

Exploring Eating Patterns Associated with Increased Prevalence of Diabetes Among Malawian Families Using Photovoice

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A thesis submitted to Auckland University of Technology in partial fulfilment of
the requirements for the Degree of Master of Public Health (MPH)

Faculty of Health and Environmental Sciences

School of Public Health and Psychosocial Studies

Auckland, New Zealand

2018

Abstract

Consumption of calorically dense foods with high levels of harmful fats and sugars is a key factor in the increased prevalence of diabetes. Diabetes, a disease previously associated with affluent nations, is increasing globally and is now becoming an important public health problem in developing countries. With a global adult prevalence of over 422 million, diabetes is a priority noncommunicable disease for global action. In Malawi, diabetes and other noncommunicable diseases are on the increase amid high rates of pre-existing communicable diseases, such as HIV/AIDS, malaria and tuberculosis. This double burden of communicable and noncommunicable diseases puts pressure on the already compromised healthcare provision and funding available. The current prevalence of diabetes among adult Malawians is estimated at 6%, an increase from less than 1% in the 1980s. Although research indicates that dietary changes in sub-Saharan Africa have increased the risk of diabetes, there is little to no research on the epidemiology or causes of this increase, including on eating patterns in Malawi. This study explored the food Malawian families eat to see if this has changed over time and how this might relate to the increased diabetes prevalence.

Underpinned by a critical public health perspective, the study utilised photovoice with four purposively selected families residing in the semi-rural areas of Blantyre district in Malawi. Photovoice was used to capture visually the food eaten, as a useful means of describing and analysing the elements of typical meals and snacks. The study also used the Honest Food Model to analyse and discuss the wider food system that affects eating patterns. The study explored eating in the family because most eating in Malawi takes place in the context of the home and family.

The findings indicate that the shift away from a traditional diet observed in current eating patterns is a major factor in the increased prevalence of diabetes in Malawi. It is important to note that Malawian diets have not undergone total modification as staples, such as maize and sorghum, are still being consumed. However, this research provides evidence of increased consumption of obesogenic foods, such as refined sugars, salty processed snacks, saturated fats and sweetened beverages, in the general population. All these foods are associated with an increased risk of type 2 diabetes. Considering the role of obesogenic products in the epidemiology of type 2 diabetes, the current eating

patterns in Malawi are in line with nutrition transitions that heighten the risk of diabetes in sub-Saharan Africa. Using the Honest Food Model, this study examines some of the key factors associated with changing dietary patterns, and consequentially makes preliminary observations on potential policy approaches. The study recommends further research on the food Malawians are eating and the resultant health effects, exploring the implications for the food system, and the need for important related micro and macro policy steps, community and societal actions, including important roles for private sector and media.

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Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person, nor material which to a substantial extent has been submitted for the award of any other degree or diploma for a university or other institution of higher learning.



McDonald William Nyalapa

Acknowledgements

First of all, I would like to thank God for His love and mercy during the research process as well as the thesis writing period. This project would have been impossible without His loving kindness.

Secondly, my sincere vote of thanks should go to my supervisors, Dr Cath Conn and Kate Kersey for providing their insights into this project. They supported me tirelessly and I felt their presence in thick and thin.

Thirdly, my heartfelt gratitude should go to my loving wife, Patricia and my daughter, Mayamiko. They supported me wholeheartedly even in difficult times. They are the reason I looked to every single day with hope to achieve my goals.

I would also like to thank the New Zealand Ministry of Foreign Affairs and Trade (MFAT) for awarding me the Commonwealth Scholarship. It would have been impossible for me to come and study in New Zealand without this prestigious scholarship. Many thanks should also go to Sacha, Margaret, Ruth and the entire AUT Scholarships Office for providing scholarship-related guidance and support in times of need.

Lastly, I wish to thank the participating families and all those who helped with data collection, analysis and interpretation, as well as thesis editing and formatting. Your assistance made the research process a less stressful journey.

Ethics Approval

Ethics approval for this study was granted by the Auckland University of Technology Ethics Committee on 10 March 2017; approval number 17/13. The study was also approved locally by the Malawi National Health Sciences Research Committee on 5 April 2017; approval number 1759.

