67	33.89	4	4	High ***	4.39	7.97	13.04	20.29	54.35
Goat meat *(nama ya podi)*	-	6.72	4	4	High ***	5.37	8.78	16.59	32.20	37.07
Biltong *(digwapa)*	-	5.44	4	5	High ***	5.61	7.48	17.76	39.25	29.44
Pounded meat *(seswaa/chotlho)*	-	1.24	5	5	High ***	5.98	13.68	17.09	22.65	40.6

Familiarity. The majority of the respondents were familiar and had eaten meat such as beef, goat meat, biltong (*segwapa*) and pounded meat (*seswaa/chotlho*). A third of the respondents (n = 81, 33.89%) indicated that they had never eaten mutton/lamb (*nama ya nku*).

Preference rating. All the meat listed, received a high preference rating.

Frequency of consumption. The majority of the respondents indicated that they consumed beef (*nama ya kgomo*) daily (n = 93, 40.79%) and three to four times a week (n = 74, 32.46%). The other meat such as mutton / lamb (*nama ya nku*), pounded meat (*seswaa / chotlho*), goat meat (*nama ya podi*) and biltong were consumed by the majority of the respondents less than three times a month or on special occasions, as 54.35% (n = 75) respondents marked this option for mutton/lamb, 40.6% (n = 95) for pounded meat, 37.07% (n = 76) for goat meat and 29.44% (n = 63) for biltong respectively.

5.6.8 Chicken and offal

Table 5.14 presents results for familiarity, preference and frequency consumption of chicken and chicken offal.

TABLE 5.14: FAMILIARITY, PREFERENCE RATING AND FREQUENCY OF CONSUMPTION OF CHICKEN AND CHICKEN OFFAL

	Familiarity		Preference			Frequency of consumption				
	Unknown	Never eaten	Median	Mode	Rating	Daily	3-4 x per week	1 x per week	<3 x per month	Special occasions
Tswana chicken[8] *(koko ya Setswana)*	-	3.75	4	5	High ***	8.26	11.47	15.6	39.45	25.23
Chicken feet *(menoto)*	-	7.47	4	5	High ***	6.13	18.87	23.11	35.85	16.04
Chicken heads *(dithogo tsa dikoko)*	-	23.75	2	1	Low *	3.36	9.40	24.83	38.93	23.49
Chicken necks *(melala)*	-	7.95	4	4	High ***	5.26	10.05	26.79	44.02	13.88
Chicken intestines *(mala a koko)*	-	18.41	4	5	High ***	5.56	16.11	19.44	38.89	20.00
Chicken gizzards *(dintshu)*	-	10.42	4	5	High ***	5.47	12.44	25.87	42.29	13.93

[8] *Tswana* chicken in this context means a free range chicken raised by Batswana people in their homes. It is locally known as *koko ya Setswana* (Botswana Tourism Board, 2009:7; Sydenham & Ron, 2007:1).

Familiarity. The majority of the respondents were familiar with chicken and chicken offal and had eaten it. However, some respondents indicated that they had never eaten certain of the chicken offal items. These were chicken heads (*Dithogo tsa dikoko*) indicated by 23.75% (n = 57) of the respondents, 18.41% (n = 44), for chicken intestines (*mala a koko*) 10.42% (n = 25), for chicken gizzards (*dintshu*), 7.95% (n = 19) for chicken necks (*melala*) and 7.47% (n = 18) for chicken feet (*Menoto*).

Preference rating. *Tswana* chicken and all the chicken offal items listed, with the exception of chicken heads, received a high preference rating. Chicken heads received a low preference rating.

Frequency of consumption. The majority of respondents consumed *Tswana* chicken and chicken offal items often, as more than 50% of the respondents marked that they either consumed it at least once a week or less than three times a month. A possible explanation might be that the majority still slaughter chicken when they have guests and have a special occasion to celebrate. Furthermore chicken offal items are widely available in the retail at an affordable price.

5.6.9 Beef offal

Table 5.15 presents results for familiarity, preference and frequency consumption of beef offal.

TABLE 5.15: FAMILIARITY, PREFERENCE RATING AND FREQUENCY OF CONSUMPTION OF BEEF OFFAL

	Familiarity		Preference			Frequency of consumption				
	Unknown	Never eaten	Median	Mode	Rating	Daily	3-4 x per week	1 x per week	<3 x per month	Special occasions
Liver *(sebete)*	0.41	2.89	5	5	High ***	9.25	15.86	31.28	27.75	15.86
Tripe *(serobe)*	-	5.81	5	5	High ***	5.53	7.37	15.21	28.57	43.32
Pancreas *(lebete)*	3.73	29.05	3	5	High ***	2.07	5.52	17.24	24.83	50.34
Lungs *(makgwafu)*	4.15	46.06	2	1	Low *	6.00	7.00	11.00	26.00	50.00
Intestines *(mala a kgomo/nku/podi)*	0.83	18.18	3	4	High ***	2.79	3.91	10.06	35.75	47.49

Familiarity. The majority of the respondents were familiar with the beef offal items listed. Although the majority of the respondents had eaten most of items, this was not so for pancreas and lungs. Those respondents who have never eaten these, were 46.06% (n = 111) for pancreas (*lebete*) and 29.05% (n = 70) for lungs (*makgwafu*) respectively.

Preference rating. With the exception of lungs, all the beef offal items were rated high preference items. Lungs were rated as low preference.

Frequency of consumption. Liver was consumed often, as 31.28% (n = 71) and 27.75 % (n = 63) of the respondents indicated that they consumed it once a week and less than three times a month respectively. For the rest of the beef offal items the majority of the respondents marked that they consumed them on special occasions.

5.6.10 Insects

Table 5.16 presents results for familiarity, preference and frequency consumption of insects.

TABLE 5.16: FAMILIARITY, PREFERENCE RATING AND FREQUENCY OF CONSUMPTION OF INSECTS

	Familiarity		Preference			Frequency of consumption				
	Unknown	Never eaten	Median	Mode	Rating	Daily	3-4 x per week	1 x per week	<3 x per month	Special occasions
Mopane worms *(phane)*	0.42	14.17	4	5	High ***	8.2	4.37	15.30	44.26	27.87
Locusts *(tsie)*	22.18	70.71	2	1	Low *	-	33.33	16.67	-	50.0

Familiarity. The majority of the respondents were familiar with locusts (*tsie*) and mopane worms (*phane*), although a number of respondents (n = 53, 22.18%) were not familiar with locusts.

Preference rating. Mopane worms were rated a high preference and locusts a low preference item.

Frequency of consumption. Most (n = 8, 44.26%) of respondents indicated that they consumed mopane worms less than three times a month and on special occasions (n = 51, 27.87%).

5.7 FAMILIARITY, PREFERENCE RATING AND FREQUENCY OF CONSUMPTION OF FAST AND SNACK FOODS

As part of the second objective the familiarity, preference rating and frequency of consumption of fast and snack foods were also determined in the same manner as explained for traditional Tswana foods (see 5.6).

5.7.1 Fast foods and savoury snacks

Table 5.17 presents results for the familiarity, preference rating and frequency consumption of fast foods and savoury snacks.

Familiarity. The majority (≥97%) of the respondents were familiar with the fast foods listed. The majority (≥89%) of the respondents indicated that they had eaten these foods. The exception was hamburgers, as 18.26% (n = 44) revealed that they had never eaten them. The majority of the respondents were also familiar with and have eaten savoury snacks although 23.24% (n = 56) and 14.58% (n = 35) of the respondents respectively indicated that they had never eaten savoury biscuits, cheese curls and/or cheese puffs.

Preference rating. All the fast foods and savoury snacks listed, received high preference ratings, except for savoury biscuits which received a neutral preference rating.

Frequency of consumption . The consumption of fast foods was indicated by ≤ 9% and <7% of the respondents as daily and 3-4 times a week respectively. The majority of the respondents reported that they consumed these less than three times a month. Nearly a quarter (n = 55, 23.5%) of the respondents consumed potato chips daily, in comparison to other savoury snacks. Nuts were consumed less than three times a month by 36.74% (n = 79) of the respondents and savoury biscuits on the other hand were consumed mostly at special occasions as indicated by 37.42% (n = 58) of the respondents.

TABLE 5.17: FAMILIARITY, PREFERENCE RATING AND FREQUENCY OF CONSUMPTION OF FAST FOODS AND SAVOURY SNACKS

	Familiarity		Preference			Frequency of consumption				
	Unknown	Never eaten	Median	Mode	Rating	Daily	3-4 x per week	1 x per week	<3 x per month	Special occasions
Fast foods										
Meat pie	1.65	10.33	4	4	High ***	7.84	10.78	22.55	43.63	15.20
Hamburger	2.49	18.26	4	4	High ***	3.24	7.03	22.16	39.46	28.11
Hot dog	0.83	7.50	4	5	High ***	8.96	9.91	23.11	34.91	23.11
Deep fried fish & chips	–	–	5	5	High ***	8.76	16.59	29.03	29.95	15.67
Russian and chips	0.42	3.75	5	5	High ***	7.59	16.52	32.14	31.70	12.05
Pizza	–	–	5	5	High ***	6.05	10.23	20.00	36.28	27.44
Savoury snacks										
Nuts	1.25	5	4	5	High ***	11.63	15.81	20.47	36.74	15.35
Potato chips / crisps	–	–	5	5	High ***	23.5	23.08	26.5	20.94	5.98
Cheese curls, cheese puffs	2.08	14.58	4	5	High ***	13.9	14.97	24.06	27.27	19.79
Savoury biscuits	2.9	23.24	3	3	Neutral **	5.16	4.52	18.06	34.84	37.42

5.7.2 Baked products and sweets

Table 5.18 presents results for familiarity, preference and frequency consumption of baked products and sweets.

Familiarity. Cakes and confectionery were familiar to the majority of the respondents with the exception of a small number of respondents who had never eaten them, as less than 2% (n = 4) of the respondents had never eaten cakes and confectionery as well as biscuits and cookies. The majority of the respondents were familiar with sweets, candy, chocolates and chocolate bars. A very small percentage indicated that sweets and candy

(n = 3, 1.24%); chocolates and chocolate bars (n = 3, 1.24%) had never been eaten by them.

TABLE 5.18: FAMILIARITY, PREFERENCE RATING AND FREQUENCY OF CONSUMPTION OF BAKED PRODUCTS AND SWEETS

	Familiarity		Preference			Frequency of consumption				
	Unknown	Never eaten	Median	Mode	Rating	Daily	3-4 x per week	1 x per week	<3 x per month	Special occasions
Baked products										
Cakes and confectionery	0.42	1.67	5	5	High ***	8	9.78	17.78	25.78	38.67
Biscuits, cookies	_	2.07	5	5	High ***	19.57	23.91	23.48	22.17	10.87
Sweets										
Sweets, candy	0.41	1.24	5	5	High ***	55.22	13.91	13.91	12.17	4.78
Chocolates, chocolate bars	0.41	1.24	5	5	High ***	19.48	24.24	22.51	20.78	12.99

Preference rating. All the baked products and sweets received a high preference rating.

Frequency of consumption . Most (n = 87, 38.67%) of the respondents consumed cakes and confectionery at special occasions. The frequency of consumption of biscuits and cookies was indicated by 19.57% (n = 45) of the respondents as daily, with 23.91% (n = 55) who mentioned 3-4 times a week and 23.48% (n = 54) once a week. Sweets and candy were marked by the majority of the respondents (n = 127, 55.22%) as consumed daily whereas chocolates and chocolate bars were consumed by 24.24% (n = 56) respondents 3-4 times a week.

5.7.3 Dairy products, beverages and fruits

Table 5.19 presents results for familiarity, preference and frequency consumption of dairy products, beverages and fruits.

TABLE 5.19: FAMILIARITY, PREFERENCE RATING AND FREQUENCY OF CONSUMPTION OF DAIRY PRODUCTS, BEVERAGES AND FRUITS

	Familiarity		Preference			Frequency of consumption				
	Unknown	Never eaten	Median	Mode	Rating	Daily	3-4 x per week	1 x per week	<3 x per month	Special occasions
Dairy products										
Yoghurt, yogi sip	0.42	4.58	5	5	High ***	12.62	21.5	25.23	33.18	7.48
Milkshakes	0.83	22.92	4	5	High ***	6.18	10.67	17.42	34.27	31.46
Ice cream	_	2.07	5	5	High ***	12.17	17.83	23.04	34.35	12.61
Dairy fruit beverages	1.24	19.92	4	5	High ***	9.73	16.22	24.86	27.57	21.62
Beverages										
Fruit juice	_	2.89	5	5	High ***	18.86	26.32	26.32	22.37	6.14
Fizzy drinks	_	0.83	4	5	High ***	16.09	26.52	26.52	20.43	10.43
Fruits	_	0.83	5	5	High ***	28.76	18.45	26.18	22.32	4.29

Familiarity. Dairy products listed as snack food included yoghurt and yogi-sip, milkshakes, ice cream and dairy fruit beverages (e.g Tropica). The majority of the respondents were familiar with these dairy products except for the 22.92% (n = 55) and 19.92% (n = 48) of the respondents who mentioned that they had never drunk milkshakes and dairy fruit beverages respectively.

The majority of respondents were familiar with fruit juice and fizzy drinks. With the exception of 2.89% (n = 7) and 0.83% (n = 2) of respondents who indicated that they had never consumed fruit juice and fizzy drinks respectively. With the exception of two respondents (0.83%), all respondents indicated that they were familiar and they had eaten fruit.

Preference rating. All dairy products, fruit juice and fizzy drinks received high a preference rating. The fruits were also rated as high preference food items.

Frequency of consumption. All the dairy products listed were consumed by the majority of respondents less than three times a month, as snack food.

Most of the respondents (26.32%, n = 60), consumed fruit juices 3-4 times a week or once a week and (n = 43, 18.86%) did so daily. Fizzy drinks were consumed by just over a quarter (n = 61, 26.52%) of the respondents either 3-4 times a week or at least once a week. This implies that more than half of the respondents consumed fizzy drinks at least once a week.

The frequency of consumption of fruit by the respondents is again reported as low, as only 28.76% (n = 67) of the respondents consumed them daily, 18.45% (n = 43) consumed them 3-4 times a week, another 22.32% (n = 52) < 3 times a month, and 4.29% (n = 10) respondents on special occasions only.

The next section report on the results of food avoidances which were also determined as part of the second objective.

5.8 FOOD AVOIDANCE

As in many other cultures of the world the Batswana also avoid certain foods for various reasons (Maruapula & Chapman-Novakofski, 2007; Demissie, Muroki & Kogi-Makau, 1998). A list of foods that some people commonly avoid was given and the respondents were requested to mark those they avoided and give the reason(s) for doing so. The following food items, namely; pork/bacon, mutton/lamb, polony, fish, eggs and caterpillar/mopane worms (*phane*) were listed and the respondents had to mark if they avoid them and give the reason(s) for avoiding them. An option other (please specify) was also given.

Reasons given for not eating certain food items were varied and the responses were grouped according to the following reasons: religious, health, cultural, vegetarian, sensory attributes (taste, texture, smell/odour), and lastly dislike and unfamiliar (never eaten). This was done in order to critically analyse why each food item was avoided by some members of this study group.

Figure 5.23 shows the foods generally avoided and the reasons for avoiding each of them.

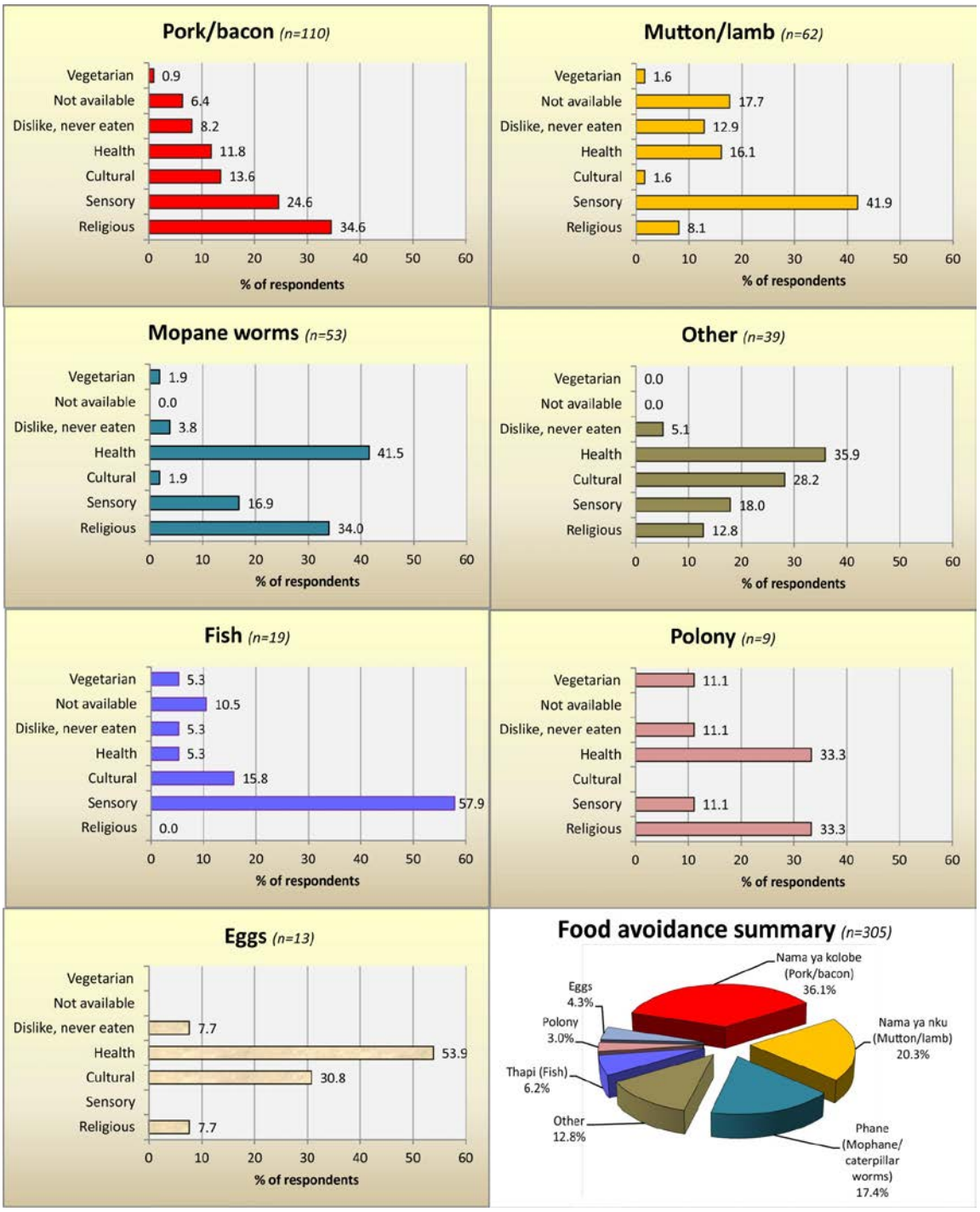


FIGURE 5.23: FOOD AVOIDANCE

The results showed that 34.6% (n = 38) of the respondents avoided pork/bacon and they gave their Christian religious belief as the reason. Another group (n = 27, 26%) did not eat pork/bacon for its sensory attributes, specifically how it smells. Mutton/lamb was avoided by 41.9% (n = 26) respondents who gave sensory characteristics as reason. On the other hand, mutton/lamb was also avoided by some for health and medical reasons. This was indicated by 16.1% (n = 10) while 17.7% (n = 11) stated that it was not

available in their homes hence its avoidance can be attributed to the fact that it was never bought or cooked in their homes. This relates to unfamiliarity, although there were those 12.9 % (n = 8) respondents who disliked mutton/lamb and never ate it.

A small group of respondents (n = 18, 34%) avoided mopane worms and they did so because of their Christian religious beliefs similar to those who avoided pork/bacon. Mopane worms was also avoided for health and medical reasons (41.5%, n = 22) and 16.9% (n = 9) avoided them because of their sensory attributes, specifically textural qualities and appearance.

Health and medical reasons and religion were indicated by 33.3% (n = 3) as the main reason for avoiding polony. Of all the food items listed vegetarian respondents avoided polony (n = 7, 11.11%) and fish (n = 5, 5.3%). For the other food items, vegetarian as reason for food avoidance was not mentioned. The majority (57.9%, n = 11) who did not eat fish gave its sensory attributes and specifically its strong smell as the reason.

Eggs were avoided mainly for health and medical reasons such as allergies or some irritation that develops after eating eggs and some of the respondents did not eat eggs for cultural reasons. The cultural reason relates to the belief that when eggs are eaten by young girls they will reach puberty at an early age, and therefore the consumption of eggs by young girls was a taboo (Maruapula & Chapman-Novakofski, 2007; Demissie *et al.,* 1998).

Other foods avoided by the respondents were liver, garlic, mushrooms, chicken and watermelon. They were mainly avoided for health and medical reasons (n = 14, 35.9%) and cultural beliefs (n = 11, 28.2%). Haram was noted as part of the food avoidances mentioned by the Muslim respondents.

It is of interest to note, as part of the eating patterns of the study group, that they adhere to certain food restrictions and do so for specific reasons. Cultural and religious beliefs were responsible for avoiding certain foods. Cultural ideology thus continues to influence the lives of some people on what to eat and what not to eat. In most of these cases, they clearly practised certain traditional customs faithfully. On the other hand, the influence of the church is also strong regarding certain food restrictions that are enforced. Some Christian churches require their members to abandon or distance themselves from the traditional food beliefs. Botswana is a Christian country where freedom of religion is provided for in the constitution, and this right is generally respected in practice. Other religions in the country are in the minority (http://www.everyculture.com/Bo-Co/B). Cultural, religious, health and sensory attributes were the main reasons given for the

avoidance of the listed food items namely, eggs, pork, bacon, mutton/lamb and mopane worms.

It was evident that the majority of respondents avoided pork/bacon because of their religious beliefs. It is noteworthy to point out that sometimes Christianity and the traditional belief system seem to stand out as contradicting each other, and in other instances, they tend to operate in accord with each other. On the other hand, some churches seemed to allow these practices as they have incorporate ancestral veneration in their liturgy. In this regard Pauw (1974:431) mentions the syncretism of certain African traditions with those of the Baptist and Pentecostalism beliefs and practices. This is the case in some of the Zionist type of churches who make exceptions to some food rules that enforce such as ones related to ancestral veneration. This is illustrated in the following quotation: “Pork is not eaten by the Zionists [ZCC] and the Apostolics (Pauw, 1974:431). Traditional beer is used and drunk by the Apostolics, but the ZCC adherents can use traditional beer to communicate with the ancestors but they are not allowed to drink it”. Mopane worms and eggs were avoided for health and medical reasons such as allergies or some irritation or discomfort that develops after they have been consumed. Eggs were also avoided for cultural reasons as explained. On the other hand mopane worms and mutton/lamb were avoided for sensory reasons. Reasons for avoiding mopane worms were particularly related to their texture or appearance.