Chapter 1 Introduction

Diabetes is increasingly imposing health and socioeconomic burdens on both developed and developing countries. Among other factors, such as sedentary lifestyles, there is evidence that changes in dietary patterns brought about by changing food environments and systems are increasing the risk of diabetes. This study explores eating patterns associated with increased prevalence of diabetes amongst Malawian families. Families were chosen as the focus of this study because most of the eating in Malawi takes place within families and homes. The participating families were asked to record the food they eat for a period of four days using photographs and food diaries. Focus group discussions were then conducted with the families to understand their perceptions on the food they eat, and the photos provided a centrepiece for the discussions.

1.1 Background to the problem

Diabetes is a serious, chronic noncommunicable disease that occurs when the pancreas produces insufficient insulin – a hormone that regulates blood sugar – or when the body cannot effectively use the insulin it produces (World Health Organization, 2016). The majority of people living with diabetes fall into two broad categories: type 1 diabetes which is primarily genetic and driven by deficient insulin production in the body; and type 2 diabetes in which the body ineffectively utilises the insulin it produces (WHO, 2016). Type 2 diabetes is primarily driven by lifestyle factors and accounts for the vast majority of people living with diabetes worldwide, particularly in developing regions, such as sub-Saharan Africa (Pastakia, Pekny, Manyara, & Fischer, 2017). Therefore, this study focuses on type 2 diabetes.

Sub-Saharan Africa, a region with widespread poverty and constrained healthcare resources, continues to register increased rates of noncommunicable diseases, such as diabetes and cardiovascular disease (Atiim & Elliott, 2016; Kengne et al., 2017; Pastakia et al., 2017). It is projected that noncommunicable diseases will account for about half of all deaths in sub-Saharan Africa by 2030 (WHO, 2016). Type 2 diabetes is one of the noncommunicable diseases which has started to have a substantial impact on Malawi and other sub-Saharan African countries in the last decade (Msyamboza, Mvula, & Kathyola, 2014; Pastakia et al., 2017). Population-based studies conducted in Malawi have revealed a high burden and a steadily increasing prevalence of diabetes over the

past decade (Msyamboza et al., 2014; Price et al., 2018). Although a specific genotype may predispose people to diabetes, it is maintained that lifestyle factors, such dietary changes, physical inactivity and rapid urbanisation are the key drivers of diabetes in Malawi (Msyamboza et al., 2014; Price et al., 2018).

Malawian studies to date have placed emphasis on quantifying trends and the burden of diabetes (Crampin et al., 2016; Msyamboza et al., 2014; Price et al., 2018). The prevalence of diabetes among adults in Malawi is at 6%, indicating a steady increase from a prevalence of less than 1% in the 1980s (Msyamboza et al., 2014). Moreover, patterns and distribution of diabetes in Malawi vary according to age, sex and area of residence as in other sub-Saharan African countries (Imamura et al., 2015; Mbanya, Assah, Saji, & Atanga, 2014). For instance, an earlier national study by Msyamboza et al. (2014) showed that diabetes prevalence increased with age in both urban and rural areas of Malawi. However, a more recent study by Price et al. (2018) indicated that the burden of diabetes was higher in adults aged below 50 years than in the older population. This high burden has been attributed to lifestyle changes among young people (Price et al., 2018). The prevalence of diabetes was also shown to be higher in females than males, similar to obesity rates in Malawi (Msyamboza et al., 2014). Also, it is estimated that over 40% of diabetes cases remain undetected especially in rural areas where people have limited access to diagnostic facilities (Price et al., 2018). Furthermore, diabetes prevalence was shown to be twice as higher among urban residents, who are less poor and better educated than rural people, who are the poorest and least educated (Msyamboza et al., 2014).