The next objective, namely objective 3 deals with the study group’s food choices in different contexts or situations and what they perceived to be appropriate food choices in each. Contexts or situations related to the family; when in the company of friends or the peer group; when experiencing time constraints; when seeking variety; when something quick and easy or nutritious is sought and when having guests or at special occasions. These were determined for both traditional and modern or Western-orientated foods. Respondents were requested to indicate for each of the listed food items, the situation(s) or context(s) within which they would choose to eat the specific food item. (See Addendum A questionnaire section D).

5.9 FOOD CHOICE PERCEPTIONS/EXPERIENCES IN DIFFERENT CONTEXTS AND SITUATIONS

The study group’s food choice associated with different contexts or situations when traditional Tswana foods are selected and consumed are presented first, followed by different contexts or situations applicable to modern or Western-orientated foods. Table

5.20 below presents results on appropriate contexts or situations for the choice and consumption of cereals.

What stands out in the cereal category as part of traditional foods is that all cereal porridges and cooked cereal grains were consumed within the context of family regularly as part of their daily lives. This is a dominant trend supported by the data. However, 20% and more of the respondents also regarded some cereal dishes such as melon porridge (*Bogobe ja lerotse),* maize/ sorghum cooked with milk (*Logala/nthiane*), samp and beans (*Setampa le dinawa/dikgobe/lechotlho*), cooked samp (*setampa*), and cracked sorghum grains (*Mosuthwane*) as appropriate choices for special occasions.

TABLE 5.20: CONTEXTS OR SITUATIONS OF CONSUMPTION OF CEREALS

	CONTEXTS and SITUATIONS							
	Family	Friends and peers	Time constraints	Seek variety	Convenience (quick and easy)	Something nutritious	Guests	Special occasions
Cereal porridges								
Sorghum/millet porridge (Bogobe) Stiff maize meal porridge *(Phaletshe)* Fermented sorghum *(Ting)*	48.22	7.6	4.52	10.69	4.51	9.74	4.51	10.21
Melon porridge *(Bogobe ja lerotse)*	31.44	6.44	3.72	10.64	2.97	8.17	7.67	29.95
Maize/sorghum cooked with milk (*Logala/nthiane*)	29.41	9.21	6.14	10.74	5.88	6.65	6.65	25.32
Cereals/grains								
Samp and beans (*Setampa le dinawa/dikgobe/lechotlho)*	34.61	11.96	2.8	9.92	3.56	9.67	6.87	20.61
Cooked samp (*Setampa)*	33.58	11.69	4.48	11.44	4.48	8.46	4.73	21.14
Fresh mealies (*Mmidi*)	33.92	12.31	6.28	13.57	5.03	6.53	5.53	16.83
Cracked sorghum grains (*Mosuthwane*)	26.40	7.58	7.58	9.55	6.46	5.9	4.78	31.74

Table 5.21 presents results of the appropriate contexts or situations for the choice of indigenous green leafy vegetables, tubers, beans and fruits.

TABLE 5.21: CONTEXTS OR SITUATIONS APPROPRIATE FOR CONSUMING INDIGENOUS GREEN LEAFY VEGETABLES, TUBERS, BEANS AND FRUITS

	CONTEXTS and SITUATIONS							
	Family	Friends and peers	Time constraints	Seek variety	Convenience (quick and easy)	Something nutritious	Guests	Special occasions
Indigenous green leafy vegetables								
Rothwe, Thepe, Delele, Morogo wa dinawa, Morogo wa lephutshi	38.74	8.72	5.08	10.17	6.05	13.8	65.81	11.62
Tubers								
Sweet potatoes, potatoes	38.08	12.44	8.03	8.29	8.55	11.14	5.96	7.51
Beans								
Black eye beans, jugo beans, sugar beans, groundnuts	36.98	9.73	6.08	11.44	4.87	9.25	5.84	15.82
Indigenous fruits								
Morula, Mmilo, Moretologa, Moroja, Mogorogorwana, Moretlwa/ Mogwana	27.10	20.09	9.81	9.35	7.24	14.25	4.44	7.71
Watermelon (*Legapu*)	33.58	13.09	5.19	10.12	8.64	12.59	4.20	12.59

All indigenous green leafy vegetables such as *rothwe, thepe, delele, morogo wa dinawa and morogo wa lephutshi* were appropriate choices for consumption in the family context (38.74% of the responses). Likewise all types of beans (36.98%), the tubers (sweet potatoes and potatoes) (38.08%), indigenous fruits (27.1%), such as *morula, mmilo, moretologa, moroja, mogorogorwana, moretlwa and mogwana* and watermelon (33.58%) too, were dominant in the family eating situation. Interestingly traditional fruit and watermelon were also prominent choices in the consumption contexts of friends, and when wanting something nutritious to eat, although a smaller percentage of responses were given for these items.

Table 5.22 presents results for meat and beef offal consumption.

TABLE 5.22: CONTEXTS OR SITUATIONS APPROPRIATE FOR CONSUMING MEAT AND BEEF OFFAL

	CONTEXTS and SITUATIONS							
	Family	Friends and peers	Time constraints	Seek variety	Convenience (quick and easy)	Something nutritious	Guests	Special occasions
Meats								
Beef *(Nama ya kgomo)*	43.32	14.01	5.23	8.31	3.09	6.89	9.50	9.74
Biltong *(Digwapa)*	35.22	13.79	6.40	9.85	6.65	6.40	5.42	16.26
Mutton/lamb (*Nama ya nku)*	30.34	8.71	7.12	8.18	5.8	5.01	9.50	25.33
Goat meat (*Nama ya podi)*	35.98	8.19	4.96	9.68	4.71	7.44	8.68	20.35
Mopane worms/caterpillar (*Phane)*	37.94	8.79	6.53	10.3	8.29	7.29	5.28	15.58
Beef offal								
Liver (*Sebete*), Tripe *(Serobe),* Pancreas (*Lebete),* Lungs (*Makgwafu),* Intestines (*Mala a kgomo/ podi/ nku)*	38.46	9.62	6.49	11.06	5.53	9.86	5.05	13.94

All meats listed were regarded as appropriate for consumption in the family context and were rated highly in this context: beef (43.23%), followed by 37.94% for mopane worms, 35.98% for goat meat, 35.22% for biltong and 35.22% mutton. Beef offal such as liver (*sebete*), tripe *(serobe,* pancreas (*lebete),* lungs (*makgwafu)* and intestines (*mala a kgomo/podi/nku)* too received a high rating (38.46%) as being associated with family food consumption times. The other contexts associated with the consumption of beef offal received less than 10% of the responses. On the other hand, the majority of responses showed that meat such as biltong *(segwapa*), mutton/lamb *(nama ya nku),* goat meat *(nama ya podi)* and mopane worms *(phane)* were consumed on special occasions. Interestingly, beef *(nama ya kgomo)* only received 9.74% of the responses as food associated with special occasions. It can be assumed that because it is consumed by most respondents 3-4 times a week, it is not regarded as a food for special occasions by the majority.

Table 5.23 presents results for contexts or situations for chicken and chicken offal.

TABLE 5.23: CONTEXTS OR SITUATIONS APPROPRIATE FOR CONSUMING CHICKEN AND CHICKEN OFFAL

	CONTEXTS and SITUATIONS							
	Family	Friends and peers	Time constraints	Seek variety	Convenience (quick and easy)	Something nutritious	Guests	Special occasions
Chicken								
Koko ya Setswana (*Tswana* chicken)	37.13	9.41	4.95	8.91	5.20	5.45	14.11	14.85
Chicken offal and cuts								
Mala a koko (chicken intestines), *Dintshu* (gizzards), *Menoto* (chicken feet), *Dithogo tsa dikoko* (chicken heads), *Melala* (chicken necks)	39.52	12.77	5.78	11.81	7.23	6.99	4.58	11.33

Tswana chicken (*koko ya Setswana)* and chicken offal and cuts (37.13% and 39.52% respectively) were all regarded as appropriate for family meals. However, another context that received more than 10% was that of serving chicken and chicken offal and cuts to guests. On special occasions Tswana chicken was served and chicken offal and cuts was also eaten when with friends and on a variety of special occasions.

Respondents associated the consumption of traditional Tswana foods mainly with family contexts and situations. This confirms the close link between family and upholding traditions. The family is the most natural and common social group for transmitting norms, values and beliefs from one generation to another (Guerrero *et al*., 2010). In many societies one essential feature of living together is eating together. Family meals unite families and promote socialisation and social cohesion (Forthun, 2013; Cook & Dunifon, 2012; Makela, 2000:11-12). The family environment is important because, when sharing meals, children are socialised and learn about the beliefs and values of their culture through food; and hence a strong cultural identity is built up. It is also of interest to point out that in Botswana children learns traditional norms and values from the elders, and more specifically their grandmothers. Family traditions, such as the consumption of traditional food, starts at an early age by transmitting skills and methods of the preparation and serving of traditional foods which inculcates a sense of belonging or togetherness (Forthun, 2013; Cook & Dunifon, 2012). This is vital because it helps in linking children with past and present generations to thus provide continuity and security.

By so doing it gives all family members a sense of belonging and commitment (Guerrero *et al*., 2010; Guerrero *et al*., 2009).

Although some respondents did link the consumption of traditional food with special occasions, the family context appeared as the most frequent context associated with the consumption of traditional food which is not surprising. Although eating patterns are clearly changing, it is apparent that the family meal and consumption of traditional food continues to prevail in Botswana. It is evident that the importance of family meals and eating together as a family is still honoured. Even though change is taking place, it is not as drastic in Botswana as is reported in some other developing and sub-Saharan countries (Popkin *et al*., 2011; Bilman *et al*., 2010; Turrel & Giskes, 2008; Raschke *et al*., 2007; Jabs & Devine, 2006; Makela, 2000).

In the next part Western-orientated food choices (fast and snack foods) and consumption in different contexts or situations is presented. These were measured in a similar way as was done with traditional Tswana foods. Table 5.24 itemises these food choices as fast foods, snack foods, such as savoury snacks, baked products, sweets, dairy products, fruits and beverages.

Within the fast food group the following foods were listed; meat pie, hamburger, hot dog, deep fried fish and chips, Russian and chips and pizza. The majority of the responses indicated that respondents associated fast foods as an appropriate choice when with their friends and family. As could be expected they were also chosen when something quick and easy or convenient to eat was sought. These foods were, interestingly, not regarded as something nutritious or appropriate to serve to guests and on special occasions, as is reflected in the low response rate marked for these two situations.

The savoury snacks, such as nuts, potato chips/crisps, cheese curls, cheese puffs and savoury biscuits were primarily associated with friends and family, as well as when something quick and easy (convenient) to eat was needed. These foods were also not regarded as nutritious foods or as appropriate to serve to guests or on special occasions.

There was no doubt about baked products, such as cakes, confectionery and biscuits or cookies, being popular (97.29%, n = 342) in friends and family situations. It is interesting to note that only some regarded baked products as appropriate for serving to guests (14.25%, n = 13) or on special occasions (19.67%, n = 28), and they were few in number. Sweets such as chocolates, chocolates bars, sweets and candy were regarded as appropriate to be enjoyed mostly with friends, family and when they wanted something quick and easy to eat.

TABLE 5.24: CONTEXTS OR SITUATIONS APPROPRIATE FOR CONSUMING WESTERN-ORIENTATED FOODS

	CONTEXTS or SITUATIONS							
	Family	Friends and peers	Time constraints	Seek variety	Convenience (quick and easy)	Something nutritious	Guests	Special occasions
Fast foods								
Meat pie	15.3	41.55	10.73	5.94	12.56	3.2	5.71	5.02
Hamburger	13.4	35.41	11.24	5.02	16.75	5.5	5.98	6.7
Hot dog	12.92	38.28	11.72	7.42	13.88	4.78	4.55	6.46
Deep fried fish & chips	22.54	29.58	11.97	7.28	13.38	4.46	5.4	5.4
Russian & chips	18.96	34.36	12.56	6.64	14.22	4.98	4.27	4.03
Pizza	26.53	28.87	10.33	6.34	10.33	5.4	6.57	5.63
Savoury snacks								
Nuts	24.36	21.31	11.01	9.13	14.05	8.9	3.98	7.26
Potato chips / crisps	23.74	26.81	11.43	8.57	12.97	6.37	4.84	5.27
Cheese curls, cheese puffs	18.35	28.21	11.7	6.88	15.14	5.73	6.19	7.8
Savoury biscuits	15.26	21.13	9.62	9.15	12.91	8.45	7.28	16.2
Baked products								
Cakes & confectionery	20.99	26.41	9.03	8.8	11.74	3.16	7.22	12.64
Biscuits, cookies	20.41	29.48	10.43	6.58	13.83	5.22	7.03	7.03
Sweets								
Chocolates, chocolate bars	13.61	36.28	11.34	7.94	14.51	4.76	3.85	7.71
Sweets, candy	15.45	36.82	11.59	8.18	13.86	5	2.73	6.36
Dairy products								
Yoghurt, Yogi-sip	17.11	32.77	11.08	7.95	14.46	8.43	4.82	3.37
Milk shakes	19.72	31.42	9.86	6.42	11.93	7.34	4.59	8.72
Ice cream	16.9	36.34	8.8	5.56	14.58	5.79	5.56	6.48
Dairy fruit beverages(e.g Tropica, krush, Cabanna)	22.74	22.04	9.28	7.19	12.06	10.21	6.96	9.51
Fruits								
Fruits(e.g. grapes, oranges,pineapple, apples, banana)	26.9	18.39	10.8	7.36	12.87	12.41	6.44	4.83
Beverages								
Fruit juice (e.g mango juice, apple juice,fruit punch)	25.55	22.25	9.69	6.17	10.79	13.44	6.17	5.95
Fizzy drinks (e.g coke, Fanta, Sprite)	24.54	27.29	13.07	5.05	11.24	5.05	6.65	7.11

The majority of the respondents felt that the listed dairy products; ice cream yoghurt and yogi-sip and milk shakes, were mostly consumed when with their friends/peers and family. Family (26.9%) and friend (18.39%) contexts were most suitable for eating fruits such as grapes, oranges, pineapples, apples and bananas and when they wanted something quick and easy to eat (12.87%) or something nutritious (12.41%). A similar pattern emerged when enjoying fruit juices, such as mango juice, apple juice and fruit punch, in the family situation (25.55% of the responses). On the other hand, fruit juices were also appropriate when something nutritious was required (13.44%). Fizzy drinks (Coke, Fanta and Sprite) were regarded as appropriate to enjoy with friends, as 27.29% of the responses indicated. When experiencing time constraints, fizzy drinks were seen as appropriate, as mentioned by 13.07% of respondents.

Fast foods such as meat pies, hot dogs, deep fried chips, Russian and chips and pizzas were sold in the tuck shops of the schools who participated in the study (see 5.10 and Addendum I). This explains that the respondents had the opportunity to consume these items while at school with their peers/friends. As explained by Walet (2009:17) peers often determine adolescents' food intake which encompasses not only the type of food consumed, but the quantity, and where and when it is eaten as well. The individual's relationship with the peer group influences the food that is consumed. This shows willingness to conform to peer group pressure, as they are often seen in stores purchasing the same food items.

It is clear that most of the traditional foods were regarded as appropriate choices for consumption in the context of the family, whereas the consumption of Western-orientated foods (fast foods/convenience foods) was regarded by the majority as suitable in the context of friends. A small number of responses related them to seeking variety and nutrition (when they wanted something nutritious to eat). Batswana mid-adolescents seem to be influenced to include Western-orientated fast foods/convenience foods when in the company of friends or peers. However, traditional foods continue to be part of the food eaten in the family context.

The next section presents results that relate to objective 4, which deals with how the various external environments, the physical, the economic, the political and the socio-cultural environments contribute to the study group‘s food behaviour. An observation checklist (see Addendum B) was used to observe these external environments of the study group.

5.10 CONTRIBUTION OF EXTERNAL ENVIRONMENTS (PHYSICAL, ECONOMIC, POLITICAL AND SOCIO-CULTURAL) TO THE FOOD CHOICE BEHAVIOUR OF THE STUDY GROUP

The presentation of the external environments is according to the conceptual framework (Figure 4.1). The observation results about the school environment, which is part of the physical, economic, political and socio-cultural environments, are included.

5.10.1 Contribution of the physical environment to the food choice behaviour of the study group

The geographical location of Francistown and other information related to the physical environment given under point 5.2 to contextualise the study. Primarily it is the natural and built environments that contribute to what food is available and accessible for consumption.

5.10.2 Contribution of the economic and political environment to the food choice behaviour of the study group

Francistown, as a modern city, seems to have influenced, in some way or another, what the respondents ate. It's urban status affected their economic and political environments thereby influencing their choice of food. As one of the modern cities in Botswana, Francistown is well positioned as a commercial and cultural centre, having excellent road links to many places both internally and regionally. As a gateway, this city is a trading, transportation and communication hub in the northern region of Botswana with marked growth of its principal economic sectors, government, wholesaling, retailing and manufacturing being evident (Maundeni, 2005:8-9). All these developments have contributed to an increase in the number of shopping malls, fast food outlets, bakeries, butcheries and supermarkets as well as an increasing number of small businesses (spaza shops, informal convenience kiosks and street food vendors) who are actively selling food (Maundeni, 2005:13).

The natural environment of this city as well as its built environment, with its infrastructure, accounts primarily for what food is available, accessible and affordable for consumption (Maundeni: 2005:8). Similar to other cities, the people in Francistown have the opportunity to select from a wide variety of foods available at supermarkets, convenience and grocery stores (Freedman & Bell, 2009; Larson & Story, 2009).

5.10.3 Contribution of the socio-cultural environment on the food choice behaviour of the study group

The socio-cultural environment of the respondents played a role in the study group's consumption of food. What was considered acceptable and not acceptable to eat by the respondents in this study was influenced by respondents' socio-cultural environment to a large extent. As discussed in Chapter 2 (see 2.4.2) and Chapter 3 (see 3.22), it is during this lifestage when a person's food behaviour is largely influenced by their peers at school or in other social contexts (Sweetman & Ron, 2011:272; Gross *et al.,* 2010, 238; Peltzer & Pengpid, 2010; Larson & Story, 2009; Sheikh & Thomas, 1994).

The adolescent lifestage is the time when a person is increasingly influenced by their peers when making their own food choices. This observation was also evident in this study as confirmed by the results of the questions relating to eating patterns in the school environment. The school environment is part of the physical and social environment of the study group and was clear that the school environment contributed to the participants; food behaviour. In order to contextualise the influence of the school environment a brief explanation and description of the school meal programme and how it operates in Francistown school environments is given.

5.10.3.1 The school meal programme in Botswana

It is significant to note that in Botswana the government supports the school meal programme, which the Ministry of Education control and manages. The aim of the programme is to provide two meals a day to schoolchildren throughout the country. Similar to school meal programmes worldwide, the school meal programme in Botswana was introduced to provide nutritious meals to schoolchildren in order to improve their daily nutrient intake and to enhance their ability to concentrate and learn.

In order to provide these meals each school has a modern food service facility (kitchen and dining hall) that is well equipped with the necessary large-scale food preparation equipment such as large cooking pots, trolleys and equipment for serving a large number of meals in a short time to the learners (see Addendum F for photographs). The basic school meal menu is structured in such a way that breakfast should consist of bread and tea or a cold drink whereas, lunch should consist of a carbohydrate-rich dish, a legume, vegetable relish and meat and a fruit (BIDPA, 2011:2-4; Mosie, 2004:39-45).

5.10.3.2 School food environment

From observations at the participating schools it was determined that the school food environment consisted of not only the school meal programme but that tuck shops and informal street food vendors were also part of this environment. The contribution of each to the school food environment follows.

5.10.3.2.1 Contribution of school meal programme

Participation in the school meal programme was compulsory for all learners in each of the schools participating in this study. Since the Ministry of Education controls the programme, a similar pattern of implementation was observed in the three schools participating in this study, although small differences were noted and recorded.

Number of meals. Learners received two meals during the school day. The first meal served was during the mid-morning break at 10:00, popularly referred to as "*tea break"* in schools. The second meal was at 13:00 and referred to as "lunch". Apart from these two meals, learners also had the opportunity to buy and consume food items from the school tuck shop. Compulsory meals served in the school dining hall were free for all learners on weekdays at their respective schools. These meals were breakfast and lunch, but learners still had the opportunity to buy food at the school tuck shop.

Menu. In all the three participating schools, the same type of food was offered at "*tea break"*. Learners received funa[9] drink and bread with peanut butter or jam. Tea and bread with peanut butter or jam was the alternate. The weather determined what they ate during this mid-morning break as well as the type of food available at the school. Tea was served mostly during cold weather while funa[1] drink was served mostly in hot weather.

The school lunch meals consisted of a large portion of starch such as samp, rice or stiff maize meal porridge. A small portion of legumes, vegetable relish, soup[10] or meat (beef/chicken/canned fish) accompanied these starch dishes. In most cases, beef was served. Only one school served tinned fish as an alternative to these. Serving fruit and salads was not a common practice. A possible explanation for the lack of serving a fruit

[9] Funa is an assorted nutritional instant powdered fruit flavoured drink, easy to prepare by just mixing it with cold water supplied in Botswana at Government institutions such as schools and Botswana Defence Force (Motseta, 2013; Mosie 2004:5).

[10] Soup in this context is a mixed vegetable or beef instant powdered mix prepared with plain boiling water or in some instances, this mixture is enriched with addition of fresh vegetables such as potatoes, onions and tomatoes, which are cut in small pieces.

and salads could be that cost of meals was better controlled in some schools compared to others.

Serving. At all three schools, the serving of meals took place in dining halls, supervised by teachers on duty and the kitchen staff. The researcher paid careful attention to how the meals were served. In all three schools, prefects served meals to their classmates according to classes. Each class had two representatives (prefects) a boy and girl to dish up for the others.

Only one school had a well-organised setup for serving meals due to close cooperation between kitchen personnel, learners and teachers at this school where things ran smoothly during the serving of meals, which was done at the respective tables allocated for each class in the presence of kitchen personnel and teachers on duty. The dining hall was only opened for the rest of the learners to enter, after prefects had dished up equal portions on their plates. When entering the hall, learners took their respective seats at the allocated tables for their class. Immediately after settling everyone, one person stood up and prayed on behalf of the others before their meals were enjoyed.

The other two schools did not serve meals in an organised manner as the serving of the meals to the learners were not controlled or properly supervised. At both of these schools learners stood in a queue while prefects served them on their plates after which learners would take their seats at the tables in the dining hall or even eat outside the hall. In some instances, there were learners who were served meals more than once. They cheated, as instead of taking their share only, they would join the queue for the second time. At these two schools supervision was minimal, there was no portion control of the meals served and this resulted in poor allocation of the food available.

Low preference of food on menu. During the dining hall observations, the preference rating of the menu items served to the learners in each participating school was confirmed. The majority of learners preferred only rice, coleslaw salad and fried chicken in all the participating schools. Dishes such as cooked plain samp, mealie-rice, and samp mixed with beans scored a low preference rating. Observation demonstrated this as there is a low turnout for the meals when these items were on the menu. A firm conclusion was that the majority of the learners did not particularly like the menus offered. It was also clear that the school meal programme as currently practised in schools had certain shortcomings that should be addressed to improve the programme in order to achieve its initial aim and objectives.

The findings of this study support the conclusion that the food items offered by the school meal programme and those available from the food vendors do not contribute to

healthy eating practices. Thus, the school food environment has to change in order to encourage healthy eating practices. The guidelines and policies have to be reformulated and implemented as far as the menus and foods made available to learners are concerned.

Although the nutrient analysis of the school meals was not part of the study, it is still important to highlight that it is based on international guidelines for school meals starting with primary schoolchildren and upwards. Schools that serve one to two meals a day should ideally contribute to approximately one-third of the daily nutrient requirements of the learners (Brown, 2011:332).

5.10.3.2.2 Contribution of school tuck shops

Observations at the tuck shops of the participating schools revealed that respondents purchased various foods items from them. In all the three schools, learners consumed foods from the tuck shop that did not promote healthy eating. Similar foods were sold in all three tuck shops. The food items offered all had a high fat and sugar content such as meat pies, hamburgers, hotdogs, Russian sausages and chips, pizza, potato crisps, nuts, cheese curls, cheese puffs, biscuits, cookies, ring bun/cream bun, sweets, candy, chocolate, ice pops and fizzy drinks. None of the school tuck shops sold fruit.

5.10.3.2.3 Contribution of informal street food vendors

Informal street food vendors also traded near the school grounds selling food items similar to those offered at the school tuck shops. Foods consumed by the learners from these informal street food vendors were also not healthy and did not include traditional foods. Although some of the informal street food vendors sold fruit like apples, bananas and oranges, it was observed that respondents did not purchase much fruit and preferred the processed snack-type foods. Most of these food items consumed could be described as unhealthy food choices as they are recognised as energy-dense foods, high in sugars and fats (Abrahams *et al*., 2011; Temple *et al*., 2006). Respondents only bought food from these informal street food vendors in the morning before entering the school gate and after school hours when they were on their way home. At break or lunch times, learners were not allowed to go outside the school premises to buy food.

In conclusion, from the description presented in this section of the external environments and, more specifically, the school food environment, it is clear that the study group is still exposed to certain traditional *Tswana* dishes as these are served at school and in the home. Eating home-cooked food and sharing family meals is still important and continues as a regular practice. The results confirm that cultural practices continue to be influenced by regular participation in traditional occasions, the effect of modernisation

and the urban environment. Together with the food practices in the school environment this means that the respondents embraced both traditional foods and Western-orientated foods as part of their regular eating patterns.

The respondents recognised, amongst others, a number of traditional foods (e.g samp, samp and beans) consumed at school as familiar as they also eat these items at home. They therefore found it acceptable to eat even when outside the home such as at school. Though samp was also part of the traditional foods consumed at school, a large number of learners did not consume it because they said they disliked it. Interestingly learners confirmed that they had no problem consuming samp at home.

Although cooked plain samp, mealie-rice and samp mixed with beans (samp and beans) were disliked or not preferred by the majority of learners in the sample, the school menus have confirmed that traditional foods are still consumed in Botswana. Learners also had the opportunity to consume various foods that they bought from the tuckshop at their respective schools, as well as from the informal food vendors near their school premises. It is also noted that what they consumed was available, acceptable and affordable for individual learners at each school. The school personnel did not have control over the decisions concerning about what the learners consumed from the tuckshop or from the informal food vendors.

Although respondents were exposed to traditional and Western-orientated foods, they did not discard traditional foods. This is because home-cooked food was more traditional while at school, particularly at the school tuck shop and what the informal food vendors offered, was mostly Western-orientated. Respondents embraced both traditional and Western-orientated food since they were both available in all their external environments, the home, the school, the shops and the structured urban environment experienced in Francistown.

The following section concerns objective 5 that deals with the contribution of the internal environment on the food choice behaviour of the study group in relation to healthy eating habits and use of traditional foods. It focuses on knowledge, beliefs, attitudes and values.

5.11 CONTRIBUTION OF THE INTERNAL ENVIRONMENT ON FOOD CHOICE BEHAVIOUR

The contribution of the respondents' knowledge, attitudes, beliefs and values in relation to healthy eating and traditional foods was determined by respondents answering

questions according to a four-point Likert-type scale on which 1 represented strongly disagree and 4 strongly agree. The respondents were asked to mark their level of agreement or disagreement with statements on knowledge, attitudes, beliefs and values that were adapted from various sources in the literature (Aikman & Crites, 2007; Worsley, 2006; Verbeke & Lopez, 2005; Medeiros, Hillers, Chen, Bergmann, Kendall & Schroeder, 2004; Sanzo, Belen del Rio, Iglesias & Vazquez, 2003; Olsen, 1999). Statements relating to healthy eating are discussed first, followed by those that concern traditional foods.

Table 5.27 presents the results on healthy eating.

Knowledge statements. The majority of the respondents agreed with the listed knowledge statements as more than 50% of them in total, either agreed or strongly agreed with them. This result shows that the respondents are knowledgeable about healthy food choices and are aware of what constitutes healthy eating, including the consequences of an excessive consumption of foods that have a high salt, sugar, fat or oil content. The results however, are in contrast to what they reported regarding their own food choice and consumption in their current eating patterns. This shows that the knowledge of the respondents was not always put into practice when selecting and eating various foods, amongst others, fruit and vegetables. For example, from the reported current eating patterns, the respondents revealed that they did not include fruit in their daily diet, yet in the knowledge statements they indicated that they know the basic principles of healthy eating that recommends eating five portions of fruits and vegetables every day.

Attitude statements. Attitudes of the respondents towards healthy eating was measured by two statements. Most of respondents agreed (37.6%, n = 91) and strongly agreed (23.14%, n = 56) that they skipped meals when busy. The response to the question about drinking a lot of fizzy drinks instead of milk matched this finding very closely as 34.73% (n = 83) generally did and 28.45% (n = 68) definitely made the choice of drinking fizzy drinks above milk. Also confirming this trend is the result that fizzy drinks are more frequently consumed than milk (see 5.4.3.11). Milk as beverage is not frequently consumed as ≤ 19.01% (n = 46) of the respondents indicated that they frequently consumed milk as a beverage *(*see 5.4.3.11*).* Traditionally Tswana people do not drink fresh milk as a beverage although it is frequently used as a relish with cereal porridges (Sydenham & Ron, 2007:1).

Belief statements. Although 50% (n = 121) of the respondents felt that junk foods are generally convenient to eat, the majority (80 %) of the respondents regarded home-

made or home-cooked food as proper food as 42.56% (n = 103) agreed and 37.6% (n = 91) strongly agreed with this statement.

TABLE 5.27: CONTRIBUTION OF KNOWLEDGE, ATTITUDES, BELIEFS AND VALUES TO HEALTHY EATING

	Strongly Disagree	Disagree	Agree	Strongly Agree
KNOWLEDGE STATEMENTS %				
It is important to eat five (5) portions of fruits and vegetables every day	7.02	28.93	45.87	18.18
Most traditional foods are healthier than fast foods and snacks or junk food	4.56	7.47	34.02	53.94
I eat traditional foods because it has no additives, colouring matters or preservatives	15.42	31.25	35.42	17.92
Junk food is low in vitamins and minerals	10.33	27.69	37.6	24.38
Eating foods that are low in fat and sugar helps one stay at a healthy weight, and decreases the risk of health problems	6.61	11.57	33.47	48.35
I may not get enough calcium if I do not drink milk or eat other dairy foods	7.02	17.36	30.17	45.45
Eating too many kilojoules or calories may cause overweight and coronary heart diseases	4.96	10.74	36.78	47.52
Fried foods contain a lot of fat	8.26	10.33	33.06	48.35
Foods high in fat, salt and sugar (e.g chocolate, muffins, potato chips) should be limited in my eating pattern	9.09	11.57	35.12	44.21
Fast food and snacks should only be eaten as a treat	11.16	21.49	39.26	28.10
ATTITUDE STATEMENTS %				
I skip meals when I am busy	17.36	21.90	37.60	23.14
I drink a lot of fizzy drinks instead of milk	14.64	22.18	34.73	28.45
BELIEF STATEMENTS %				
Junk foods are generally convenient to eat	8.68	21.90	50.00	19.42
Proper food is regarded as home-made or home-cooked food	5.79	14.05	42.56	37.60
VALUE STATEMENTS %				
Media (e.g television, radio, posters, and magazines) influences my food choice	12.40	16.94	38.43	32.23
It is important for me to eat healthy meals even when I am busy or have limited time	4.55	7.02	42.98	45.45
Only healthy foods should be available at school	9.50	8.68	31.82	50.00
School tuck shop / canteens should sell fresh fruits every day	8.26	9.50	23.97	58.26

Value statements. The majority of the respondents reported that they agreed with the four value statements given. A large proportion of the respondents (n = 93, 38.43% agreed and n = 78, 32.23% strongly agreed) were convinced that the media does influence their food choices via television, radio, posters, and magazines. The majority, 58.26% (n = 141) strongly agreed and 23.97% (n = 58) agreed that school tuck shops/canteens should sell fresh fruit every day. Similarly the majority, 50% (n = 121) strongly agreed and 31.82% (n = 77) agreed that only healthy foods should be available for sale at school. On the other hand, 45.45% (n = 110) respondents strongly agreed together with 42.98% (n = 104) who agreed that it is important for them to eat healthy meals even when they are busy or have limited time. This is encouraging. Even though the respondents seem to be influenced by the media they do however, value and are aware of the fact that healthy food must be available and that is important to make an effort to eat healthily.

Table 5.28 presents the results on the respondents' knowledge, attitudes, beliefs and values regarding the consumption of traditional foods.

TABLE 5.28: KNOWLEDGE, ATTITUDES, BELIEFS AND VALUES REGARDING TRADITIONAL FOODS

	Strongly Disagree	Disagree	Agree	Strongly Agree
KNOWLEDGE STATEMENT %				
Most traditional foods are healthier than fast foods and snacks or junk food	4.56	7.47	34.02	53.94
ATTITUDE STATEMENTS %				
Most traditional foods are tasty	12.4	20.66	38.43	28.51
Traditional foods are too difficult and time-consuming to prepare	11.57	28.1	34.71	25.62
I do not like others (e.g my friends, school / classmates) to know that I eat traditional foods	61.16	25.62	9.5	3.72
It is important to me to follow traditional food patterns	11.16	21.49	42.98	24.38
BELIEF STATEMENTS %				
Most people who consume traditional foods are old-fashioned	47.52	26.03	13.64	12.81
Traditional foods takes a long time to cook (are time-consuming)	14.46	24.79	35.12	25.62
Traditional foods cannot be found easily	14.46	30.17	35.95	19.42
My religion allows me to use and eat traditional foods	8.71	9.54	32.78	48.96
Traditional foods are expensive to buy	40.91	35.12	14.46	9.5
VALUE STATEMENTS %				
Traditional foods are part of our cultural heritage and should be preserved	6.2	9.5	28.93	55.37
Traditional foods are suitable to serve to guests	9.09	20.25	40.08	30.58

Knowledge statements

The majority of the respondents strongly agreed (53.94%, n = 130) and agreed (34.02%, n = 82) that most traditional foods are healthier than fast, snack or junk foods. This was confirmed in the eating patterns of the study group as they continued to consume traditional foods as part of their usual food pattern on weekdays and over weekends, as well as on special occasions.

Attitude statements

There were four attitude statements on traditional foods. The respondents liked traditional foods as 38.43% (n = 93) agreed that most traditional foods are tasty, with a further 28.51% (n = 69) strongly agreeing. Although the majority 34.71% (n = 84) agreed and 25.62% (n = 62) strongly agreed that traditional foods are too difficult and time-consuming to prepare, they felt it was important for them to follow traditional food patterns, 42.98% (n = 104) agreed and 24.38% (n = 59) strongly agreed to this statement. Overall a positive attitude towards traditional food is thus portrayed and further confirmed by the results of the 61.16% (n = 148) of the respondents who strongly disagreed that they do not like others, including their friends, school/classmates, to know that they eat traditional foods. Further confirmation of their positive attitudes was revealed in the results regarding the belief statements.

Belief statements

The majority of the respondents (n = 115, 47.52%) strongly disagreed with the statement that consuming traditional foods is old-fashioned. However, they believed that traditional foods are time-consuming to prepare, as marked by 35.12% (n = 85) of the respondents who agreed and 25.62% (n = 62) who strongly agreed with this statement. A little more than half the respondents definitely held the view that traditional foods cannot be easily found (35.95%; n = 87 agreed; and (n = 47, 19.42% strongly agreed). Religious beliefs did not seem to prohibit the consumption of traditional foods as 48.96% (n = 118) strongly agreed and a further 32.78% (n = 79) agreed that their religion allowed them to use and eat traditional foods. Moreover, the general opinion was that traditional foods were affordable and not expensive to buy (n = 99, 40.91% strongly disagreed and 35.12% (n = 85) disagreed).

Value statements

The majority of respondents (55.37%; n = 134) strongly agreed and 28.93%; n = 70) agreed that traditional foods were part of their cultural heritage and should be preserved. Likewise the majority, 40.08% (n = 97) agreed and 30.58% (n = 74) strongly agreed that

traditional foods are suitable to serve to guests while only 20.25% (n = 49) disagreed with this statement. From these results it can be concluded that the study group values and has a positive attitude towards traditional foods.

5.12 IMPLICATIONS OF THE NUTRITION TRANSITION FOR ADOLESCENTS' CURRENT EATING PATTERNS

The last objective deals with the effect of the nutrition transition on the current eating patterns of the study group.

Globally, peoples' dietary intake is becoming increasingly energy-dense as a result of added sugar, oils and fats to food, and the increased availability and inclusion of more commercially processed foods (Popkin *et al*., 2011:3; Popkin 2006:289). This, together with the accelerating intake of foods of animal origin, overweight, obesity and inactive lifestyles results in a higher incidence of nutrition-related non-communicable diseases (NR-NCDs). Numerous studies also document these shifts in eating patterns in sub-Saharan countries such as Botswana and South Africa (Shisana, Labadarios, Rehle *et al.,* 2013; Maruapula *et al*., 2011; Popkin *et al*., 2011; Maruapula & Chapman-Novakofski, 2010; Vorster *et al.,* 2005b; MacIntyre *et al.,* 2002; Walker & Charlton, 2001).

Popkin (2006) described global nutrition dynamics and the characteristics of nutrition transition as five distinctive patterns progressing from collecting food, famine, receding famine, degenerative diseases and lastly behavioural change. The characteristics of the nutrition transition vary according to how food is used. This process starts with production, through processing to consumption. All phases contribute to shifts in diet and activity patterns (Popkin, 2006). For example, in pattern three (receding famine), where mortality rates declined, the residential pattern was mainly rural and the economy was referred to as the second agricultural revolution. The second agricultural revolution was basically a period of agricultural development between the eighteenth century and the end of the nineteenth century, which saw a massive and rapid increase in agricultural productivity and vast improvements in farm technology (Encyclopaedia Britannica, 2014, sv 'agricultural revolution).This means that when one aspect of life is affected all other aspects are affected.

Botswana, as a developing country, falls within pattern four (degenerative disease). In pattern four, changes in diet and activity patterns lead to the emergence of new diseases and increased disability (Popkin, 2006). Generally, apart from consuming traditional foods, which are considered healthier, people in Botswana are increasingly consuming

foods with more fat, specifically from animals, sugar, processed foods and consuming less food high in fibre (Maruapula *et al*., 2011). Such a diet could result in overweight and obesity, poor bone health and many other disabling conditions (Maruapula & Chapman-Novakofski, 2010; Maruapula & Chapman-Novakofski, 2007; Clausen *et al.,* 2005). This has also been shown globally that populations shifting rapidly towards a diet containing more fat, especially from animal products, together with a high sugar content, and other processed foods, together with less fibre leads to degenerative diseases, characterised as pattern four of the nutrition transition stages as described by Popkin (2006).

In developing countries, the nutrition transition is also associated with increased access to cheaper, processed foods that are high in fat, added sugar and salt (Popkin *et al*., 2011). Maruapula *et al.* (2011) confirm the presence of a nutrition transition in Botswana by stating that it can be traced through the country's food pattern history. Botswana society has undergone a transition from being a hunter-gatherer people to a modern agricultural society, a situation brought about through the moving from pastoralism to the receding famine phase with current evidence that it has advanced to the degenerative disease pattern with a high prevalence of overweight and obesity cases, particularly in women (Maruapula *et al*., 2011).

The results of this study confirm that eating patterns of the Batswana adolescents are changing. The findings revealed that the majority of respondents consumed traditional foods frequently at home. However, some indicated that they did not eat certain traditional foods because either they were not familiar with them or they did not like them. On other hand, the majority of the respondents indicated that they consumed snack and fast foods such as meat pies, hamburgers, hot dogs, fish and chips, Russians and chips, fat cakes and pizza. Savoury snacks consumed were potato chips/crispies, nuts, cheese curls, cheese puffs and savoury biscuits. They enjoyed baked products (cakes and confectionery, biscuits and cookies), sweets (sweets, i.e. candy and chocolates or chocolate bars) and fizzy drinks together with the listed fast foods. Savoury snacks were indulged in on weekdays in the company of friends/peers at school, as well as over weekends and on special occasions when with their friends/peers and family respectively. These food choices clearly indicate the importance of the influence of the presence of others (family, friends/peers).

Some respondents do still consume traditional foods. However, the consumption of foods prepared away from the home is on the increase. Researchers (De Vogli, Kouvonenb & Gimenoc, 2014; Fortin & Yazbeck, 2011; Popkin, *et al*., 2011; Aounallah-Skhiri, Traissac, El-Ati, Eymard-Duvernay, Landais, Achour, Delpeuch, Romdhane &

Maire, 2011) have documented that foods prepared away from home are usually fast foods and these are generally high in fat content and are more energy-dense. This contributes to the emergence of NCDs. Pattern four of the nutrition transition profile by Popkin (2006) also emphasises that dietary changes of this nature lead to the emergence of NCDs and disabilities later in life. The increased consumption of commercially processed food, together with meals eaten away from home, particularly in fast food restaurants, give rise to negative health conditions such as obesity, coronary heart diseases, cancer, diabetes and many others (Popkin *et al*., 2011). Other factors such as the economy, household production, income and assets, residency patterns and food processing also contribute to pattern four of the evolving nutrition transition leading to an increase in degenerative diseases (Popkin, 2006). This, together with fewer physically demanding jobs, in conjunction with a rapid growth in disposable income and technological production, results in a rapid shift in what people eat. This often leads to an increased consumption of commercially processed food that manifests in negative health conditions. However, other considerations too are important, like the effect of where people live and what food is available, accessible and affordable for them.

It is clear that the nutrition transition in Botswana is also caused by numerous factors that are responsible for the change from the traditional to a more Western-orientated eating pattern. In accord with what is reported in other African countries, this is characteristically a change from securing food from cultivated and gathered indigenous food crops and animal products to becoming almost totally dependent on food processed in the commercial and industrial sectors (Raschke & Cheema, 2007; Weinberger & Swai, 2006; Gockowski, Mbazo'o, Mbah & Moulende, 2003; Ogoye-Ndegwa & Aagaard-Hansen, 2003). Moreover, several specifically South African studies confirm that a nutrition transition within a society takes place as a direct consequence of demographic and lifestyle changes. In recent times, of greater concern than simply producing food, are the negative consequences of certain current eating patterns, particularly those responsible for the increase in the occurrence of obesity and other non-communicable diseases associated with it, especially in the younger generation groups and urban populations (Shisana *et al.,* 2013; Vorster *et al.,* 2005b; MacIntyre *et al.,* 2002; Walker & Charlton, 2001).

Botswana is a multi-cultural and indigenous African country, and its people have contact with Western-orientated societies and seem to have gradually adopted or partially adopted a Western-orientated lifestyle. This has led to a change and/or adjustment to traditional food practices due to increased exposure to Western foods, mainly because of the effect of urbanisation and modernisation. The change in the dietary patterns of the local Botswana people reflects this interaction with Western-orientated food practices

especially as the respondents were from schools in the urban area of Francistown and nearby Tonota, which is in close proximity to this city. Nutritional transition is evidently an on-going process in Botswana. The people of Botswana need a wake-up call to change their eating habits in line with an effective public nutritional health model that will lead to decreasing the prevalence of all chronic diseases related to an unhealthy diet in order to increase their life expectancy. The current description of food patterns in adolescents, however, may help to inform improved health behaviours of the Botswana population. This will be a stepwise move. Yet to come is the final fifth phase of the nutritional transition that accommodates a stage pattern behavioural change, which should be encouraged in Botswana. In this last phase, appropriate intentional eating and physical activity behaviours may be suggested to enable successful ageing even in a setting of high rates of chronic diseases (Popkin, 2006:290).

5.13 CONCLUSION

In conclusion, the findings of this study have presented an in-depth account of the current eating patterns of mid-adolescents in the Francistown area of Botswana. It has been guided by executing the objectives of the study, which mainly addressed various areas of concern derived from the aim. First, the current eating patterns of the study group on weekdays, weekend days and on special occasions, together with the frequency consumption of various foods, were analysed and interpreted. The results showed that the majority of respondents still consume traditional foods at home. Eating home-cooked food and sharing of meals with their family members is still practised. The study group had also confirmed a low frequency of consumption of fruits as well as low frequency of consumption of milk when taken as a beverage.

To the contrary, the study group consumed snack and fast food outside the home when with friends and peers. Furthermore, also significant issues were the respondents' familiarity with, their preference ratings and frequency of consumption of traditional (indigenous) foods and snack or fast foods (Western-orientated foods). Results revealed that some of the respondents had never consumed some of the foods and they were unfamiliar with it, in that they were neither part of their school menu nor prepared at home, or they just disliked them. The preference ratings and frequency of consumption of traditional and Western-orientated foods varied considerably. Most of the traditional foods received a high preference rating, with a few that received low or neutral preference ratings respectively. These foods are consumed regularly (three to four times a week) and some on special occasions only (e.g. melon porridge and maize kernels). Although, the majority of the respondents consumed Western-orientated foods regularly,

and foods such as fast foods and savoury snacks received a high preference rating, these were however consumed less than three times a month by the majority. Cakes and confectionery were for special occasions. Interesting results concerned the contexts or situations in which these foods were considered for consumption. The majority of respondents consumed traditional foods when they were with their families. Western-orientated foods were eaten when they were with friends/peers and when they did not have enough time in a particular situation when they wanted something quick and easy to eat for convenience.

On the other hand, the external and individual environments also contributed to the food choice behaviour of the study group. External environments together with individual environments prove to play unique roles in the food choice behaviour of an individual. Francistown, as urban area, contributed considerably to what the respondents consumed in their homes as well as at their respective schools. The majority of respondents were knowledgeable about quite a number of health aspects and issues, but they did not put them into practice when selecting, preparing, cooking and consuming food. Food choice behaviour of the study group related to healthy eating habits and the role of traditional foods in diets reflected attitudes, beliefs and values, as an integral part of their individual environment.

Lastly, the findings from this study, which focused on the current eating patterns of a group of Botswana adolescents, matched Popkin's work of 2006 on global characteristics of the five patterns of the nutrition transition, and a recent study on adolescents conducted by Maruapula *et al*. (2011) in Botswana. These patterns place Botswana in the fourth phase in which degenerative diseases are becoming prevalent. The study group however, confirmed that traditional foods are still consumed, yet from the study's results, it is also evident that Botswana is not an exception to the on-going global phenomenon of a nutrition transition, which is a matter of concern even in sub-Saharan countries. Hence it advocates for an increase in fruit consumption while reducing consumption of the Western-orientated foods in the form of snacks and fast foods in the mid-adolescents' eating patterns, as well as emphasising continuity of traditional foods consumption.