Nutrition transition, an important driver in the rise of type 2 diabetes, is defined as dietary and lifestyle changes associated with shifts in body composition and nutrition-related disease in countries undergoing economic and social development (Nnyepi, Gwisai, Lekgoa, & Seru, 2015; Popkin, 2015). Nutrition transition started to occur following WWII when the global food system began to focus on cash crops, such a sugar cane, palm oil and animal-source food from animals fed with grains, as well as monocultures of grains to meet the global dietary needs (Popkin, 2015; Zucali et al., 2018). Additionally, the commercialisation and industrialisation of food resulted in increased processing of food (Nnyepi et al., 2015). Sub-Saharan Africa has come late to an accelerating worldwide nutrition transition, as plant-based foods have dominated

African diets for decades, probably with the addition of small amounts of locally sourced animal proteins (Haggblade et al., 2016).

Although nutrition transition has been identified as a driver of type 2 diabetes in sub-Saharan Africa (Haggblade et al., 2016; Pisa et al., 2018; Steyn & Mchiza, 2014), comprehensive research on dietary patterns and diabetes is limited. This is partly because noncommunicable diseases, such as diabetes, are considered emerging epidemics, hence, much of the research in Africa has focused on infectious diseases (Pastakia et al., 2017). This study aims to explore and understand the specifics of what families in Malawi are eating currently, how this contributes to the risk of developing type 2 diabetes, and how and why this has changed. This is crucial for developing unique prevention strategies and contextually specific policy (Pastakia et al., 2017; Pisa et al., 2018).

Over the past 20 years, global eating patterns have shifted to highly refined diets rich in saturated fats, salt and caloric sweeteners, but low in fibre and micronutrients, and this shift has included developing countries (Nnyepi et al., 2015). With increased urbanisation and industrialisation, there is an unlimited and pervasive food supply based on high levels of processing and distribution to meet consumer demand for tasty food (Haggblade et al., 2016). Although the food is not of high nutritional quality, multinational food companies market it heavily as affordable, convenient and delicious (Nnyepi et al., 2015; Stuckler & Nestle, 2012). Moreover, poverty drives consumers into purchasing affordable and filling processed food, such as breads, biscuits, carbonated drinks and food prepared by “Big Food” outlets, rather than local staples, such as maize and sorghum, which are lower in salt and unhealthy sugars (Haggblade et al., 2016; Stuckler & Nestle, 2012). Consumption of refined carbohydrates often results in individuals having an increased glycaemic index (Popkin, 2015). Glycaemic index, a measure of the blood sugar level in response to carbohydrate consumption, is a critical determinant of nutrition-related diseases, such as diabetes (Popkin, 2015).

Food systems play a pivotal role in people’s nutrition and health across the globe. However, the unfortunate reality is that the current food system in sub-Saharan Africa and worldwide has been described to be in critical condition because it is failing to provide safe and nutritious food to populations or communities, including vulnerable

communities, such as those that are economically deprived (Nyantakyi-Frimpong et al., 2017). This differs sharply from Sustainable Development Goal (SDG) 2 which focuses on ending hunger and improving food security and nutrition (Montagnini & Metzel, 2017; Stephens, Jones, & Parsons, 2018). The current food system has been associated with increased energy food supply without corresponding nutritional value (Vandevijvere, Chow, Hall, Umali, & Swinburn, 2015). Moreover, the food supply has been globalised to meet the growing needs of the global population (D'Odorico, Carr, Laio, Ridolfi, & Vandoni, 2014). This global food distribution has escalated the availability and consumption of obesogenic, ultra-processed foods in both developed and developing countries (Swinburn et al., 2013; Vandevijvere et al., 2015).

Malawi is a landlocked country located in the southern African region (World Bank, 2016). It has an estimated total population of 18 million, and the population experiences widespread poverty amid an undiversified agro-based economy (World Bank, 2018a). The average per capita income in Malawi Kwacha (MK) is MK15,161 (the equivalent of US\$30) per person per annum, which is the lowest in the world (National Statistical Office & ICF International, 2016). The majority of the poor remain locked in low productivity subsistence farming, although maize, a key staple for Malawi, continues to fall in production following countrywide drought conditions since 2000 (World Bank, 2016). Malawi has a total fertility rate (TFR) of 5.7 children per woman (NSO & ICFI, 2016). This high fertility rate, including improved life expectancy and reduction of HIV/AIDS-related mortality has led to a rapid population growth since 2008 (NSO & ICFI, 2016), and imposes pressure on land.