Chapter 6

CONCLUSIONS AND RECOMMENDATIONS OF THE STUDY

6.1 INTRODUCTION

This chapter gives the conclusions of the study that focused on how the nutrition transition in Botswana contributes to the current food habits and food choice behaviour of mid-adolescents (15-18 years of age) in the Francistown area of Botswana. The conclusions are based on the main findings of the study and points discussed refer to the significance of the study and its limitations, and recommendations for future research are given.

The nutrition transition is a widespread concern phenomenon in the developed world as well as in developing African countries like Botswana. It is associated with a wide range of characteristic changes in dietary and nutrient intake patterns associated with social, cultural and economic changes that tend to occur during a demographic transition (Maruapula *et al.,* 2011; Misra *et al*., 2011; Vorster *et al*., 2005b). As outlined in Chapter 1, the nutrition transition may have adverse effects on adolescents' future health, as it is a change and/or shift away from a high carbohydrate and low-fat diet to a more Western-orientated diet together with an associated sedentary lifestyle that leads to an increase in nutrition-related NCDs. In terms of nutrition, this Western-orientated diet is known for its low fruit and vegetable consumption and food with a high fat and sugar content. They are high energy, dense foods (Popkin *et al*., 2011; Popkin, 2006; Popkin, 2004; Swinburn, Caterson, Seidell & James, 2004).

Maruapula *et al.* (2011) point out that collectively the nature of the food choices of mid-adolescents in Botswana is a matter of concern and should be addressed. Currently limited information on the food habits of adolescents in Botswana is available. Hence this study sought to investigate how the nutrition transition in Botswana contributes to the current food habits and food choice behaviour of mid-adolescents (15-18 years of age) in the Francistown area. The study presents a description of the food choices of a group of adolescents in different contexts and documents the factors that influenced their perceptions of their food choices too. The situations involved the respondents' family or household, friends or the peer group and specifically, their reaction when experiencing time constraints. By exploring the contribution of this group's current eating patterns and food-related behaviour provided more insight into the nutrition transition process taking place within the Botswana population. Thus this study fills an existing gap in current

research on the food habits of this age group. This fuelled the researcher's interest to find out where the mid-adolescents in the northern part of Botswana are in the nutrition transition process with regard to their food-related behaviour and associated food practices. Of particular interest was the extent to which they still included indigenous and traditional Batswana foods as well as Western-orientated foods in their eating patterns. The main conclusion on each of the formulated objectives for this study follows in the next section.

6.2 CONCLUSIONS ON THE OBJECTIVES OF THE STUDY

6.2.1 Conclusions on the current food habits of mid-adolescents (15-18 years) in the Francistown area of Botswana (objective 1)

The objective included sub-objectives related to information about the study group's eating patterns that dealt with the number of meals eaten on weekdays and during weekends, and the composition of these meals. Additional information related to these meals on weekdays and weekend days was noted. A non-quantitative food frequency questionnaire concerning eating patterns measured the frequency of consumption of selected food items and provided information on what was consumed on special occasions.

Weekday eating patterns

The majority (n = 114, 48%) of the respondents consumed three meals a day with in-between snacking on weekdays when they attended school. This is a change from the traditional Tswana eating pattern of two meals a day (Scroggie, 1946:231).

For the majority (n = 134, 42.14%) of the respondents breakfast was a bread-based meal with tea. The most consumed foods for breakfast were bread and tea, or soft porridge prepared from sorghum meal (*mabele)* or mealie meal. These results concur with other Botswana studies that also found that Batswana's morning meal is a light meal consisting of bread, tea, coffee and soft sorghum porridge (Clausen *et al*, 2005; Mokwena *et al*., 2003:49; Grivetti, 1978*).*

Snacking in-between meals occurred more on school days, which implied that this practice seemed to be influenced by the ready availability of snack foods in the school environment. Many respondents consumed savoury snacks and sweets during the mid-morning break at 10:00 to 10:30. These savoury snacks included potato crisps, cheese curls, cheese puffs, nuts and savoury biscuits purchased at the school tuck shop. Beverages such as fizzy drinks, fruit juice and dairy fruit beverages were also consumed

often. On weekdays in the afternoons, respondents consumed similar foods to the morning's in-between meals. Although in-between meal snacking was not a common practice in the Batswana traditional eating patterns, Grivetti mentions that traditionally, indigenous fruits, when in abundance, together with sun dried *phane*, seeds of pumpkin, sweet melon, and watermelon were eaten as snacks (Grivetti, 1978).

On weekdays, lunch and supper comprised similar items. The staple foods, soft sorghum porridge, stiff sorghum porridge, stiff maize meal porridge and cooked samp were still important dishes and frequently included on the menu of the majority of the respondents. Stiff maize meal porridge, rice and samp were the main cereal dishes consumed for lunch and supper accompanied by a meat stew, legume stew or vegetable relishes. There is a relatively frequent consumption of beef and green leafy vegetables taken with cereal porridges, cooked cereal grains and legumes. This is similar to results reported in older studies conducted in Botswana by Scroggie (1946) and Grivetti (1978). Beef is more widely consumed in Botswana compared to other meats, such as goat meat, chicken, pork and mutton/lamb (Botswana Tourism Board, 2009:7; Sydenham & Ron, 2007:1; Coetzee, 1982:165). Although relishes prepared from vegetables, legumes, meat or a combination of these, were included at meals, consumption of fresh vegetables and fruit was limited and/or infrequent.

The weekday eating patterns of the respondents indicated quite a number of changes in their meal pattern and the type of food consumed. Although they still consumed traditional foods, it was noted that snack and fast foods, were more frequently included between meals during the week than on weekend days.

Weekend eating patterns

For the majority (n = 147, 60.74%) of the respondents eating patterns were different over weekends. The difference noted related to the number of foods that were included at meals on weekend days. More respondents ate vegetables as part of the Saturday lunch, in comparison to the school meals where they were not served green leafy vegetables such as spinach, chomolia and rape. The weekend food composition also included dishes such as dumplings, pasta and millet porridge that were not part of the respondents' school meal menus. The consumption of beverages was definitely highest on Saturday in comparison with Sundays and weekday meals. The fact that respondents said that they ate out more often at shopping complexes and malls near their residential areas on Saturdays could explain this result.

It is noticeable that respondents' weekend eating patterns varied a great deal from their weekday eating pattern they had most of their meals at home over weekends. In the

respondents' homes, family meals were planned and they had to eat what was available but were fortunate enough as there was more variety of foods vegetables were included which was not the case when eating at school. However, over weekends they did not consume fast foods at home frequently, as this mostly took place away from home generally at fast food restaurants in shopping malls near where they lived.

Respondents also had to indicate how often they eat meals together with their family/household members or at other places. The majority (n = 125, 51.65%) eat at least one meal daily together with their family/household members. In Botswana, sharing family meals is most important because cultural and family values and beliefs are entrenched at meal times. In response to the question on where food consumption took place when eating away from home or school the most popular fast food restaurants sold chicken. Their choice, in order were Kentucky Fried Chicken, followed by Nandos and Chicken Licken and also mentioned were street food vendors, supermarkets and the market place. The respondents ate out more over weekends and on special occasions and usually did this with their family and friends. Eating out alone was not a common practice.

Frequency for consumption of food

Results from the non-quantitative food frequency questionnaire enabled the application of triangulation and provided more information on the frequency of consumption with regard to what other foods the respondents consumed and how often. The food frequency questionnaire had 13 food groups, namely, breads and bread products, spreads or accompaniments to bread, soft cooked porridges, convenient breakfast cereals, other cereals, stiff porridges, vegetables, tubers, fruits, meat and meat products, processed meats, other protein dishes, egg and egg dishes, dairy and dairy products, beverages, puddings and baked products. Amongst the breads and bread products respondents consumed white and brown bread frequently. Most of the respondents had brown bread every day rather than other breads and scones that were only for special occasions. Margarine was the most commonly used spread or accompaniment for bread. For breakfast, the respondents had the usual soft cooked porridges such as oats, mealie meal or sorghum soft porridge as well as regularly having breakfast cereals such as cornflakes, All Bran flakes, Rice Krispies, and Weetbix.

As for other cereals, the majority had rice and pasta three to four times a week and samp once a week and stiff porridges such as millet porridge, stiff sorghum and stiff mealie meal porridge often. The majority consumed stiff mealie meal porridge on a daily basis or three to four times a week, in comparison to other stiff porridges (millet porridge, melon porridge, stiff sorghum porridge) that were only for special occasions. The

traditional custom of enjoying cooked porridges prepared from maize meal regularly continues, and agrees with of the findings of other recent studies (Mpotokwane, 2008; Mokwena *et al*., 2003). The low frequency of consumption of vegetables and fruit confirms the results obtained from the respondents' usual eating patterns. In other countries adolescents also appear to have a low consumption pattern of fruits and vegetables; and it is often raised as a matter of concern (Molaison *et al.,* 2005; Baxter & Schröder, 1997).

Respondents reported a frequent consumption of beef and chicken, the majority eating other meats such as goat, pork and mutton or lamb only on special occasions. Although chicken, goat meat, lamb and mutton are also plentiful in Botswana, respondents confirmed frequent consumption of beef. This is because the Batswana have many cattle that produce high quality beef (Botswana Tourism Board, 2009:7, 9; Sydenham & Ron., 2007:1; Vossen, 1990; Coetzee, 1982:165). The respondents seldom ate processed meat such as polony, Vienna sausages, Russian sausages, boerewors, ham and bacon. Those who did indicated a frequency of less than three times a month. Ham and bacon were not part of the eating patterns of the respondents. Results of the frequency questionnaire confirm this as the majority indicated that they had never eaten these two processed meat products. Fish too was not a commonly food choice. This is attributed to people in Botswana not liking the smell and appearance of fish. They also regard fish as closely resembling snakes (Sen, 1990; Coetzee, 1982:70) in accord with a commonly held tradition belief that snakes bring evil.

Other protein dishes not regularly part of their eating pattern were cooked cheese dishes and soya. However, eggs and egg dishes were frequently included. In the past, it was a taboo for teenage girls to eat eggs, but today many people are educated and are aware that certain food taboos can affect nutrition negatively (Meyer-Rochow, 2009:9). The results show that the restriction on the consumption of eggs is no longer strictly enforced.

The respondents consumed dairy and dairy products. Having fresh milk frequently was common practice on a daily basis as 34.3% (n = 83), followed by 28.1% (n = 68) of the respondents doing so 3-4 times a week and 16.12% (n = 39) once a week. Milk as a beverage is not frequently consumed by the Batswana and ≤ 19.01% (n = 46) of the respondents reported that they did consume it as a beverage. This is understandable as traditionally Batswana people mostly used it as a relish with cereal porridges and not as a beverage (Sydenham & Ron, 2007:1). Coffee and tea were frequently consumed as hot beverages, marked respectively by 49.38% (n = 119) and 43.57% (n = 105) respondents on a daily basis. As for the cold beverages, fizzy drinks and fruit juices

showed a similar consumption pattern. On special occasions the majority of respondents drank home-brewed ginger beer while *mageu* and herbal tea were not popular.

The frequency of consumption of puddings, baked products and confectionery also varied. Sweets and biscuits were marked as frequently consumed by the majority on a daily basis or three to four times a week. Most of the respondents had ice cream, cakes/cupcakes and muffins fewer than three times a month or once per week and jelly and custard sauce only on special occasions.

The overall conclusions about the frequency the study group consumed the listed foods, is a noticeable frequent consumption of processed and Western-orientated types of food. However, for a clear majority of this group the traditional staple foods prepared from maize and sorghum as soft or stiff cereal porridges or whole as cooked cereal grains are clearly still frequently included in their diet. This confirms the central and important role of the staple foods in their eating patterns in spite of increased exposure to and inclusion of Western-orientated foods. This is supported by Kittler *et al* (2011:7) who state that it is a common practice that the staple or core foods are eaten on an almost daily basis as it endorses the cultural and religious relevance of such foods.

Special occasions

The food the respondents consume at traditional and modern special events they attend is significant and it varies according to the type of special occasion. At traditional special occasions, such as ancestral worship or veneration (*phekolo*), traditional weddings (*patlo le bogadi*) and at funerals or when a tombstone is unveiled, traditional foods are served together with other foods, similar to those eaten at modern special occasions. Prominent are traditional foods such as cooked cereal grains, green leafy vegetables and pounded meat (*seswaa)* with traditional beer. According to the majority of respondents, meat is consumed at funerals and tombstone unveiling ceremonies, traditional weddings and traditional/ritual ceremonies. These results agree with studies conducted in the past, where meat and traditional beer were regarded as prestigious foods appropriate for traditional special occasions in Botswana (Grivetti, 1976: 1209; Scroggie, 1946:268-273). However, today at modern special occasions Western-orientated foods have replaced the traditional foods depending on the type of celebration. For example, at civil wedding ceremonies the menu comprises meat and rice together with salads, alcoholic beverages, snacks and desserts. At birthday parties guests are offered fizzy drinks, cake, savoury snack and “braai” (barbequed meat) with starch (pap or rice) and salads. Culture is dynamic and all these changes seem to be fuelled by influences such as westernisation, urbanisation and modernisation (Popkin *et al*., 2011; Popkin, 2009;

Popkin, Duffey & Gordon-Larsen, 2005; Mendez & Popkin, 2003; Weatherspoon & Reardon, 2003).

Evident from the results obtained from these respondents' eating habits on weekdays, over weekends and on special occasions considering food choices and their frequency of consumption is that the eating patterns of the Batswana people are changing. These changes in the meal pattern and meal composition show a more frequent inclusion of modern Western-orientated foods at breakfast, lunch, supper and in-between meals. The results confirm that, as the Batswana people become more urbanised, a meal pattern of three meals a day, with in-between meals is becoming typical. Similarly, Maruapula *et al* (2011) also report that in urban areas adolescents in Botswana, Greece and Germany consume three to five meals a day.

6.2.2 Conclusions on the extent to which traditional (indigenous) and snack or fast foods are included in the eating patterns of the study group and their frequency of consumption and preference ratings (objective 2)

The second objective of the study dealt with the familiarity, preference ratings and frequency of consumption for both traditional (indigenous) foods and snack or fast foods. Respondents received a list of selected traditional Tswana foods, and dishes, as well as a list of selected snack or fast foods to measure their familiarity, preference ratings and frequency of consumption. First, conclusions about traditional Batswana foods are discussed, followed by those concerning fast and snack foods.

Familiarity, preference ratings and frequency of consumption of traditional (indigenous) foods

The results show that the respondents knew most of the listed selected traditional foods and dishes. The majority of the respondents were familiar with cereal porridges and cooked cereal grains as well as indigenous vegetables, fruits, melons and meats. All respondents were accustomed to eating cereal porridges. Stiff sorghum porridge received a neutral preference rating, while millet porridge received a low preference rating. Other cereal porridges such as sorghum soft porridge, sour sorghum porridge, stiff maize meal porridge, melon porridge and sorghum porridge with fresh milk were rated high preference foods. Consumption of all these cereal porridges had different frequency levels.

Respondents also rated their preferences for cooked cereals or grains. The majority of the respondents indicated that cooked cereals or grains, cooked dried maize kernels and beans, and cracked cooked sorghum grains were known to them. Fresh mealies, cooked samp, samp and beans, and maize kernels received high preference rating. Those who

were not familiar with cooked dried maize kernels and beans, and cracked cooked sorghum grains gave them a neutral and low preference rating respectively.

The results served as confirmation that maize and sorghum dishes prepared with maize and sorghum continue to be used as staple food in Botswana and are preferred and frequently consumed. Small melons were popular and rated highly while dried melon strips, and melon and beans with fresh milk were rated low preference. The majority of respondents only had melons and legumes on special occasions or less than three times a month. All legumes such as black-eyed beans/cowpeas, sugar beans, mung beans, jugo beans and groundnuts were rated high preference items.

With the exception of pumpkin leaves, all other traditional green leafy vegetables were familiar to the respondents. Many indicated that they had never eaten pumpkin leaves as a vegetable. Some of the traditional green leafy vegetables were rated high preference items such as bean leaves (*morogo wa dinawa*), Jew's mallow and cooked bean leaves with powdered groundnuts. Those that received a low preference rating were pumpkin leaves, pigweed and spider flower. Since traditional green leafy vegetables are seasonal, they were not consumed daily. This is confirmed by other studies that mention that daily consumption of the green leafy vegetables is not possible when they are out of season. They are only eaten when harvested at a young stage of plant development when the leaves are more tender and palatable. Then they are enjoyed daily (Legwaila *et al*., 2011; Olesitse, 2010; Ohiokpehai, 2003). Similarly, the majority of the respondents revealed they consumed traditional green leafy vegetables only on special occasions or less than three times a month. Generally the consumption of root vegetables, such as sweet potatoes, was less than three times a month, whereas some ate potatoes three to four times a week or daily. Both potatoes and sweet potatoes were rated high preference foods. Indigenous fruits such as *Mimusops zeyheri (mmupudu)* and wild cactus fruit (prickly pear) were not familiar to the majority of respondents or they had never eaten them. The following indigenous fruits were rated high preference items namely watermelon, *Mimusops zeyheri,* wild berry (*mmupudu*), wild oranges, wild medlar and *Azanza garkeana (Morojwa).* Wild cactus fruit / prickly pear had a low preference rating while marula and *Ximenia Caffra (Moretologa)* were rated neutral preference fruits. Indigenous fruits were consumed only when in season or on special occasions.

All kinds of meat were familiar to the respondents with the exception of mutton/lamb that was unknown to some. All meat (beef, mutton/lamb, goat meat, biltong and pounded meat) were rated high preference foods. Generally beef was consumed daily. On the other hand, mutton/lamb, pounded meat (*seswaa*) and goat meat were mainly consumed

on special occasions whereas biltong was indicated by the majority as consumed less than three times a month.

Chicken and chicken offal products (chicken feet, necks, intestines and gizzards) were familiar to the respondents and they received a high preference rating except chicken heads that received a low preference rating. The majority of the respondents only consumed chicken and chicken offal products less than three times a month. This included *Tswana* chicken, reared as free-range chickens at Batswana homes and served as a relish (Botswana Tourism Board, 2009:7; Sydenham & Ron, 2007:1).

Beef offal (liver, tripe, pancreas and intestines) received high preference ratings whereas lungs received a low preference rating. The respondents did not have beef offal products daily but only on special occasions or less than three times a month.

Insects were also grouped as part of traditional *Tswana* foods. These were mopane worms and locusts and they were rated as high and low preference items respectively. Many respondents indicated that they have never eaten locusts. These insects also differed regarding the frequency of consumption as the majority revealed that they consumed mopane worms less than three times a month while those who consumed locusts did so on special occasions only. From these results, it can be concluded that traditional Batswana foods and dishes were still known and consumed regularly by the majority of the study group. That some respondents were not familiar with all the foods listed, could be because some were no longer prepared or not frequently prepared in their homes anymore. This is possible because some traditional Batswana foods were not familiar to even the parents of the respondents. Familiarity, preference ratings and frequency of consumption of snack or fast foods were determined as well.

Familiarity, preference ratings and frequency of consumption of snack or fast foods

Respondents were familiar with all the listed snack and fast food with the exception of some items such as savoury biscuits, milk shakes, dairy fruit beverages and hamburgers that nearly 20% indicated to have never eaten. All other snack and fast foods were rated high preference items. Most of the respondents consumed fast foods, such as meat pies, hamburgers, hotdogs, deep fried fish and chips, Russians and chips, and pizza less than three times a month while savoury snacks (e.g. potato chips/crisps) sweets and candy, and dairy products were consumed daily. Sweets and candy, chocolates and chocolate bars were only eaten on special occasions, as were fizzy drinks and fruit juices. This confirms that these have been accepted and integrated into the eating patterns of the majority.

Food avoidances

Food avoidances were also determined as part of this objective to get a clear picture of what foods were avoided. This was also to cross-check the unfamiliar or unknown foods and those never eaten. Some of the respondents avoided pork, mutton/lamb, mopane worms, fish, polony and eggs. They were avoided for various reasons such as religious beliefs, health aspects, cultural reasons, vegetarianism or their sensory attributes (taste, texture, smell/odour), and lastly dislike. With regard to avoiding mopane worms, many respondents indicated that they avoid them for health and religious reasons. Fish, mutton/lamb and pork/bacon were avoided for their sensory attributes, whereas eggs and polony were mainly avoided for religious and health reasons.

The conclusion reached about the second objective is that familiarity, preference ratings and frequency of consumption for both traditional (indigenous) foods and snack or fast foods varied. Most traditional foods were familiar to the respondents and frequently consumed. Staple foods and meats were highly preferred. Green leafy vegetables were familiar and consumed when available and some, such as bean leaves (*morogo wa dinawa*), received a high preference rating. Although it is reported that Western-orientated foods were included and generally received a high preference rating, the traditional foods were not discarded and they still play a prominent role in the eating patterns of the participants in this study group.

6.2.3 Conclusions on the contexts or situations when traditional (indigenous) and/or modern (Western-orientated) foods were considered for consumption (objective 3)

The third objective dealt with the choice and consumption of selected traditional Tswana foods and modern or Western-orientated foods in specific contexts or situations. Contexts or situations for choosing and consuming traditional foods are discussed first, and those for modern or Western-orientated foods thereafter.

The results demonstrated that the majority of respondents were more inclined to consuming traditional (indigenous) foods in a family context. All the groups of traditional foods (cereal porridges, cooked cereal grains, indigenous green leafy vegetables, tubers and beans, indigenous fruits, meats, beef offal products, *Tswana* chicken, chicken offal products and/or chicken cuts) were considered appropriate for consumption in the context of the family and special occasions.

Interestingly, it emerged that traditional foods were consumed by a minority within the group when they were in situations in which they experienced time constraints when sought variety, or when they wanted “something quick and easy to eat for convenience”,

or in instances when they had “guests”. It is noteworthy that in the family context, traditional *Tswana* foods were eaten at home. In many households, children had no say about what food was prepared for the household, as it was mainly the mother’s decision.

With regard to modern (Western-orientated) foods, most of respondents felt that the most appropriate time for having these modern foods (fast foods, savoury snacks, baked products, sweets and dairy products) was when they were enjoying themselves with friends and peers. Fast or convenience foods were a good option when sharing either with their friends and peers, or their family or when they wanted something quick and easy to eat especially when they had time constraints. The choice of fast foods included a meat pie, a hamburger, a hot dog, deep fried fish and chips, Russian and chips and a pizza. Savoury snacks such as nuts, potato chips/crisps, cheese curls, cheese puffs and savoury biscuits revealed similar results. Many respondents indicated that they consumed savoury biscuits only on special occasions. As for baked products, the majority of respondents confirmed that cakes, confectionery, biscuits and cookies were only to be consumed in the presence of friends, peers and family and on special occasions. Similarly, sweets too, such as chocolates, chocolate bars and candy were considered appropriate for consumption when in the company of friends and peers.