Malawi is undergoing both demographic and epidemiological transitions. For instance, the population of Malawi is rapidly growing and aging with an improvement in life expectancy from 37 to 58 years in the past decade, and an adjusted life expectancy of 77 years for those who reach 60 years (WHO, 2018a). Malawi also has a high burden of infectious diseases, including an adult HIV prevalence of about 10% (Allain et al., 2017). The emergence of noncommunicable diseases, such as diabetes, amid high rates of pre-existing infectious diseases, such as HIV/AIDS, also means that public-sector funding is overburdened, thereby compromising attention on other priority sectors e.g. agriculture and education (World Bank, 2016). The difficult economic situation renders Malawi

unable to cope with the double burden of communicable and noncommunicable diseases.

Studies conducted in the 1960s and 1970s demonstrated that diabetes was not an important health problem in Malawi, with a prevalence of 1% or less (Goodall & Pilbean, 1964; Wicks, Castle, & Gelfand, 1973). The major public health problem at that time was undernutrition, where one in three adults was undernourished, as a result of high levels of poverty and food insecurity in Malawi (Chilima & Ismail, 1998). However, the prevalence of undernutrition has decreased substantially over the last two decades (Bygbjerg, 2012). The current problem is arguably less one of lack of food but poor-quality food, which has given rise to the prevalence of overweight and nutrition-related diseases, such as diabetes (Mamun & Finlay, 2015). Improvements in wealth and education among Malawian families in semirural and urban areas have driven the epidemic by providing resources for purchasing food and drink items, including those which are of poor quality (Msyamboza et al., 2014; Price et al., 2018).

The current study focused on eating patterns within the family because it is a common practice in Malawi to have main meals with the family in the home (Sedibe et al., 2018). In Malawi, gathering together for a meal is a tradition that many families cherish and encourage (Kodish, Aburto, Hambayi, Kennedy, & Gittelsohn, 2015; Open Arms Malawi, 2018). This sometimes goes beyond a family custom as it mirrors peace, love, harmony and unity of the family members, and these are inherited from generation to generation (Oniang'o, Mutuku, & Malaba, 2003). Moreover, eating away from home is expensive for most families (Kodish et al., 2015). However, spending time with these families and photographing family food also enabled information to be collected about the types of food eaten outside the home.

1.2 Study design

This study utilises photovoice to explore and understand dietary patterns that may be contributing to the rise of diabetes in Malawi. Photovoice is a qualitative research methodology whereby people use a specific photographic technique to document their everyday realities (Wang & Redwood-Jones, 2001). Photovoice has been widely used as a health assessment tool to explore contextually based meanings of health phenomena (Sutton-Brown, 2015). The study engages semi-rural Malawian families in

photographing of the food they eat daily to promote discussions about the food they eat and provide a visual representation of the components of a meal and snacks. The semi-rural population is chosen because over 80% of Malawians live in rural areas, and semirural areas are a target for the sprawling processed food markets (Price et al., 2018; World Bank, 2016).

This study hinges on the food people eat within the family and home, and the wider food system that is associated with eating patterns. This approach is in line with a new public health paradigm, which is based on the longstanding evidence that, as well as biomedical factors, the interplay of social, cultural, economic and environmental factors contributes significantly to ill-health (Baum, 2016). The new public health is anchored by the social determinants of health approach, which recognises that individual and population health outcomes are contextual and that it is essential to consider a wide range of social, cultural, economic and political settings in which people live (Baum & Fisher, 2014; Kickbusch, 2009). Traditionally, public health policies and interventions have been driven by behavioural approaches which focus on individual responsibility for unhealthy behaviour (Baum & Fisher, 2014; Nutbean & Harris, 2004). This ignores the role of vulnerability and limited control over broader, structural forces and, as a result, it has failed to address disparities in health status and social inequities (Baum, 2016). Although behavioural approaches have been excessively favoured by governments, it is contended that a social determinants approach that addresses the conditions in which people make choices is appropriate (Baum & Fisher, 2014).