Offering dairy products was seen as appropriate for contexts or situations in which they wanted “something quick and easy to eat for convenience” when they were with their friends and peers and family. Dairy products included yoghurt, Yogi-sip, milk shakes, ice cream and dairy fruit beverages, such as Tropica, Krush, and Cabanna. All fruits (grapes, oranges, pineapple, apples, banana) could be served in many contexts or situations: when with the family or with friends and peers and when they wanted “something nutritious” as well as “something quick and easy to eat and for convenience”. The two groups of beverages, fruit juices (mango juice, apple juice, fruit punch) and fizzy drinks (Coke, Fanta, and Sprite), were marked respectively by the majority of respondents that they were appropriate for consumption in the context or situation when they were with their family and with their friends and peers.

The results that relate to the contexts or situations in which traditional foods are consumed within the family context indicate that these were prepared more often in the home than in schools. Interestingly the results have confirmed that the appropriate contexts and/or situations for consumption of modern (Western-orientated) foods were with friends and peers and not with their parents or family. This is because most of the modern (Western-orientated) foods are available and accessible to the respondents when they were with their friends and peers at school, buying them from school tuck shops, informal street food vendors and from shops as opposed to when they were with

their family at home. These findings are supported by Maruapula *et al.* (2011) who note that people of the same age within a study group consume traditional foods mostly with their family while fast foods are consumed in the company of friends and peers.

6.2.4 Conclusions on how the various external environments (physical environment, economic and political environment, and socio-cultural environment) contribute to the food choice behaviour of the study group (objective 4)

The fourth objective of the study dealt with the various external environments that contribute to the food choice behaviour of the study group. Observations of the structural (physical) environment and the school environment of Francistown measured this objective. The observation checklist designed for observing the structural environment of Francistown identified shops/supermarkets, fast food outlets and street food vendors. Data gathered focused on the availability, accessibility and price of food items. The observation checklist for the school environment involved observing places such as the school dining hall, school tuck shop and the informal street food vendors around the school grounds. It was necessary to observe how the external environments of the respondents influenced their food choice behaviour in and outside the school environment.

The observations of the physical environment of Francistown, confirmed describing it as a modern urban environment. The vast variety of processed foods, ready prepared convenience foods and fresh products, were available and accessible. This is typical of a modern urban environment. Food outlets were definitely part of the structural environment of Francistown. The increased consumption of modern Western-orientated foods related to the respondents' disposable income hence their cost was a deciding factor. In the home environment cooking food especially traditional dishes was general practice. In the school environment, there were three sources of food, the school meal, the tuck shop and the informal street vendors. The school meals were traditionally orientated while the tuck shop and informal street food vendors sold foods that were Western-orientated. However, the respondents reported that they consumed Western-orientated foods with their friends/peers two to three times a week or fewer than three times a month.

Both traditional and modern foods available to the study group are used and consumed. It does not seem that traditional foods are discarded but gradually there is an increase in the consumption of processed foods that are Western-orientated food. This supports some studies that suggest that food practices in Botswana are changing due to the retail market, including supermarkets and fast food chains that have opened in the urban

areas. Hence traditional food being dominated by modern Western-orientated foods (Durham, 2013; Letsididi, 2013; Maruapula *et al*., 2011; Emongor & Kirsten, 2009; Weatherspoon & Reardon, 2003). Furthermore, Maundeni (2005:8) indicates that the natural environment and built infrastructures in Francistown contribute to food being available, accessible and affordable to all its inhabitants.

6.2.5 Conclusions on the contribution/influence of the individual environment (knowledge, attitudes, beliefs, values) on the food choice behaviour of the study group in relation to healthy eating and traditional foods (objective 5)

This objective focused on how knowledge, beliefs, attitudes and values contributed to the food choice behaviour of the study group in relation to healthy eating and the use of traditional foods.

Healthy eating Although the respondents were knowledgeable about what led to healthy eating, their knowledge was not put into practice. This was specifically evident regarding the consumption of fruit, vegetables and dairy products.

From the attitude statements, it was also confirmed that they would rather drink fizzy drinks than milk, and that they are inclined to skip meals when busy. The majority of the respondents reported that the consumption of milk as a beverage was not frequent (see 5.4.3.11). For example, the majority of respondents agreed that it is important to eat five (5) portions of fruits and vegetables every day but did not do so in practice. Their current eating patterns confirm this (see Table 5.27). Another example is that the respondents knew that eating foods that are low in fat and sugar help one to keep a healthy weight. This decreases the risk of health problems. What the respondents did in practice contradicted their knowledge as they consumed high fat and sugar content foods, specifically when in the school environment when they were with their friends and peers. The respondents admitted that the media influenced their food choices. However, they claimed that they valued the ideas that healthy food options should be available at school and that it is important to eat healthy meals in spite of busy schedules.

Food choice modelling incorporates the idea that there is a link between attitudes and beliefs. It involves thoughts, decision making and behaviour (Olsen, 1999).It is possible that the food choices these respondents make are a result of individuals acting on their thoughts. Other studies confirm that the internal/individual environment influences the food choices of adolescents as they were aware what healthy eating entails (Fitzgerald *et al.,* 2010; Lytle, Seifert, Greenstein & McGovern, 2000). It is suggested that their diet was not healthy due to the food choices made within the environment of the individual in which other factors had an influence too. In the literature it is mentioned that

adolescents' eating pattern change when they start attending a secondary/high school. This can be explained by their increased autonomy over food choices particular at breakfast when eating fruit, vegetables and milk decreases, while consumption of soft/fizzy drinks as well as snack/junk foods rises (Fitzgerald *et al*., 20101; Lytle *et al*., 2000). The findings of this study concur with this observation since the respondents revealed a similar food choice eating pattern when, consuming savoury snacks, fast foods, and sweets that are not healthy when they are with friends/peers. Other studies also demonstrated that, though adolescents are aware of long-term consequences of unhealthy eating they continued to consume these foods (Fitzgerald *et al*., 2010; Story *et al*., 2002; Lytle *et al*., 2000). There are those potential contributors such as time constraints and convenience that influence their unhealthy eating while at school, more than when they are at home, which is where individual attributes on food choices are realised (Fitzgerald *et al*., 2010; Story *et al*., 2002; Lytle *et al*., 2000). This was also found in this study with Batswana adolescents when they were at school, due to the money and the freedom of choice they had. Without parental control they purchased food such as savoury snacks, fast foods, sweets and fizzy drinks from the school tuck shop and informal street food vendors. All this led to unhealthy eating due to the choices exercised linked to the individual environment.

Use of traditional foods Although respondents consumed modern foods inclusive of snack/junk and fast foods, their attitudes, values and beliefs about the consumption of traditional foods was positive. They also were of the opinion that traditional foods are healthier than snack/junk and fast foods. Moreover, their expressed view was that people who consumed traditional foods were not old-fashioned. They regarded it important for them to follow traditional food patterns. Those traditional foods were part of their cultural heritage and this should be preserved. Respondents regarded home-made or home-cooked food as proper food but they still believed that junk foods are generally convenient to eat as opposed to traditional foods that cannot be found easily and are too difficult and time-consuming to prepare and cook.

This is because they value that eating healthy meals even when they are busy or have limited time is key to their lives. On a different note respondents revealed that the media, television, radio, posters, and magazines, was another element that influenced their choice of food.

6.2.6 To interpret and describe the implications of the nutrition transition on the current eating patterns of the study group (objective 6)

Botswana as a developing country falls within pattern 4 (Popkin, 2006) of the nutrition transition as described in Chapter 5 (see 5.12). The results have shown that although

traditional foods and home-cooked meals are still important, they are gradually replaced by including more foods prepared away from the home. From the findings of this study, it can be concluded that today (2015) mid-adolescents in Francistown include foods with a high fat and sugar content more often in their eating patterns than they did before. The majority of respondents often consumed fast foods, savoury snacks, fizzy drinks, sweets and confectionery. This result was also recorded in the study by Maruapula *et al.* (2011). These foods are associated with increasing energy consumption particularly from fat that is less healthy and increased rates of obesity and other non-communicable diseases (Brindal, 2010). Therefore, this finding serves as an indicator that the nutrition transition in Botswana contributes to a change from the traditional eating patterns to one associated with a modern/Western lifestyle. Popkin (2006) emphasises that it can lead to the emergence of new disease patterns associated with NR-NCD and increases disability later in life.

The next section addresses the significance of this study.

6.3 SIGNIFICANCE OF THE STUDY

The aim of the study was to determine and describe how the nutrition transition in Botswana contributes to the current food habits and food choice behaviour of adolescents (15-18 years of age) in the Francistown area, and to what extent Western-orientated foods are included in their eating patterns. In addition, the study further explored the contribution of the various environments, contexts and situations to the study group's eating patterns.

Since the study was limited to three senior secondary schools in Francistown, the result cannot be generalised and applied to all senior secondary school mid-adolescents in Botswana. However, valuable insights were realised about the food habits of the study group both at school and at home as well. The extent to which they were familiar with and consumed traditional foods was determined. The study contributed to closing the gap in the knowledge on what mid-adolescents in Botswana eat. Certain areas where improvement of their food intake is required were identified, and recommendations to followed-up and what should be done are given. Of specific concern is the low fruit and vegetable consumption and the increased consumption of snack and fast foods as reported in this study. Nutrition education for adolescents should encourage an increased intake of milk, fruits and vegetables daily in their eating patterns as a priority. Equally important is that snack and fast foods should only be indulged in as a treat. As already mentioned, evidence reflects a low level of fruit and vegetable consumption.

Parents and school meal providers of the respondents and all Batswana adolescents should see to it that this priority is addressed by promoting traditional foods, including milk, fruits and vegetables in meals and by reducing the eating of snack and fast foods. The next section deals with the limitations of the study.

6.4 LIMITATIONS OF THE STUDY

In conducting a study, there are often limitations present. This study is no exception.

6.4.1 Access to respondents

The main limitation of this study was that access to respondents who were learners at the said secondary schools in Francistown, was not easy to effect. Data collection was done during the time when teachers in Botswana schools were on strike. The researcher experienced challenges in contacting the school authorities to set up meetings with learners in order for those interested in participating in the study to volunteer.

6.4.2 Poor cooperation with schools

Cooperation with some schools was limited. In some instances, the researcher went to schools and learners did not honour the appointment scheduled to gather in one place. Some were reluctant to respond to the questionnaires the researcher was administering.

6.4.3 Amount of money spend at school

Although great care was taken in the development of the questionnaire, it would have been interesting to obtain more information on the amount of money and packed food and/or meals brought to school. Including a question about the amount of money the parents and/or guardians gave their child on weekdays would have been helpful in determining the frequency of consumption of snack and fast foods at school. It would have been valuable to know the amount of money given daily and at month-end, and how much was spent on buying these food items when eating alone or with friends and peers.

6.4.4 Packed food/meals

A question on packed meals (lunch boxes) brought to school from home as snack or lunch could have been included. This would have enabled the researcher to determine if these food items were healthy food choices and what reasons the respondents would have given for these choices.

Based on the findings and conclusions of the study the next section presents the recommendations drawn from the study findings.

6.5 RECOMMENDATIONS

The results of this study could be used in menu planning and other nutrition intervention programmes in secondary schools to help combat the negative impact of the nutrition transition on the eating patterns of adolescents in Botswana.

The following recommendations are made to the relevant authorities and stakeholders in Botswana such as the Department of Education, school administrators, teachers and parents.

- Food items and/or meals offered in the dining hall and at school tuck shops, as well as from the informal street food vendors operating at the schoolyards should be healthy. A policy about school meals in all Botswana schools already advocates balanced meals, including a greater variety of fruit and vegetables on school menus should be a priority.

- Tuck shops at schools should be encouraged to promote healthy foods and a regulatory body should be in place to check adherence to official policy and guidelines. They should not only sell snack and/or fast foods high in fat and sugars but also include food items such as fruit and traditional snacks low in sugars and fats.

- Curriculum designers should evaluate the curriculum and make healthy eating a priority issue for learners so they are aware of healthy food choices and how vitally important it is to make the right food choices in their daily lives. This aspect as a component of their learning programmes should be taught in all relevant subjects offered in schools. Subjects such as Science, Agriculture, *Setswana*, Moral Education and even Mathematics can be used to reinforce the information on healthy eating habits and stop learners from associating such information with only the Home Economics subject. The importance of emphasising the inclusion of traditional foods in their eating patterns must continue even ensuring it is properly taught in the school curriculum.

- Appointed persons responsible for the preparation of the school meals should be trained in menu planning or sensitised with information pertaining to good nutrition. Emphasis should be on healthy eating and the promotion of healthy food choices by providing interesting and balanced school meals. Healthy food preparation practices,

adequate portion control and the serving of the meals should also be addressed. Parents should also receive information on promoting healthy food choices.

- The training of informal street food vendors on the importance of offering healthy food choices to learners should be considered. They should be made aware of and be sensitive about the role they play in helping learners make healthy food choices. Guidelines on healthy eating must be given to them. Teaching these food vendors the principles of healthy eating and setting guidelines for the inclusion and promotion of healthier food options at affordable prices should also be considered.

- The establishment of vegetable gardens and fruit orchards should be a priority in Botswana schools and homes. All learners in schools should become actively involved in the planning, cultivation and maintenance of the school gardens as part of the curriculum. The fruit and vegetables produced can be used in the preparation of the school meals since the meals currently served lacked a variety of fruit and vegetables. Inclusion of the cultivated fruits and vegetables from the school garden in school meals could reduce the cost of meal preparation and motivate the learners to eat the vegetables they themselves produced.

- Within the community, parents and guardians of the learners at the various schools should be involved and active in such a school gardening project. Teachers should create an environment for the community that would be conducive for engaging community members in such activities. Teachers, together with the Departments of Agriculture and Health can provide lifelong learning when sharing their knowledge and skills related to the importance of healthy food choices and eating. Parents and guardians should be motivated to consider having their own home vegetable gardens and fruit trees, and to involve their children in the cultivation of these gardens to improve the availability of fruit and vegetables for their meals in the home.

- Family meals in Botswana should also include a variety of fruit and vegetables and balanced meals should be provided. People should be made aware of the established fact that it is important to eat five (5) portions of fruit and vegetables every day. The importance of the consumption of traditional foods should be also be emphasised.

Adopting the recommendations made on healthy eating patterns should help to improve the school and home and family food environments. As noted, to date (2015), the Botswana Department of Education has not issued policy guidelines that would assist schools in promoting healthy food choices and eating. Hence, it is necessary to put the recommendations from this study forward to the relevant school authorities with a copy

being forwarded to the Ministry of Education for consideration and possible implementation.

Based on the results of this study certain aspects that need further research are identified and presented in the following section.

6.6 SUGGESTIONS FOR FUTURE RESEARCH

Suggestions for future research on the topic of the effects of the nutrition transition on adolescents (15-18 years) in the Francistown area of Botswana as based on the results of this study are twofold:

- To execute a comparative study on the food habits of adolescents in urban, semi-urban, rural and remote areas in all regions of Botswana, including the extent to which traditional foods are included in each region.

- To investigate the reasons for the low fruit and vegetable consumption and increased fast and snack food consumption of mid-adolescents by means of a study on the contribution of the food environment of both rural and urban communities in Botswana.

6.7 CONCLUDING REMARKS

Though little has been published on the food habits and eating patterns of Batswana in general, and specifically on those of adolescents, this study offers some insight into the current eating patterns and food choice behaviour of adolescents in the Francistown area of Botswana. It is evident that a nutrition transition is taking place. The current phase is characterised by a change from a traditional lifestyle and eating patterns to those typically associated with a modern Western lifestyle.

The study has revealed that the food habits of the Batswana people continue to change as portrayed in the reported current food patterns, and the familiarity, preference and consumption frequency of various foods of the study group. The influence of modernisation and urbanisation was noted in the type of foods included in the meal patterns on weekdays, over the weekend as well as on special occasions. The external and internal environments have been seen to influence the food choice behaviour of the study group at particular places, the school environment, at their homes and elsewhere, for example, at fast food outlets and at special events. A Western eating pattern is

typically the consumption of three meals a day with in-between snacks. This study confirms that this practice exists in Botswana.

The findings of this study have clearly indicated that fruit and vegetable consumption was very low. Sweets and savoury snacks, such as potato crisps and cheese puffs, were consumed more frequently, especially while at school. Although there is a gradual increase in the consumption of modern Western-orientated foods, particularly the fast foods like pies, Russian sausages, cream buns/ring buns (doughnuts), hot dogs, potato chips, fat cakes (*magwinya*), the inclusion of certain traditional food items continues. This is confirmed as the majority of the respondents were familiar with and consumed these food dishes. Maize, sorghum and dishes prepared with maize and sorghum meal were eaten at least three to four times a week by the majority of the respondents, confirming its importance and position as the staple food of the Batswana people. Most of the other traditional foods and dishes prepared from legumes, root vegetables and melons were enjoyed and had a high preference rating. Although familiar and consumed, respondents also rated green leafy vegetables highly except pumpkin leaves, pigweed and spider flower that had a low preference rating, probably due to the bitter taste associated with some of these green leafy vegetables.

What people eat is primarily determined by where they live denoting that the external environments are part of the context in which food practices take place. These have to be taken into account. This study has contextualised the current eating patterns of the respondents in finding out their meal patterns and meal composition at weekdays, over weekends and on special occasions. In spite of evidence of an increased inclusion of Western-orientated food in the eating pattern of the study group, traditional Tswana food has not been discarded. It continues to be an integral part of food consumed in family context. On the other hand, the consumption of Western-orientated food (fast food and take-away foods) is closely associated with eating in the company of friends and peers.

In conclusion, the school environment should be used more constructively and creatively used to encourage healthy eating practices. Having clear guidelines and policies on the food that should be available to learners regardless of age (young or older) in the school environment will help to curb emerging trends that look for healthy food consumption worldwide.

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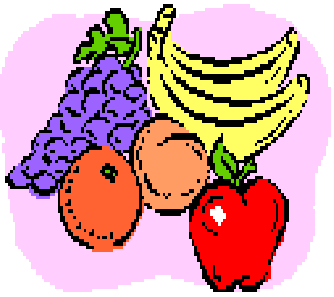
ADDENDUM A: SURVEY QUESTIONNAIRE ON FOOD HABITS

NUTRITION TRANSITION OF MID-ADOLESCENTS IN THE FRANCISTOWN AREA, BOTSWANA





THE PURPOSE OF THE STUDY IS: To determine and describe how the nutrition transition in Botswana contributes to the eating patterns and food choice behaviour of mid-adolescents (15-18 years of age) in the Francistown area, in various contexts (i.e family/household, friends/peer group and time frames) and how they experience/perceive their food choices in each of these contexts and situations.

PLEASE NOTE THE FOLLOWING

There are **no** correct or incorrect answers. Simply give your **own personal** habits and likes or dislikes.

- Your name will **not** appear in the questionnaire, the information obtained from you is **confidential.**
- I will only use a number **instead** of your name to mark the questionnaire for office use.
- The Questionnaire will take approximately **60 minutes** to complete.
- **Please answer ALL questions.**


Thank you for your esteemed cooperation.

Respondent Number | | | |

For official use only

V1 | | | |

SECTION A: SOCIO-DEMOGRAPHIC INFORMATION

Please answer **all** the questions.

A1. What is your age? A1 | | |

A2. What is your gender? A2 |

Male	1	Female	2

A3. In what form are you? A3 |

Form 4	1	Form 5	2

A4. In which area do you live in Francistown? A4 | |

A5. What is your home language? A5 | |

A6. To which church do you belong? A6 | |

A7. Who is the breadwinner or provider in your household? A7 |

A8. What kind of a job does he/she work? A8 |

A9. How many people live in your household? A9 | |

A10. Indicate which of the following **best** describe your household structure. **Mark only one.** A10 |

Nuclear family (parents and children)	1
Extended family (parents, children and other family members)	2
Single parent family (father or mother and children)	3
Child headed family (no parents only children)	4
Other (*please specify*) …….	5

A11. Who is mainly responsible for preparing meals in your household? A11 |

A12. Indicate which of the following **best** describes your mother's educational level. *Mark only one*. A12 |

University/College	1
High school/Secondary school	2
Primary school	3
Not gone to school	4
Other (*please specify*) …….	5

A13. Indicate which of the following **best** describes your father's educational level. *Mark only one*. For official use only

University/College	1
High school/Secondary school	2

A13 |

Primary school	3
Not gone to school	4
Other (*please specify*) ……..	5

A14. Please indicate which of the following appliances you have in your household. *You may mark more than one*.

Gas Stove	1	A14.1	
Electric Stove	2	A14.2	
Prima Stove	3	A14.3	
Refrigerator	4	A14.4	
Deep freezer	5	A14.5	
Microwave oven	6	A14.6	
Television	7	A14.7	
Radio	8	A14.8	

SECTION B: USUAL EATING PATTERNS

In this section information is needed on how you usually eat. Please indicate what you typically eat (**at least 3-4 times per week**) at **home** during **weekdays** (**Mondays to Fridays**).

B1. How many meals do you eat a day? B1 ☐

B2. Do you usually eat breakfast? B2 ☐

Yes	1	No	2

B3. If YES mark the **most** important reason why you eat breakfast? B3 ☐

To get strength or energy for the day	1
It is the most important meal of the day	2
Force of habit	3
Because I am hungry	4
Breakfast is prepared and available	5
Other (**give reason**) …….	6

B4. If NO mark the **most** important reason why you do **not** eat breakfast? B4 ☐

Too early, I cannot eat so early	1
No time for breakfast	2
I become nauseous when eating breakfast	3
Not hungry	4
Breakfast is not prepared	5
Other (**give reason**) …….	6

B5. Please indicate what you usually (**3-4 x per week**) eat or drink during **week days** (**Mondays to Fridays**) at the following times given in a table below. Please be very specific and indicate the type of food and drink (beverages) clearly.

For Example:

For official use only

Breakfast:
Soft mealie meal porridge with milk and sugar
Brown bread with margarine and jam or peanut butter
Tea with milk and sugar

In-between:
2 packets of chips, fruit juice, apple or banana

WEEKDAYS (MONDAY-FRIDAY)		
TIME:	FOOD EATEN:	
Breakfast (6-9am)		B5.1 B5.2 B5.3 B5.4 B5.5
In-between (9-12 Noon)		B5.6 B5.7 B5.8 B5.9
Lunch (12-3 pm)		B5.10 B5.11 B5.12 B5.13 B5.14 B5.15
In-between (3-5 pm)		B5.16 B5.17 B5.18 B5.19
Supper (5-8 pm)		B5.20 B5.21 B5.22 B5.23 B5.24
After supper (8+ pm)		B5.25 B5.26 B5.27 B5.28

For official use only

B6. Is there a **difference** in your eating pattern over **weekend days** (Saturdays and Sundays)?

Yes	1	No	2

B6 ☐

B7. If your answer to question B6 is NO, continue with question B8. If YES, please indicate the difference in your eating pattern during **weekend days**.

WEEKEND DAYS (SATURDAYS and SUNDAYS)		
TIME:	FOOD EATEN ON SATURDAYS:	FOOD EATEN ON SUNDAYS:
Breakfast (6-9am)		
In-between (9-12 Noon)		
Lunch (12-3 pm)		
In-between (3-5 pm)		
Supper (5-8 pm)		
After supper (8+ pm)		

Sat.(B7)		Sun.(B7U)	
B7.1		B7U.1	
B7.2		B7U.2	
B7.3		B7U.3	
B7.4		B7U.4	
B7.5		B7U.5	
B7.6		B7U.6	
B7.7		B7U.7	
B7.8		B7U.8	
B7.9		B7U.9	
B7.10		B7U.10	
B7.11		B7U.11	
B7.12		B7U.12	
B7.13		B7U.13	
B7.14		B7U.14	
B7.15		B7U.15	
B7.16		B7U.16	
B7.17		B7U.17	
B7.18		B7U.18	
B7.19		B7U.19	
B7.20		B7U.20	
B7.21		B7U.21	
B7.22		B7U.22	
B7.23		B7U.23	
B7.24		B7U.24	
B7.25		B7U.25	
B7.26		B7U.26	
B7.27		B7U.27	
B7.28		B7U.28	

B8. Please indicate how **often** you consume the following types of food and beverages. Please use the following four point scale.

For official use only

	5-7 x per week	3-4 x per week	1-2 x per week	Never	
Home cooked food	1	2	3	4	B8.1
Take away or fast food (e.g Chicken Licken, Nandos)	1	2	3	4	B8.2
Snack foods (e.g chips, chocolate, sweets, popcorn)	1	2	3	4	B8.3

Fruits (e.g oranges, bananas, apples, guava, grapes)	1	2	3	4	B8.4
Soft drinks (e.g coke, sprite, fanta)	1	2	3	4	B8.5
Fruit juice (e.g mango juice, apple juice)	1	2	3	4	B8.6

B9. When eating with family members please indicate how the meals are eaten. **Mark the option** which **best** describes how the meals are eaten in your family/household. B9

All members of the household eat together at the table	1
Different age groups are formed and eat separately	2

B10. How **often** do you and your family/household members **eat a meal together?** B10

Daily	1
3-4 x per week	2
1-2 x per month	3
Never	4

B11. How **often** do you eat meals in **places other than your home**? B11

Daily	1
3-4 x per week	2
1-2 x per month	3
Never	4

<u>If your answer is **never** to question B11, continue with SECTION C. and the rest.</u>

B12. If you eat **away** from home or school **where** do you eat **most often**? **Mark only** the food outlet where you eat **most often**. B12

Market place	1
Street vendors	2
Supermarkets	3
Restaurants	4
Kentucky Fried Chicken (KFC)	5
Nandos	6
Chicken Licken	7
Bimbos	8
Wimpy	9
Other (*please specify*) …….	10

B13. When eating **out**, **when** do you eat these meals? B13

Weekdays	1
Weekend days	2
Both Weekdays & Weekend days	3
Special occasions	4

B14. With whom do you eat these meals? B14

SECTION C: FAMILIARITY, FOOD PREFERENCE AND FREQUENCY OF CONSUMPTION OF TRADITIONAL FOODS, SNACK AND FAST FOODS

❖ TRADITIONAL TSWANA FOODS

C1. Do you eat Traditional Setswana food? C1

Yes	1	No	2

If you do **not** eat Traditional Setswana food, then continue with question **C5**.

C2. Please give a **reason** for your answer to question C1? C2.1 C2.2 C2.3 C2.4 C2.5

C3. Indicate when do you **usually** eat traditional foods? **You may mark more than one option.**

Weekdays	1
Weekend days	2
Special occasions only	3
When available	4
Other (*please specify*) ……	5

C3.1 C3.2 C3.3 C3.4 C3.5

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C4. How do you feel about Traditional Tswana foods? Please give your **personal opinion** in 4 to 5 lines.

C4.1 C4.2 C4.3 C4.4 C4.5

❖ FOOD AVOIDANCES

This PART deals with foods that are **not** eaten by **you** and **your** household members and **reasons** for the avoidances.

C5. In your cultural beliefs which foods do you **avoid** or do **not** eat? Please **mark** the foods you **avoid** or do **not** eat, and state **one reason** why you **avoid** or do **not** eat the food?

FOOD ITEM		REASON	
Nama ya kolobe (Pork/Bacon)	1		C5.1
Nama ya nku (Mutton/Lamb)	2		C5.2
Polony	3		C5.3
Fish	4		C5.4
Eggs	5		C5.5
Phane (Mophane/ caterpillar worms)	6		C5.6
Other (*please specify*) ……	7		C5.7 (*Other*) C5.8 (*Reason*)

❖ FOOD AT SPECIAL OCCASSIONS

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This PART deals with the food consumed at special occasions.

C6. Write a list of foods that are **usually served** at the special occasion **you usually participate in**. You may write **under more than one occasion**.

1. Birthday Parties	C6.1 C6.2 C6.3 C6.4
2. Weddings (civil ceremonies) **Lenyalo la lesire**	C6.5 C6.6 C6.7 C6.8
3. Weddings (traditional ceremonies) **Patlo le Bogadi**	C6.9 C6.10 C6.11 C6.12
4. Funerals or Tombstone unveiling ceremony	C6.13 C6.14 C6.15 C6.16

5. Traditional or Ritual ceremonies (e.g Ancestral Worship) **phekolo**	C6.17 C6.18 C6.19 C6.20
6. Other (*please specify*) ……	C6.21 C6.22 C6.23 C6.24

❖ FAMILIARITY, FOOD PREFERENCE AND FOOD FREQUENCY ON TRADITONAL FOODS

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C7. This section determines the **familiarity**, **food preference** and **food frequency** of traditional foods. **Read carefully** the **two (2) statements** given **below** to guide you.

-IF YOU HAVE NOT EATEN A FOOD: Please under **familiarity**, put a **mark** (x) next to the food item in the table **below** if it is **unknown** (that is, if you don't know the food, or you are not sure what it is) and if you have **never eaten** it. Then proceed to the next food item, thus if you do **not** know or have **never eaten** that particular food, because you can't tell how much you like a food which you do **not** know (**unknown**) or have **never eaten**.

-IF YOU HAVE EATEN A FOOD: then you must indicate **how much you like** that particular food item (**food preference**) and how **often** you eat that particular food item (**food frequency**). Put a **circle** on top of the number next to **each** of the food item given in the table below to indicate **how much you like** that particular food item (**food preference**) and **how often** you eat that particular food item (**food frequency**).

	Familiarity		Food preference					Food frequency				
	Unknown	Never Eaten	Dislike it very much	Dislike it	Neutral	Like it	Like it very much	Daily	3-4 x per week	1 x per week	< 3 x per month	Special Occasions
FOOD ITEM	x	x	1	2	3	4	5	1	2	3	4	5
CEREAL AND CEREAL PRODUCT												
Bogobe ja Mabele (sorghum porridge)			1	2	3	4	5	1	2	3	4	5
Motogo wa Mabele (sorghum soft porridge)			1	2	3	4	5	1	2	3	4	5
Ting (sour sorghum porridge)			1	2	3	4	5	1	2	3	4	5
Lebelebele (millet porridge)			1	2	3	4	5	1	2	3	4	5
Phaletshe (maize meal porridge)			1	2	3	4	5	1	2	3	4	5
Motogo wa Phaletshe (soft maize meal porridge)			1	2	3	4	5	1	2	3	4	5
Mmidi (fresh mealies)			1	2	3	4	5	1	2	3	4	5
Setampa (Plain Samp)			1	2	3	4	5	1	2	3	4	5
Setampa le dinawa/Dikgobe (Samp and beans)			1	2	3	4	5	1	2	3	4	5

C7.1		C7.2	
C7.3		C7.4	
C7.5		C7.6	
C7.7		C7.8	
C7.9		C7.10	
C7.11		C7.12	
C7.13		C7.14	
C7.15		C7.16	
C7.17		C7.18	

Lechotlho la dinawa (cooked dried maize kernels and beans)			1	2	3	4	5	1	2	3	4	5	C7.19		C7.20
Kabu (maize kernels)			1	2	3	4	5	1	2	3	4	5	C7.21		C7.22
Mosuthwane (cracked sorghum grains)			1	2	3	4	5	1	2	3	4	5	C7.23		C7.24
Logala/nthiane (fresh milk maize/sorghum porridge)			1	2	3	4	5	1	2	3	4	5	C7.25		C7.26
Other (*please specify*) ……			1	2	3	4	5	1	2	3	4	5	C7.27		C7.28
MELON DISHES															
Bogobe ja lerotse/lekatane/Thopi (melon porridge)			1	2	3	4	5	1	2	3	4	5	C7.29		C7.30
Makgomane (small melons)			1	2	3	4	5	1	2	3	4	5	C7.31		C7.32
Legodu la dinawa (melon and beans with fresh milk)			1	2	3	4	5	1	2	3	4	5	C7.33		C7.34
Other (*please specify*) ……			1	2	3	4	5	1	2	3	4	5	C7.35		C7.36
	Familiarity		Food preference					Food frequency					For official use only		
	Unknown	Never Eaten	Dislike it very much	Dislike it	Neutral	Like it	Like it very much	Daily	3-4 x per week	1 x per week	< 3 x per month	Special Occasions			
	x	x	1	2	3	4	5	1	2	3	4	5			
LEGUMES															
Dinawa tsa Setswana (black eye beans/cowpeas)			1	2	3	4	5	1	2	3	4	5	C7.37		C7.38
Dinawa (sugar beans)			1	2	3	4	5	1	2	3	4	5	C7.39		C7.40
Letlhodi (china beans)			1	2	3	4	5	1	2	3	4	5	C7.41		C7.42
Ditloo (jugo beans)			1	2	3	4	5	1	2	3	4	5	C7.43		C7.44
Manoko (groundnuts)			1	2	3	4	5	1	2	3	4	5	C7.45		C7.46
Other (*please specify*) ……			1	2	3	4	5	1	2	3	4	5	C7.47		C7.48
VEGETABLES															
Morogo wa dinawa (fresh / dried Bean leaves)			1	2	3	4	5	1	2	3	4	5	C7.49		C7.50
Morogo wa dinawa ka manoko (fresh / dried Bean leaves with Groundnuts powder)			1	2	3	4	5	1	2	3	4	5	C7.51		C7.52
Morogo wa lephutshi (fresh /dried pumpkin leaves)			1	2	3	4	5	1	2	3	4	5	C7.53		C7.54
Thepe (Pig weed/Amaranthus)			1	2	3	4	5	1	2	3	4	5	C7.55		C7.56
Rothwe (Spider flower/ *cleome gynandra*)			1	2	3	4	5	1	2	3	4	5	C7.57		C7.58
Delele (Jew's mallow plant/ *Corchorus olitorius*)			1	2	3	4	5	1	2	3	4	5	C7.59		C7.60
Longangale (dried melon strips)			1	2	3	4	5	1	2	3	4	5	C7.61		C7.62
Other (*please specify*) ……			1	2	3	4	5	1	2	3	4	5	C7.63		C7.64
FRUITS															
Legapu (water melon)			1	2	3	4	5	1	2	3	4	5	C7.65		C7.66
Mmupudu (*mimusops zeyheri*)			1	2	3	4	5	1	2	3	4	5	C7.67		C7.68
Morula (marula)			1	2	3	4	5	1	2	3	4	5	C7.69		C7.70
Moretlwa/ mogwana (wild berry/ Grewia flava)			1	2	3	4	5	1	2	3	4	5	C7.71		C7.72
Motoroko (wild cactus fruit)			1	2	3	4	5	1	2	3	4	5	C7.73		C7.74
Mogorogorwana (wild oranges)			1	2	3	4	5	1	2	3	4	5	C7.75		C7.76
Mmilo (wild medlar/ *Vangueria infausta*)			1	2	3	4	5	1	2	3	4	5	C7.77		C7.78
Moretologa (*Ximenia Caffra/ americana*)			1	2	3	4	5	1	2	3	4	5	C7.79		C7.80

Morojwa (*Azanza garkeana*)			1	2	3	4	5	1	2	3	4	5	C7.81		C7.82
Other (***please specify***) ……			1	2	3	4	5	1	2	3	4	5	C7.83		C7.84
ROOTS															
Dipotata (sweet potatoes)			1	2	3	4	5	1	2	3	4	5	C7.85		C7.86
Potatoes			1	2	3	4	5	1	2	3	4	5	C7.87		C7.88
Other (***please specify***) ……			1	2	3	4	5	1	2	3	4	5	C7.89		C7.90
MEATS															
Seswaa/ chotlho (pounded meat)			1	2	3	4	5	1	2	3	4	5	C7.91		C7.92
Sebete (liver)			1	2	3	4	5	1	2	3	4	5	C7.93		C7.94
Serobe (tripe)			1	2	3	4	5	1	2	3	4	5	C7.95		C7.96
Lebete (pancreas)			1	2	3	4	5	1	2	3	4	5	C7.97		C7.98
Makgwafu (lungs)			1	2	3	4	5	1	2	3	4	5	C7.99		C7.100
	Familiarity		Food preference					Food frequency					For official use only		
	Unknown	Never Eaten	Dislike it very much	Dislike it	Neutral	Like it	Like it very much	Daily	3-4 x per week	1 x per week	< 3 x per month	Special Occasions			
	x	x	1	2	3	4	5	1	2	3	4	5			
Mala a kgomo/podi/nku (intestines)			1	2	3	4	5	1	2	3	4	5	C7.101		C7.102
Menoto (chicken feet)			1	2	3	4	5	1	2	3	4	5	C7.103		C7.104
Mala a koko (chicken intestines)			1	2	3	4	5	1	2	3	4	5	C7.105		C7.106
Dithogo tsa dikoko (chicken heads)			1	2	3	4	5	1	2	3	4	5	C7.107		C7.108
Melala (chicken necks)			1	2	3	4	5	1	2	3	4	5	C7.109		C7.110
Dintshu (chicken gizzards)			1	2	3	4	5	1	2	3	4	5	C7.111		C7.112
Nama ya kgomo (beef)			1	2	3	4	5	1	2	3	4	5	C7.113		C7.114
Digwapa (biltong)			1	2	3	4	5	1	2	3	4	5	C7.115		C7.116
Nama ya nku (mutton/lamb)			1	2	3	4	5	1	2	3	4	5	C7.117		C7.118
Nama ya podi (goat meat)			1	2	3	4	5	1	2	3	4	5	C7.119		C7.120
Koko ya Setswana (tswana chicken)			1	2	3	4	5	1	2	3	4	5	C7.121		C7.122
Other (***please specify***) ……			1	2	3	4	5	1	2	3	4	5	C7.123		C7.124
INSECTS															
Phane (caterpillar/Mopane worms)			1	2	3	4	5	1	2	3	4	5	C7.125		C7.126
Tsie (locusts)			1	2	3	4	5	1	2	3	4	5	C7.127		C7.128
Other (***please specify***) ……			1	2	3	4	5	1	2	3	4	5	C7.129		C7.130

❖ FAMILIARITY, FOOD PREFERENCE AND FOOD FREQUENCY ON SNACK AND FAST FOODS

For official use only

C8. This section determines the **familiarity**, **food preference** and **food frequency** of traditional foods. **Read carefully** the **two (2) statements** given **below** to guide you.

-IF YOU HAVE NOT EATEN A FOOD: Please under **familiarity**, put a **mark (x)** next to the food item in the table **below** if it is **unknown** (that is, if you don't know the food, or you are not sure what it is) and if you have **never eaten** it. Then proceed to the next food item, thus if you do **not** know or have **never eaten** that particular food, because you can't tell how much you like a food which you do **not** know (**unknown**) or have **never eaten**.

-IF YOU HAVE EATEN A FOOD: then you must indicate **how much you like** that particular food item (**food preference**) and how **often** you eat that particular food item (**food frequency**). Put a **circle** on top of the number next to **each** of the food item given in the table below to indicate **how much you like** that particular food item (**food preference**) and **how often** you eat that particular food item (**food frequency**).

	Familiarity		Food preference					Food frequency								
	Unknown	Never eaten	Dislike it very much	Dislike it	Neutral	Like it	Like it very much	Daily	3-4 x per week	1 x per week	< 3 x per month	Special Occasions				
FOOD ITEM	x	x	1	2	3	4	5	1	2	3	4	5				
Meat pie			1	2	3	4	5	1	2	3	4	5	C8.1		C8.2	
Hamburger			1	2	3	4	5	1	2	3	4	5	C8.3		C8.4	
Hot dog			1	2	3	4	5	1	2	3	4	5	C8.5		C8.6	
Deep fried fish & chips			1	2	3	4	5	1	2	3	4	5	C8.7		C8.8	
Russian & chips			1	2	3	4	5	1	2	3	4	5	C8.9		C8.10	
Pizza			1	2	3	4	5	1	2	3	4	5	C8.11		C8.12	
Yoghurt, Yogi sip			1	2	3	4	5	1	2	3	4	5	C8.13		C8.14	
Fruits(e.g grapes, oranges, pineapple, banana)			1	2	3	4	5	1	2	3	4	5	C8.15		C8.16	
Fruit juice (e.g mango juice, apple juice, fruit punch)			1	2	3	4	5	1	2	3	4	5	C8.17		C8.18	
Fizzy drinks (e.g coke, fanta, sprite)			1	2	3	4	5	1	2	3	4	5	C8.19		C8.20	
Dairy fruit beverages (e.g tropica, krush, cabanna)			1	2	3	4	5	1	2	3	4	5	C8.21		C8.22	
Milk shakes			1	2	3	4	5	1	2	3	4	5	C8.23		C8.24	
Ice cream			1	2	3	4	5	1	2	3	4	5	C8.25		C8.26	
Cakes & Confectionery			1	2	3	4	5	1	2	3	4	5	C8.27		C8.28	
Biscuits, cookies			1	2	3	4	5	1	2	3	4	5	C8.29		C8.30	
Chocolates, chocolate bars			1	2	3	4	5	1	2	3	4	5	C8.31		C8.32	
Sweets, candy			1	2	3	4	5	1	2	3	4	5	C8.33		C8.34	
Nuts			1	2	3	4	5	1	2	3	4	5	C8.35		C8.36	
Potato chips / crisps			1	2	3	4	5	1	2	3	4	5	C8.37		C8.38	
Cheese curls, cheese puffs			1	2	3	4	5	1	2	3	4	5	C8.39		C8.40	
Salty biscuits			1	2	3	4	5	1	2	3	4	5	C8.41		C8.42	

❖ NON QUANTITATIVE FOOD FREQUENCY QUESTIONNAIRE

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C9. This section determines the food frequency of different foods. **Read carefully** the instruction given below to guide you.

- Put a **circle** on top of the number next to each of the food items given in the table below to indicate **how often** you eat that particular food item (**food frequency**).

	Daily	3-4 x per week	1 x per week	< 3 x per month	Special Occasions	Never		
	1	2	3	4	5	6		
BREAD AND BREAD PRODUCTS								
White bread	1	2	3	4	5	6	C9.1	
Brown bread	1	2	3	4	5	6	C9.2	
Buns, bread rolls	1	2	3	4	5	6	C9.3	
Fat cakes (Magwinya)	1	2	3	4	5	6	C9.4	
Flat cakes (Diphaphatha/ mapakiwa)	1	2	3	4	5	6	C9.5	
Dumplings (Matemekwane)	1	2	3	4	5	6	C9.6	
Pot bread	1	2	3	4	5	6	C9.7	
Rusks	1	2	3	4	5	6	C9.8	
Scones	1	2	3	4	5	6	C9.9	
Other (*please specify*)	1	2	3	4	5	6	C9.10	
SPREADS OR ACCOMPANIMENTS TO BREAD								
Butter	1	2	3	4	5	6	C9.11	
Margarine	1	2	3	4	5	6	C9.12	
Jam/honey/marmalade	1	2	3	4	5	6	C9.13	
Peanut butter	1	2	3	4	5	6	C9.14	
Cheese	1	2	3	4	5	6	C9.15	
Other (*please specify*)	1	2	3	4	5	6	C9.16	
CEREALS								
Breakfast cereals (Corn flakes, All bran flakes, Rice krispies, Veet bix)	1	2	3	4	5	6	C9.17	
Soft cooked porridge (Oats, mealie meal soft porridge, sorghum soft porridge)	1	2	3	4	5	6	C9.18	
Samp	1	2	3	4	5	6	C9.19	
Rice	1	2	3	4	5	6	C9.20	
Pasta (macaroni, spaghetti)	1	2	3	4	5	6	C9.21	
Stiff mealie-meal porridge	1	2	3	4	5	6	C9.22	
Stiff sorghum porridge	1	2	3	4	5	6	C9.23	
Millet porridge (lebelebele)	1	2	3	4	5	6	C9.24	
Other (*please specify*)	1	2	3	4	5	6	C9.25	
VEGETABLES								
Green vegetables (spinach, chomolia, cabbage, cucumber, lettuce)	1	2	3	4	5	6	C9.26	
Yellow vegetables (butternut, pumpkin, carrots)	1	2	3	4	5	6	C9.27	
Other vegetables (onion, tomato, cauliflower, mushroom, beetroot)	1	2	3	4	5	6	C9.28	
Other (*please specify*)	1	2	3	4	5	6	C9.29	
TUBERS								
Potatoes	1	2	3	4	5	6	C9.30	
Sweet potatoes	1	2	3	4	5	6	C9.31	
Other (*please specify*)	1	2	3	4	5	6	C9.32	

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	Daily	3-4 x per week	1 x per week	< 3 x per month	Special Occasions	Never		
FRUITS								
Citrus fruits (oranges, lemons, naartjies)	1	2	3	4	5	6	C9.33	
Vitamin A rich (yellow peaches, mangoes, paw paw, pineapple)	1	2	3	4	5	6	C9.34	
Other fruits (grapes, bananas, apples, pears, litchis)	1	2	3	4	5	6	C9.35	
Tinned fruits / canned	1	2	3	4	5	6	C9.36	
Dried fruits (raisins)	1	2	3	4	5	6	C9.37	
Other (*please specify*)	1	2	3	4	5	6	C9.38	
MEAT AND MEAT DISHES								
Beef (nama ya kgomo)	1	2	3	4	5	6	C9.39	
Mutton/lamb (nama ya nku)	1	2	3	4	5	6	C9.40	
Goat meat (nama ya podi)	1	2	3	4	5	6	C9.41	
Chicken (koko)	1	2	3	4	5	6	C9.42	
Pork (kolobe)	1	2	3	4	5	6	C9.43	
Bacon	1	2	3	4	5	6	C9.44	
Ham	1	2	3	4	5	6	C9.45	
Boerewors (boroso)	1	2	3	4	5	6	C9.46	
Russian sausages	1	2	3	4	5	6	C9.47	
Vienna sausages	1	2	3	4	5	6	C9.48	
Polony	1	2	3	4	5	6	C9.49	
Other (*please specify*)	1	2	3	4	5	6	C9.50	
FISH								
Fresh fish	1	2	3	4	5	6	C9.51	
Fried fish	1	2	3	4	5	6	C9.52	
Canned/ tinned fish (sardines/ pilchards)	1	2	3	4	5	6	C9.53	
Dried fish	1	2	3	4	5	6	C9.54	
Other (*please specify*)	1	2	3	4	5	6	C9.55	
OTHER PROTEINS								
Eggs, egg dishes	1	2	3	4	5	6	C9.56	
Cooked cheese dishes (macaroni cheese)	1	2	3	4	5	6	C9.57	
Other (*please specify*)	1	2	3	4	5	6	C9.58	
DAIRY AND DAIRY PRODUCTS								
Fresh milk	1	2	3	4	5	6	C9.59	
Sour milk (madila)	1	2	3	4	5	6	C9.60	
Cheese	1	2	3	4	5	6	C9.61	
Yoghurt, Yogi sip	1	2	3	4	5	6	C9.62	
Other (*please specify*)	1	2	3	4	5	6	C9.63	
BEVERAGES								
Coffee	1	2	3	4	5	6	C9.64	
Tea	1	2	3	4	5	6	C9.65	
Milk as beverage	1	2	3	4	5	6	C9.66	
Herbal tea (e.g Mosukujane, Green tea)	1	2	3	4	5	6	C9.67	
Mageu	1	2	3	4	5	6	C9.68	
Fruit juices (e.g mango juice, apple juice)	1	2	3	4	5	6	C9.69	
Fizzy drinks (e.g coke, fanta)	1	2	3	4	5	6	C9.70	
Ginger beer-home brew	1	2	3	4	5	6	C9.71	
Water	1	2	3	4	5	6	C9.72	
Other (*please specify*)	1	2	3	4	5	6	C9.73	

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	Daily	3-4 x per week	1 x per week	< 3 x per month	Special Occasions	Never		
PUDDINGS AND CONFECTIONERY								
Ice cream	1	2	3	4	5	6	C9.74	
Custard sauce & jelly	1	2	3	4	5	6	C9.75	
Muffins	1	2	3	4	5	6	C9.76	
Cake & cup cakes	1	2	3	4	5	6	C9.77	
Biscuits	1	2	3	4	5	6	C9.78	
Sweets	1	2	3	4	5	6	C9.79	
Other (*please specify*)	1	2	3	4	5	6	C9.80	

SECTION D: KNOWLEDGE, ATTITUDES, BELIEFS, VALUES AND DIFFERENT CONTEXTS AND SITUATIONS

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❖ KNOWLEDGE, ATTITUDES, BELIEFS AND VALUES

D1. Please indicate or mark your level of **agreement** or **disagreement** with each of the following statements; to **mark** put a **circle** on top of the number.