In adopting a new public health lens, the researcher searched for a framework consistent with that approach. The Honest Food Model seemed highly suitable for analysing the wider food systems, including environmental and economic factors that affect the people's eating patterns and the corresponding health outcomes (Hebda, 2014). While other frameworks, such as the Health Belief Model, focus on behavioural change at the individual level (Green & Murphy, 2014), the Honest Food model allows for analysis of wider determinants of food quality and health, with a special emphasis on the food system. This is a central part of the new public health jigsaw. Moreover, the Honest Food Model fits well with a focus on the SDG 2 which aims to halt hunger, achieve food security and improve nutrition and agriculture (Richardson et al., 2018). The use of analytical frameworks such as the Honest Food in research makes the findings

useful and accessible by shaping them into a meaningful structure that addresses the underlying determinants of health outcomes (Polit & Beck, 2017).

1.3 Researcher position

The researcher is a Malawi registered nurse-midwife involved in the provision of health services to people at both facility and community levels in Malawi. Also, as a Malawian born and raised in a rural setting, the researcher recognises the challenges people face in rural Malawi, such as unequal access to health services and information, and a lack of participation in the formulation of health policies. Therefore, the researcher utilised a participatory approach with semirural families to better understand their everyday challenges and bridge the gap between them and policy makers or authorities. This sits well with the critical public health approach referred to above, which favours joint production of knowledge to empower vulnerable populations (Neuman, 2014).

Another important issue that prompted the researcher to investigate diabetes is the scarcity of literature relating to diabetes in Malawi and sub-Saharan Africa. As pointed out by Price et al. (2018), detailed, reliable data on diabetes and noncommunicable diseases in sub-Saharan Africa remain sparse. Priority is still given to research that focuses on infectious diseases, such as HIV/AIDS, malaria and tuberculosis (Pastakia et al., 2017). Therefore, the researcher decided to embark on this study to contribute to the body of knowledge on diabetes in sub-Saharan Africa.

1.4 Research question

The aim of my study is to investigate current eating patterns associated with diabetes among families in Malawi. Based on the rationale presented here and the study aim, the researcher developed three research questions:

- What is the current situation of the Malawi food system, and how might this be influencing diet and increased prevalence of diabetes?
- What are families in Malawi currently eating and what has changed?
- How might Malawian family eating patterns be linked to the increased prevalence of type 2 diabetes?

1.5 Contribution of research to Malawi

This is the first study aiming to explore and understand eating patterns associated with type 2 diabetes among families in Malawi. Therefore, the study aims to address the knowledge gap regarding dietary patterns that might be linked to the increased prevalence of type 2 diabetes in Malawi. Also, the use of a new public health model, reflected in exploring the food system and underlying causes of this increased prevalence, is enriching the discussion and contributing to policy on prevention of diabetes in Malawi.

1.6 Thesis organisation

This thesis is an in-depth analysis of the issue of food and type 2 diabetes based on appropriate evidence. It is organised in chapters. Chapter 2 provides evidence of an in-depth comprehension of the literature that has guided this research. This chapter also analyses food systems globally as well as in Malawi using the Honest Food Model and how these systems influence the food people eat. Chapter 3 presents a confident and imaginative execution of photovoice in the study. The chapter also critically analyses the theoretical underpinnings of photovoice; the rationale for using photovoice in the current study; and how the study was conducted. Chapter 4 presents study findings as photographs of food taken by the participating families and the texts collected through food diaries and focus group discussions. Chapter 5 discusses the findings and implications for policy and practice on food systems and prevention of type 2 diabetes. Chapter 6 draws conclusions of the study. In this chapter, contributions and limitations of the study are discussed.

Chapter 2 Literature review

2.1 Introduction

This chapter presents a critical review of literature on food, nutrition and diabetes. A critical review is a type of literature review which goes beyond a simple description of previous research on a topic and includes analysis and synthesis of literature from a wide range of sources (Grant & Booth, 2009). A distinctive feature of an effective critical review is its ability to critically analyse literature using a model or conceptual innovation, which may be derived from existing perspectives or may be a completely new analysis of existing data (Grant & Booth, 2009). According to literature, unhealthy eating consistent with nutrition transition is a key driver of type 2 diabetes (Burgio, Lopomo, & Migliore, 2015; Haggblade et al., 2016; Hall, Thomsen, Henriksen, & Lohse, 2011; Msyamboza et al., 2014). The general trend of nutrition transition is the abandonment of wholesome traditional and predominantly plant-based diets to highly refined food that is high in energy, saturated fats and simple, unhealthy sugars (Nnyepi et al., 2015).