	Strongly Disagree	Disagree	Agree	Strongly Agree		
KNOWLEDGE STATEMENTS						
It is important to eat five (5) portions of fruits and vegetables every day.	1	2	3	4	D1.1	
Most traditional foods are healthier than fast foods and snacks or junk food.	1	2	3	4	D1.2	
I eat traditional foods because it has no additives, colouring matters or preservatives.	1	2	3	4	D1.3	
Junk food is low in vitamins and minerals.	1	2	3	4	D1.4	
Eating foods that are low in fat and sugar helps one stay at a healthy weight, and decreases the risk of health problems.	1	2	3	4	D1.5	
I may not get enough calcium if I do not drink milk or eat other dairy foods.	1	2	3	4	D1.6	
Eating too many kilojoules or calories may cause overweight and coronary heart diseases.	1	2	3	4	D1.7	
Fried foods contain a lot of fat.	1	2	3	4	D1.8	
Foods high in fat, salt and sugar (e.g chocolate, muffins, potato chips) should be limited in my eating pattern.	1	2	3	4	D1.9	
Fast food and snacks should only be eaten as a treat.	1	2	3	4	D1.10	
ATTITUDES STATEMENTS						
Most traditional foods are tasty.	1	2	3	4	D1.11	
Traditional foods are too difficult and time consuming to prepare.	1	2	3	4	D1.12	
I do not like others (e.g my friends, school / classmates) to know that I eat traditional foods.	1	2	3	4	D1.13	
Iam afraid to eat things I have never had before.	1	2	3	4	D1.14	
I like trying new foods.	1	2	3	4	D1.15	
It is important to me to follow traditional food patterns.	1	2	3	4	D1.16	
Media (e.g television, radio, posters, and magazines) influences my food choice.	1	2	3	4	D1.17	
I skip meals when I am busy.	1	2	3	4	D1.18	
I drink a lot of fizzy drinks instead of milk.	1	2	3	4	D1.19	
BELIEF STATEMENTS						
Most people who consume traditional foods are old fashioned.	1	2	3	4	D1.20	
Traditional foods takes a long time to cook (are time consuming).	1	2	3	4	D1.21	
Junk foods are generally convenient to eat.	1	2	3	4	D1.22	
Traditional foods cannot be found easily.	1	2	3	4	D1.23	
Proper food is regarded as home-made or home cooked food.	1	2	3	4	D1.24	
My religion allows me to use and eat traditional foods.	1	2	3	4	D1.25	
VALUE STATEMENTS						
Traditional foods are expensive to buy.	1	2	3	4	D1.26	
What I eat indicates my social status.	1	2	3	4	D1.27	
My parents determine what I eat on a daily basis.	1	2	3	4	D1.28	
It is important for me to eat healthy meals even when I am busy or have limited time.	1	2	3	4	D1.29	
Traditional foods are part of our cultural heritage and should be preserved.	1	2	3	4	D1.30	
Traditional foods are suitable to serve to guests.	1	2	3	4	D1.31	
Only healthy foods should be available at school.	1	2	3	4	D1.32	
School tuck-shop / canteens should sell fresh fruits every day.	1	2	3	4	D1.33	

❖ TRADITIONAL FOODS IN DIFFERENT CONTEXTS AND SITUATIONS (FAMILY CONTEXT, FRIENDS/PEER GROUP CONTEXT AND WHEN EXPERIENCING TIME CONSTRAINTS/LIMITED TIME e.t.c)

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D2. Please indicate about **three** (3) **contexts** or **situations** you would choose to eat **each** stated food item in the table below. To **mark** put a **circle** on top of the number.

	CONTEXTS or SITUATIONS								
	When I am with my family	When I am with my friends/ peers/ school mates	When I do not have much time to eat	When I want variety in my food	When I want something quick and easy to eat	When I want something nutritious	When we have guests	For special occasions/ ceremonies/ celebrations	
BOGOBE/PORRIDGE (sorghum, millet) Phaletshe (stiff maize meal porridge) Ting (fermented sorghum)	1	2	3	4	5	6	7	8	D2.1 ☐ D2.2 ☐ D2.3 ☐
Bogobe ja lerotse (melon porridge)	1	2	3	4	5	6	7	8	D2.4 ☐ D2.5 ☐ D2.6 ☐
Setampa le dinawa/ dikgobe / lechotlho (Samp & Beans)	1	2	3	4	5	6	7	8	D2.7 ☐ D2.8 ☐ D2.9 ☐
Setampa (Plain Samp)	1	2	3	4	5	6	7	8	D2.10 ☐ D2.11 ☐ D2.12 ☐
Mmidi (fresh mealies)	1	2	3	4	5	6	7	8	D2.13 ☐ D2.14 ☐ D2.15 ☐
Mosuthwane (cracked sorghum grains)	1	2	3	4	5	6	7	8	D2.16 ☐ D2.17 ☐ D2.18 ☐
Logala/ nthiane (maize/ sorghum cooked with milk)	1	2	3	4	5	6	7	8	D2.19 ☐ D2.20 ☐ D2.21 ☐
BEANS (e.g Black eye beans, jugo beans, sugar beans, groundnuts)	1	2	3	4	5	6	7	8	D2.22 ☐ D2.23 ☐ D2.24 ☐
GREEN LEAFY VEGETABLES (Rothwe, Thepe, Delele, Morogo wa dinawa, Morogo wa lephutshi)	1	2	3	4	5	6	7	8	D2.25 ☐ D2.26 ☐ D2.27 ☐
FRUITS (e.g Morula, Mmilo, Moretologa, Moroja, Mogorogorwana, Moretlwa/ Mogwana)	1	2	3	4	5	6	7	8	D2.28 ☐ D2.29 ☐ D2.30 ☐
Legapu (water melon)	1	2	3	4	5	6	7	8	D2.31 ☐ D2.32 ☐ D2.33 ☐
TUBERS (sweet potatoes, potatoes)	1	2	3	4	5	6	7	8	D2.34 ☐ D2.35 ☐ D2.36 ☐
OFFALS; Sebete (liver) Serobe (tripe) Lebete (pancreas) Makgwafu (lungs) Mala a kgomo/ podi/ nku (intestines)	1	2	3	4	5	6	7	8	D2.37 ☐ D2.38 ☐ D2.39 ☐
CHICKEN INSIDES/ CUTS; Mala a koko (chicken intestines) Dintshu (gizzards) Menoto (chicken feet) Dithogo tsa dikoko (chicken heads) Melala (chicken necks)	1	2	3	4	5	6	7	8	D2.40 ☐ D2.41 ☐ D2.42 ☐
Nama ya kgomo (beef)	1	2	3	4	5	6	7	8	D2.43 ☐ D2.44 ☐ D2.45 ☐
Digwapa (biltong)	1	2	3	4	5	6	7	8	D2.46 ☐ D2.47 ☐ D2.48 ☐
Nama ya nku (mutton/lamb)	1	2	3	4	5	6	7	8	D2.49 ☐ D2.50 ☐ D2.51 ☐
Nama ya podi (goat meat)	1	2	3	4	5	6	7	8	D2.52 ☐ D2.53 ☐ D2.54 ☐
Koko ya Setswana (tswana chicken)	1	2	3	4	5	6	7	8	D2.55 ☐ D2.56 ☐ D2.57 ☐
Phane (Mophane worms/ caterpillar)	1	2	3	4	5	6	7	8	D2.58 ☐ D2.59 ☐ D2.60 ☐

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❖ FAST FOODS / CONVENIENCE FOODS IN DIFFERENT CONTEXTS AND SITUATIONS (FAMILY CONTEXT, FRIENDS/PEER GROUP CONTEXT AND WHEN EXPERIENCING TIME CONSTRAINTS/LIMITED TIME e.t.c)

D3. Please indicate about **three** (3) **contexts** or **situations** you would choose to eat **each** stated food item in the table below. To **mark** put a **circle** on top of the number.

	CONTEXTS or SITUATIONS								
	When I am with my family	When I am with my friends/ peers/ school mates	When I do not have much time to eat	When I want variety in my food	When I want something quick and easy to eat	When I want something nutritious	When we have guests	For special occasions/ ceremonies/ celebrations	
Meat pie	1	2	3	4	5	6	7	8	D3.1 D3.2 D3.3
Hamburger	1	2	3	4	5	6	7	8	D3.4 D3.5 D3.6
Hot dog	1	2	3	4	5	6	7	8	D3.7 D3.8 D3.9
Deep fried fish & chips	1	2	3	4	5	6	7	8	D3.10 D3.11 D3.12
Russian & chips	1	2	3	4	5	6	7	8	D3.13 D3.14 D3.15
Pizza	1	2	3	4	5	6	7	8	D3.16 D3.17 D3.18
Yoghurt, Yogi sip	1	2	3	4	5	6	7	8	D3.19 D3.20 D3.21
Fruits(e.g grapes, oranges, pineapple, apples, banana)	1	2	3	4	5	6	7	8	D3.22 D3.23 D3.24
Fruit juice (e.g mango juice, apple juice, fruit punch)	1	2	3	4	5	6	7	8	D3.25 D3.26 D3.27
Fizzy drinks (e.g coke, fanta, sprite)	1	2	3	4	5	6	7	8	D3.28 D3.29 D3.30
Dairy fruit beverages (e.g tropica, krush, cabanna)	1	2	3	4	5	6	7	8	D3.31 D3.32 D3.33
Milk shakes	1	2	3	4	5	6	7	8	D3.34 D3.35 D3.36
Ice cream	1	2	3	4	5	6	7	8	D3.37 D3.38 D3.39
Cakes & Confectionery	1	2	3	4	5	6	7	8	D3.40 D3.41 D3.42
Biscuits, cookies	1	2	3	4	5	6	7	8	D3.43 D3.44 D3.45
Chocolates, chocolate bars	1	2	3	4	5	6	7	8	D3.46 D3.47 D3.48
Sweets, candy	1	2	3	4	5	6	7	8	D3.49 D3.50 D3.51
Nuts	1	2	3	4	5	6	7	8	D3.52 D3.53 D3.54
Potato chips / crisps	1	2	3	4	5	6	7	8	D3.55 D3.56 D3.57
Cheese curls, cheese puffs	1	2	3	4	5	6	7	8	D3.58 D3.59 D3.60
Salty biscuits	1	2	3	4	5	6	7	8	D3.61 D3.62 D3.63

THANK YOU!

ADDENDUM B: PHYSICAL (STRUCTURAL) ENVIRONMENT OBSERVATION CHECKLIST

I. COMPOSITION OF THE OBSERVATION CHECKLIST AT SCHOOLS

Name of school: _____

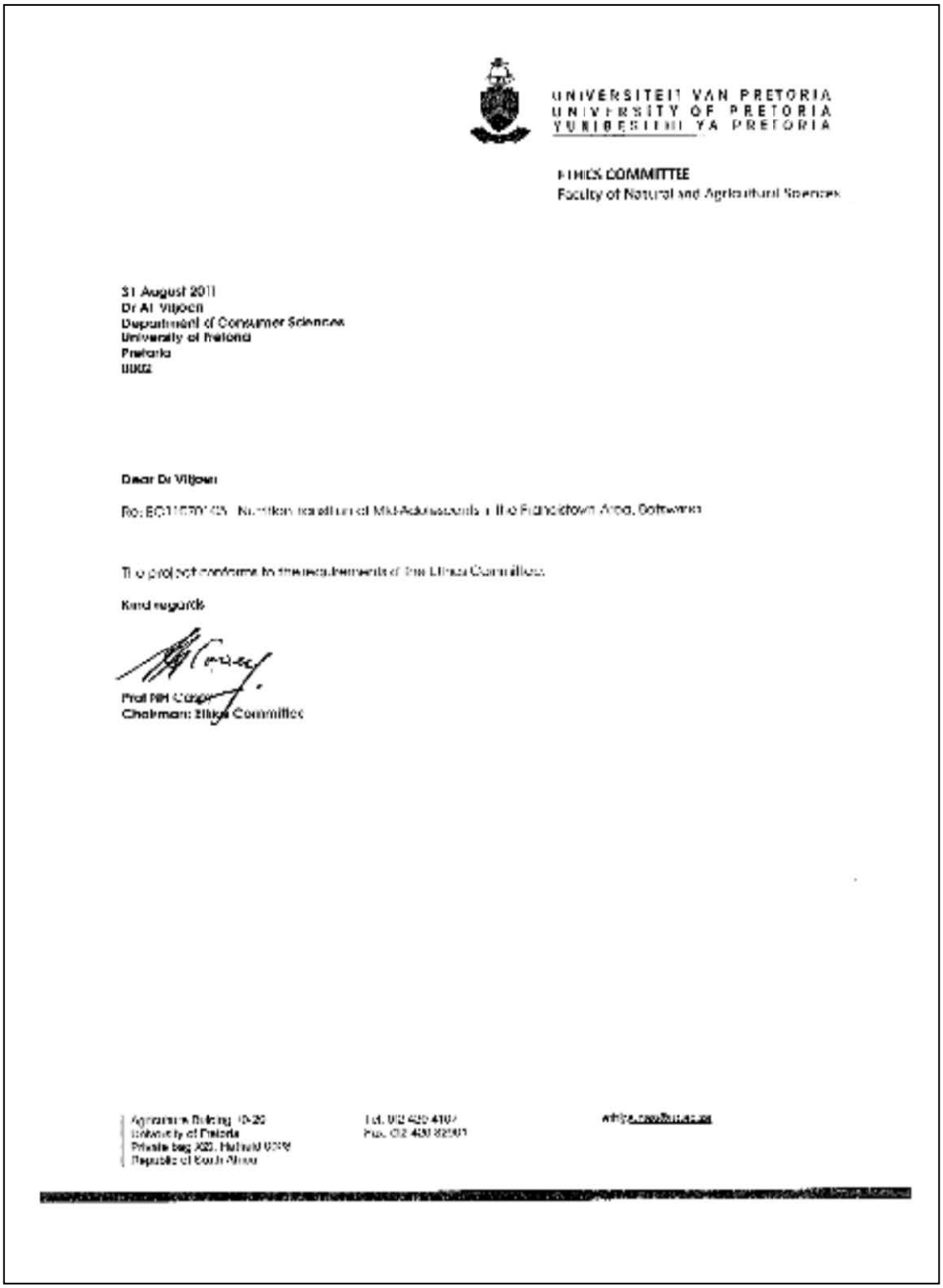
PLACE VISITED FOR OBSERVATION	ATTRIBUTES OBSERVED / CONCEPTS MEASURED
1. Dining Hall	Tea break (10:00hours) • Weekday school meals served • Serving of the meal • Sitting arrangement/pattern when eating
	Lunch break (13:00hours) • Weekday school meals served • Serving of the meal • Sitting arrangement/pattern when eating
2. School tuck shop	Tea break (10:00hours) • List of food items sold • Most frequently bought and less frequently bought food items • Price of food items • Days when the most frequent items are bought • Days when few items are bought
	Lunch break (13:00hours) • List of food items sold • Most frequently bought and less frequently bought food items • Price of food items • Days when the most frequent items are bought • Days when few items are bought
3. Informal street vendors "Aunties" nearer school grounds	• List of food items sold • Most frequently bought and less frequently bought food items • Price of food items • Days and times when most frequent food items are bought • Days and times when less food items are bought

ADDENDUM B: PHYSICAL (STRUCTURAL) ENVIRONMENT OBSERVATION CHECKLIST (continued)

II. COMPOSITION OF THE OBSERVATION CHECKLIST FOR STRUCTURAL ENVIRONMENT IN FRANCISTOWN

PLACES VISITED FOR OBSERVATION	ATTRIBUTES OBSERVED / CONCEPTS MEASURED
1. Shops/supermarkets 2. Fast food outlets 3. Street food vendors	• Availability • Accessibility • Affordability
	• Serving of the meal • Sitting arrangement/pattern when eating
	• List of food items sold • Most frequently bought and less frequently bought food items: • Price of food items • Days when most frequent food items are bought • Days when less food items are bought

ADDENDUM C: UNIVERSITY OF PRETORIA (UP) ETHICS LETTER OF APPROVAL



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

ETHICS COMMITTEE
Faculty of Natural and Agricultural Sciences

31 August 2011
Dr AI Viljoen
Department of Consumer Sciences
University of Pretoria
Pretoria
0002

Dear Dr Viljoen

Re: EC11070[illegible] Nutritional assessment of Mid-Adolescents in the Francistown Area, Botswana

The project conforms to the requirements of the Ethics Committee.

Kind regards

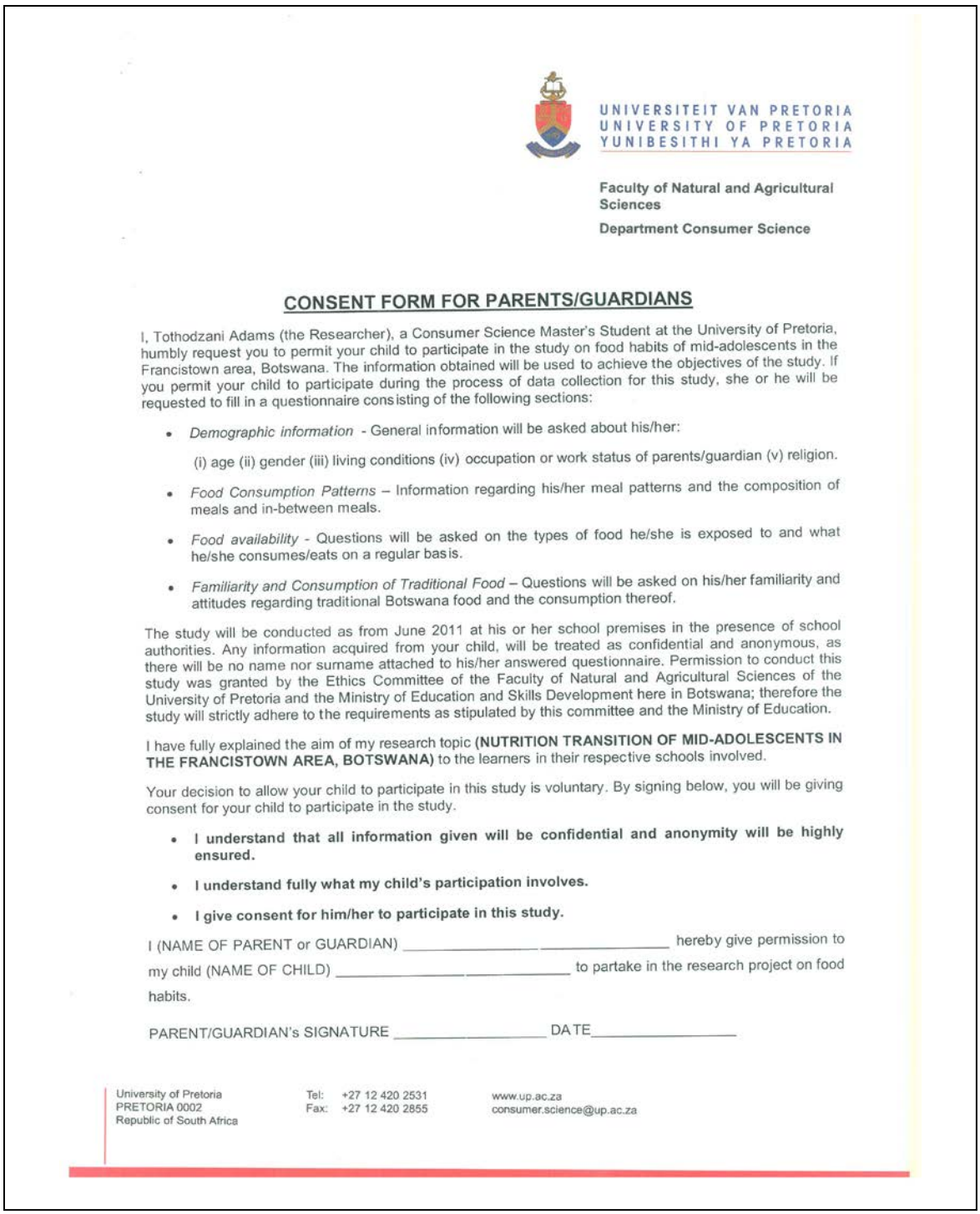
Prof RH Cooper
Chairman: Ethics Committee

Agriculture Building 10-20
University of Pretoria
Private bag X20, Hatfield 0028
Republic of South Africa

Tel: 012 420 4107
Fax: 012 420 [illegible]

ethics.nas@up.ac.za

ADDENDUM D.1: CONSENT FORM FOR PARENTS



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YUNIBESITHI YA PRETORIA

Faculty of Natural and Agricultural Sciences

Department Consumer Science

CONSENT FORM FOR PARENTS/GUARDIANS

I, Tothodzani Adams (the Researcher), a Consumer Science Master's Student at the University of Pretoria, humbly request you to permit your child to participate in the study on food habits of mid-adolescents in the Francistown area, Botswana. The information obtained will be used to achieve the objectives of the study. If you permit your child to participate during the process of data collection for this study, she or he will be requested to fill in a questionnaire consisting of the following sections:

- *Demographic information* - General information will be asked about his/her:

  (i) age (ii) gender (iii) living conditions (iv) occupation or work status of parents/guardian (v) religion.

- *Food Consumption Patterns* – Information regarding his/her meal patterns and the composition of meals and in-between meals.
- *Food availability* - Questions will be asked on the types of food he/she is exposed to and what he/she consumes/eats on a regular basis.
- *Familiarity and Consumption of Traditional Food* – Questions will be asked on his/her familiarity and attitudes regarding traditional Botswana food and the consumption thereof.

The study will be conducted as from June 2011 at his or her school premises in the presence of school authorities. Any information acquired from your child, will be treated as confidential and anonymous, as there will be no name nor surname attached to his/her answered questionnaire. Permission to conduct this study was granted by the Ethics Committee of the Faculty of Natural and Agricultural Sciences of the University of Pretoria and the Ministry of Education and Skills Development here in Botswana; therefore the study will strictly adhere to the requirements as stipulated by this committee and the Ministry of Education.

I have fully explained the aim of my research topic **(NUTRITION TRANSITION OF MID-ADOLESCENTS IN THE FRANCISTOWN AREA, BOTSWANA)** to the learners in their respective schools involved.

Your decision to allow your child to participate in this study is voluntary. By signing below, you will be giving consent for your child to participate in the study.

- **I understand that all information given will be confidential and anonymity will be highly ensured.**
- **I understand fully what my child's participation involves.**
- **I give consent for him/her to participate in this study.**

I (NAME OF PARENT or GUARDIAN) _____ hereby give permission to my child (NAME OF CHILD) _____ to partake in the research project on food habits.

PARENT/GUARDIAN's SIGNATURE _____ DATE_____

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ADDENDUM D.2: CONSENT FORM FOR LEARNERS

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UNIVERSITY OF PRETORIA
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Faculty of Natural and Agricultural Sciences

Department Consumer Science

CONSENT FORM FOR LEARNERS

The Researcher, Miss Tothodzani Adams, has fully explained to me why she is present in my school during this week (as from June 2011), concerning her research topic **NUTRITION TRANSITION OF MID-ADOLESCENTS IN THE FRANCISTOWN AREA, BOTSWANA**. She explained that permission to conduct this study was granted by the Ethics Committee of the Faculty of Natural and Agricultural Sciences of the University of Pretoria and the Ministry of Education and Skills Development here in Botswana; therefore the study will strictly adhere to the requirements as stipulated by this committee and the Ministry of Education.

I understand the aim of her research and I volunteer to be a respondent in this study on the eating patterns and food choice behaviours of mid-adolescents in my school.

- **I understand that all information given will be confidential and anonymity will be highly ensured.**
- **I understand fully what my participation involves.**
- **I give consent to participate in this study.**

LEARNER's NAME _____

LEARNER's SIGNATURE _____

DATE _____

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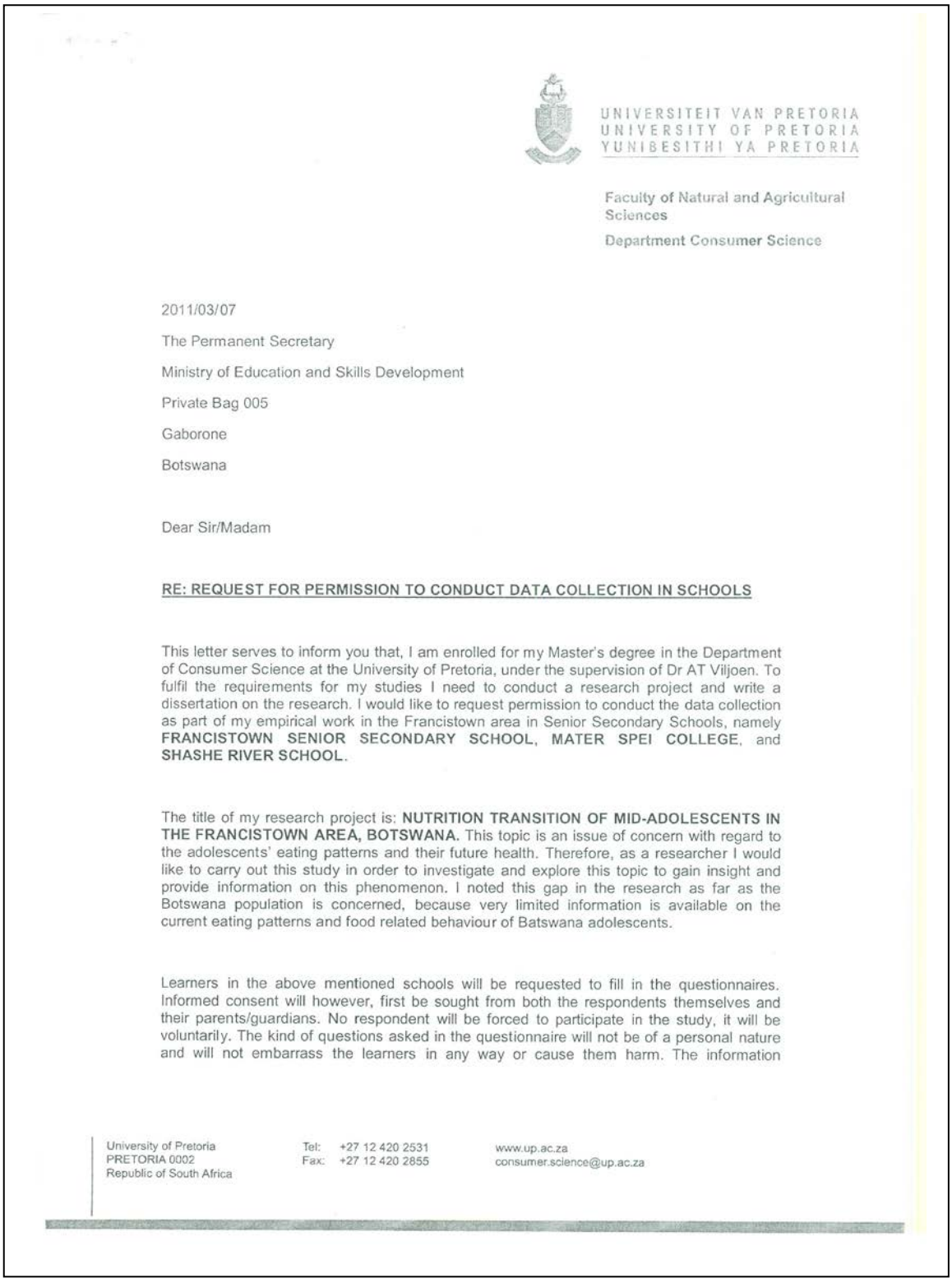
ADDENDUM E.1: LETTERS: UP REQUESTS PERMISSION TO COLLECT DATA IN SCHOOLS



UNIVERSITEIT VAN PRETORIA
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YUNIBESITHI YA PRETORIA

Faculty of Natural and Agricultural Sciences

Department Consumer Science

2011/03/07

The Permanent Secretary

Ministry of Education and Skills Development

Private Bag 005

Gaborone

Botswana

Dear Sir/Madam

RE: REQUEST FOR PERMISSION TO CONDUCT DATA COLLECTION IN SCHOOLS

This letter serves to inform you that, I am enrolled for my Master's degree in the Department of Consumer Science at the University of Pretoria, under the supervision of Dr AT Viljoen. To fulfil the requirements for my studies I need to conduct a research project and write a dissertation on the research. I would like to request permission to conduct the data collection as part of my empirical work in the Francistown area in Senior Secondary Schools, namely **FRANCISTOWN SENIOR SECONDARY SCHOOL, MATER SPEI COLLEGE**, and **SHASHE RIVER SCHOOL**.

The title of my research project is: **NUTRITION TRANSITION OF MID-ADOLESCENTS IN THE FRANCISTOWN AREA, BOTSWANA.** This topic is an issue of concern with regard to the adolescents' eating patterns and their future health. Therefore, as a researcher I would like to carry out this study in order to investigate and explore this topic to gain insight and provide information on this phenomenon. I noted this gap in the research as far as the Botswana population is concerned, because very limited information is available on the current eating patterns and food related behaviour of Batswana adolescents.

Learners in the above mentioned schools will be requested to fill in the questionnaires. Informed consent will however, first be sought from both the respondents themselves and their parents/guardians. No respondent will be forced to participate in the study, it will be voluntarily. The kind of questions asked in the questionnaire will not be of a personal nature and will not embarrass the learners in any way or cause them harm. The information

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ADDENDUM E.1: LETTERS: UP REQUESTS PERMISSION TO COLLECT DATA IN SCHOOLS (continued)

obtained will be used only for the purpose of this research, and all information will be treated with confidentiality and anonymity will be assured.

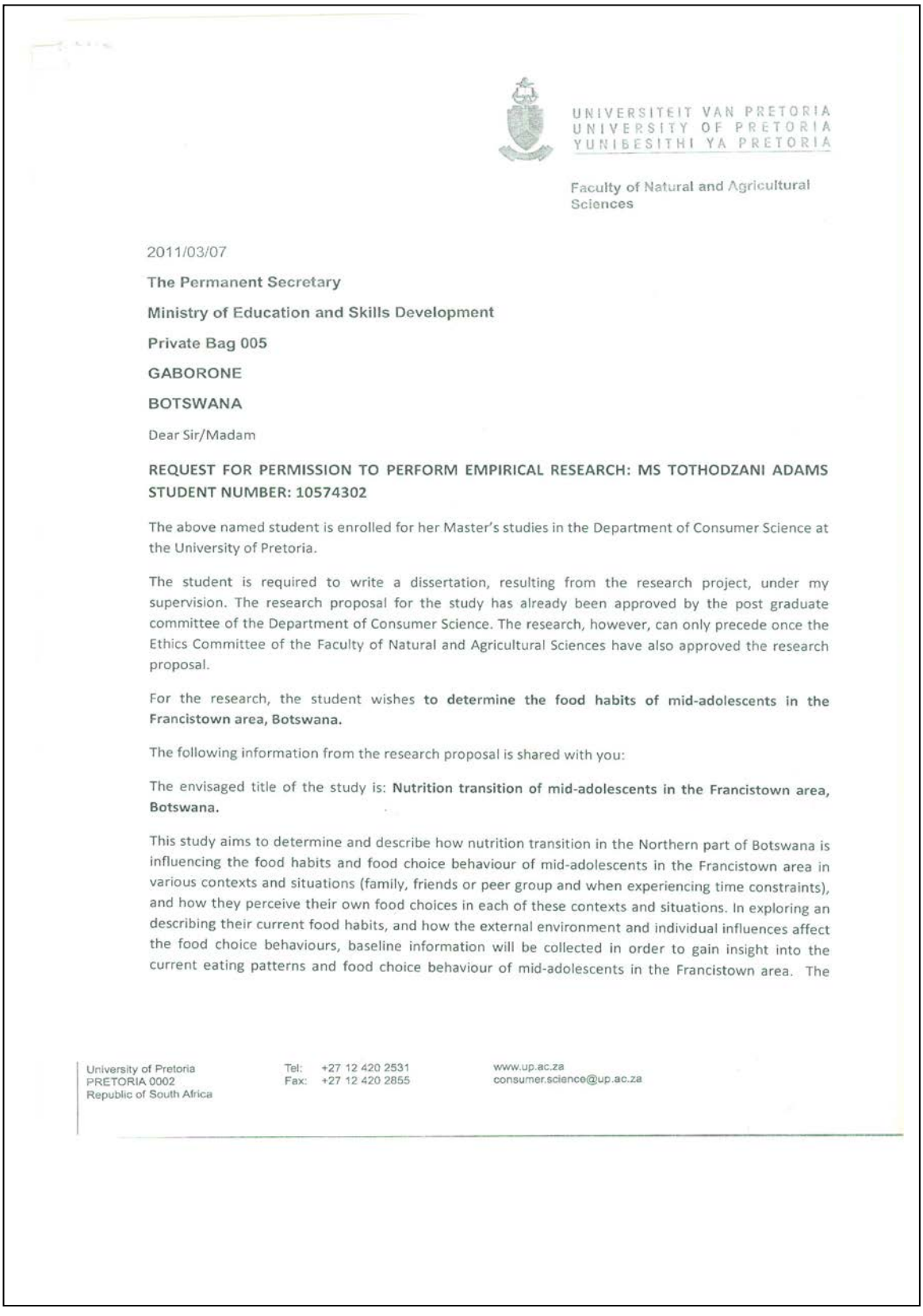
I am aware that school lessons will have to be observed, and that the filling out of the questionnaires have to take place after consideration of the timetables and academic activities of the learners. The data collection will therefore be arranged after consultation with the head teachers of the schools, and will take place when it is convenient for them.

Thank you for your continued support.

Yours Faithfully

Tothodzani Adams ID no: 604522612 TSM no: 104848

ADDENDUM E.1: LETTERS: UP REQUESTS PERMISSION TO COLLECT DATA IN SCHOOLS (continued)



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Faculty of Natural and Agricultural Sciences

2011/03/07

The Permanent Secretary

Ministry of Education and Skills Development

Private Bag 005

GABORONE

BOTSWANA

Dear Sir/Madam

REQUEST FOR PERMISSION TO PERFORM EMPIRICAL RESEARCH: MS TOTHODZANI ADAMS STUDENT NUMBER: 10574302

The above named student is enrolled for her Master's studies in the Department of Consumer Science at the University of Pretoria.

The student is required to write a dissertation, resulting from the research project, under my supervision. The research proposal for the study has already been approved by the post graduate committee of the Department of Consumer Science. The research, however, can only precede once the Ethics Committee of the Faculty of Natural and Agricultural Sciences have also approved the research proposal.

For the research, the student wishes **to determine the food habits of mid-adolescents in the Francistown area, Botswana.**

The following information from the research proposal is shared with you:

The envisaged title of the study is: **Nutrition transition of mid-adolescents in the Francistown area, Botswana.**

This study aims to determine and describe how nutrition transition in the Northern part of Botswana is influencing the food habits and food choice behaviour of mid-adolescents in the Francistown area in various contexts and situations (family, friends or peer group and when experiencing time constraints), and how they perceive their own food choices in each of these contexts and situations. In exploring an describing their current food habits, and how the external environment and individual influences affect the food choice behaviours, baseline information will be collected in order to gain insight into the current eating patterns and food choice behaviour of mid-adolescents in the Francistown area. The

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ADDENDUM E.1: LETTERS: UP REQUESTS PERMISSION TO COLLECT DATA IN SCHOOLS (continued)

researcher is interested in finding out whether mid-adolescents in Botswana are moving away from traditional to Western-oriented type of eating patterns and the associated food choice behaviours and to what extent or degree they still use indigenous/cultural or traditional foods.

The envisaged target group of the study are Form 4 learners from three Senior secondary schools in Francistown, namely, Francistown Senior Secondary School, Mater Spei College and Shashe River School.

The student wishes to do the empirical part (data collection) of the study through means of a structured questionnaire containing both open-ended and closed-ended question on aspects dealing with food consumption patterns and food choice behaviour.

Participation in this study will be on a **voluntary** basis, and **informed consent** will be sought from the **parents/guardians** and the **learners** themselves prior to handing out the questionnaires for completion. The information gathered will be treated confidentially and the anonymity of the respondents will be protected throughout the data collection and thereafter.

The student undertakes the responsibility to provide you with a copy of the final research report after it has been assessed and approved.

Your permission is hereby sought to conduct the research at Francistown Senior Secondary School, Mater Spei College and Shashe River School. It would be appreciated if you will consider and grant permission in writing at your earliest convenient date. Your letter of permission is a requirement of the Ethics Committee of the Faculty of Natural and Agricultural Sciences of the University of Pretoria and is thus needed to prepare the application for the said committee.

If you need any further information concerning the planned research, please feel free to contact me during office hours at +27 12 420 2854 or alternatively by e-mail at the following address: Annemarie.viljoen@up.ac.za

Yours sincerely

Dr Annemarie Viljoen

Supervisor and lecturer

Department Consumer Science

ADDENDUM E.1: LETTERS: UP REQUESTS PERMISSION TO COLLECT DATA IN SCHOOLS (continued)

Department of Consumer Science

Faculty of Natural and Agricultural Sciences

2011/04/19

Chief Education Officer

Francistown Regional office

Department of Secondary Education

Private Bag

Francistown

Botswana

RE: PERMISSION TO CONDUCT DATA COLLECTION IN SCHOOLS

Dear Sir/Madam

This letter serves to inform you that, i am a second year student pursuing master's degree at the University of Pretoria, under the supervision of Dr A.T Viljoen. Currently am doing research in fulfilment of the requirements for my studies. I would like to inform your office that i applied for permission to conduct data collection as part of my research work in the Francistown area in Senior Secondary Schools, namely **FRANCISTOWN SENIOR SECONDARY SCHOOL**, **MATER SPEI COLLEGE**, and **SHASHE RIVER SCHOOL** and iam pleased to inform you that the Ministry of Education Skills and Development has granted me this permission ***(find the attached letter from the Ministry of Education)***.

The title/topic of my research is: **NUTRITION TRANSITION OF MID-ADOLESCENTS IN THE FRANCISTOWN AREA, BOTSWANA**. This topic is an issue of concern with regard to the adolescents eating patterns and their future health. Therefore, as a researcher i would like to carry out this study in order to investigate this issue of concern to gain insight and provide valuable information on this phenomenon, since there is a gap in the research as far as the Botswana population is concerned because only limited information is available on the current eating patterns and food related behaviour of Batswana adolescents.

Learners in the above mentioned schools will be requested to fill in the questionnaires. Informed consent will be sought from the respondents. No respondents will be forced to participate in the study, it will be voluntarily. I am aware that lessons will have to be observed. The kind of questions asked in the questionnaire will not be of personal nature and will not embarrass in any way or cause any harm to the respondents (learners). The information obtained will be used only for the purpose of this research, and all information will be treated with confidentiality and anonymity is highly assured.

Thank you for your continued support.

Yours Faithfully

Tothodzani Adams **ID no: 604522612** **TSM no: 104848**

ADDENDUM E.2: LETTER: PERMISSION GRANTED BY THE MINISTRY OF EDUCATION BOTSWANA TO COLLECT DATA IN SCHOOLS

TELEPHONE: 3655473
TELEX: 2944 THUTO BD
FAX: 3972531
REFERENCE E 1/20/ 2 XII (5)

REPUBLIC OF BOTSWANA

MINISTRY OF EDUCATION
PRIVATE BAG 005
GABORONE
BOTSWANA

8th March 2011

To: Tothodzani Adams
P/Bag 11621
Francistown

RE: REQUEST FOR A PERMIT TO CONDUCT A RESEARCH STUDY

We acknowledge receipt of your application to conduct a research study. This serves to grant you permission to conduct your study in sampled schools around Francistown area to address the following research objectives/questions:

To: Determine and describe how the nutrition transition in Botswana contributes to the food choice behaviour of mid adolescents (15-18) in Francistown.

It is of paramount importance to seek Assent and Consent from the Department of secondary education, principals as well as teachers you are going to interview, observe as well administering questionnaires. We hope and trust that you will conduct the study as stated in your Proposal and to strictly adhere to the Research Ethics. Failure to Comply, with the above Regulations will result in Immediate Termination of the Research permit.

Please note that this permit is valid for a period of one year effective from 8th March 2011 to 8th March 2012.

You are furthermore requested to submit a copy of your final report of the study to the Division of Planning, Statistics and Research, Ministry of Education, Botswana.

Thank you in advance.

Yours faithfully

K.Mathabathi
For / Permanent Secretary

ADDENDUM E.3: LETTER: APPROVAL BY THE DEPARTMENT OF MINISTRY OF EDUCATION AND SKILLS DEVELOPMENT (North East) TO SCHOOL HEADS

SAVINGRAM

FROM: Director, Regional Operations
Ministry of Education & Skills
Development (North East)

M. N. Phuthego for/DRO

TEL: 2415704/2419534

FAX: 2410838/2415606

TO: School Head
Shashe River School

REF: FRE 1/15/3 I (79) 21st April 2011

RE: PERMISSION TO CONDUCT DATA COLLECTION IN SCHOOLS

Ms. Tothodzani Adams has been granted permission to carry out her research on NUTRITION TRANSITION OF MID-ADOLESCENTS IN THE FRANCISTOWN AREA, BOTSWANA in your school.

Kindly accord her the necessary assistance.

Thank you.

DIRECTOR, REGIONAL OPERATIONS
MINISTRY OF EDU. & SKILLS DEVELOPMENT
NORTH EAST REGION
21 APR 2011
PRIVATE BAG F251 FRANCISTOWN
TEL: 2415623 / 2413181 FAX: 2410838

cc: Director, Regional Operations
Central Region

ADDENDUM F: PHOTOGRAPHS OF RESPONDENTS DURING MEAL TIMES AT THEIR RESPECTIVE SCHOOLS

(a) Learners queuing outside dining hall.

(b) Food plated by kitchen staff.

(c) & (d) Learners enjoying meals.

(e) Food plated by class prefects.

(f) Class prefects serving tea for breakfast.

(g) Bread served for breakfast.

ADDENDUM G: PHOTOGRAPHS OF TRADITIONAL DISHES

(a) Stiff mealie-meal porridge.
(b) Growing maize for use in traditional dishes.
(c) Melons (marotse).
(d) Millet porridge and seswaa.
(e) Stewed mopane worms.
(f) Samp and beans.
(g) Sorghum porridge with green leafy vegetable stew and meat.

ADDENDUM H: PHOTOGRAPHS OF FOOD AT SPECIAL OCCASIONS

(a) & (b) Baby shower.

(c) & (d) Birthday celebration – food and beverages.

(e), (f) & (g) Food at wedding celebration.

ADDENDUM I: PHOTOGRAPHS OF FOOD SOLD IN THE SCHOOL TUCK SHOPS

(a) Learners enjoying snack foods.
(b) Learners buying hot dogs.
(c) Items sold by Tuck shop.
(d) Ample stocks of soft drinks.
(e) Pies are popular.
(f) Fatcakes prepared by "auntie" and learners buying the fatcakes.
(g) Learners with items bought from vendors.

INSET : Photo of Tuck shop

ADDENDUM J: PHOTOGRAPHS OF SCHOOL FOODSERVICE UNITS

Foodservice Units at various schools

ADDENDUM K: CONFERENCE PRESENTATIONS

PRESENTATION	HOST/ORGANISATION	TITTLE
☐ PAPER PRESENTATION	**SAAFECS AND IFHE CONFERENCE** 11th International South African Association of Family Ecology and Consumer Sciences **(SAAFECS)** Conference, and the 6th International Federation for Home Economics **(IFHE)** Africa Regional Conference.	Eating Patterns of Adolescents (15-18 years) in the Francistown area, Botswana.
☐ POSTER PRESENTATION	**SAAFOST CONGRESS AND EXHIBITION** 20th International South African Association for Food Science and Technology **(SAAFoST)** Congress and Exhibition.	Familiarity, Acceptance and Consumption Patterns of Indigenous and Traditional Foods by Adolescence (15-18 years) in the Francistown area, Botswana.