This chapter rises above mere description of previous studies on people's eating patterns and analyses the wider food system that affects people's eating patterns through the critical lenses of the Honest Food model. Literature from diverse sources and countries was used, where relevant, due to the paucity of research on nutrition and noncommunicable diseases in sub-Saharan Africa. Literature was generated from searches of computerised databases (ProQuest, MEDLINE, Scopus, CINAHL Plus and SPORTDiscus), published reports and authoritative texts. The initial search strategy used a combination of key terms, "obesity" "nutrition" "urbanisation" "climate change" "food diversity" "diabetes" and "sub-Saharan Africa" to identify potential articles. This search resulted in only 110 database hits. A refined search using "Malawi" as a context only yielded 10 articles. Articles were included if they were primary sources, published in English from 1970 to 2018 and relevant to diabetes. Analysis was done and presented based on the fundamental principles of the Honest Food Model and the new public health perspective.

2.2 Honest Food for Malawi

The Honest Food model is a framework that analyses food sustainability and security amid climate change factors and considers how food can be managed to improve people's health and reduce exposure to nutrition-related problems, such as malnutrition, obesity and diabetes (Hebda, 2014). Its purpose is to evaluate the food systems from ecological, economic and social perspectives with emphasis on food quality, nutrition, culture and communities (Hebda, 2014). The Honest Food Model recognises the changes of human societies, including their nutrition needs and practices, which is also an important element in the stages of nutrition transition (Haggblade et al., 2016; Nnyepi et al., 2015).

The Honest Food Model is appropriate for this study because it analyses the wider food system and social, economic and environmental factors which affect people's eating patterns and corresponding health outcomes. This line of thinking is the centrepiece of the new public health, which recognises that health and behaviour are greatly influenced by people's environmental, socioeconomic and cultural settings (Baum & Fisher, 2014). Also, the economy-food security nexus proposed by the Honest Food Model best suits the Malawi poverty and food insecurity situation. This analytical framework consists of six main categories: economy and food security; ecological integrity; climate change; culture and community; food biodiversity and seeds; and food quality and nutrition (Hebda, 2014). Each of these components will be discussed in this chapter. Figure 1 below is the diagrammatic representation of the Honest Food Model.



Figure 1: The Honest Food Model. Adapted from Hebda (2014)

2.2.1 Economy and food security

Economy refers to the state of a country or region based on its production and consumption of goods and services, including the distribution of money (Oxford University Press, 2018). The economy of Malawi hinges mainly on the agriculture sector, generating a third of gross domestic product (GDP), half of total export earnings, and two-thirds of employment (Douillet, Pauw, & Thurlow, 2012). Maize and tobacco are considered to be the most dominant, rain-fed crops grown by Malawian smallholder farmers who entirely depend on these crops for income and subsistence (World Bank, 2018a). Maize is an important cereal in a Malawian diet contributing over 60% of the total dietary energy supply (Oniang'o et al., 2003). Grains, such as maize, are good sources of complex carbohydrates, vitamins, minerals, dietary fibre and phytochemical compounds (Oniang'o et al., 2003). Although it forms the basis of a typical Malawian meal, maize continues to fall in production due to inconsistent rainfall, resulting in food insecurity among low income households (NSO & ICFI, 2016). Therefore, improving maize yields among smallholder farmers in Malawi is a priority for poverty reduction and food security (Arndt, Pauw, & Thurlow, 2016).

Improving economy and food security has been at the core of the international agenda for the past decade. For instance, the first Millennium Development Goal (MDG) was to

eradicate poverty and extreme hunger by 2015 (Kwon & Kim, 2014). This was not only a priority goal but also an indication of the close association between poverty and hunger or food insecurity. It is a known fact that food insecurity is an indicator of poverty (Dzanja, Christie, Fazey, & Hyde, 2015). Moreover, the World Food Summit of 1996 defined food security as existing “when all people, at all times, have the physical and economic access to sufficient, safe and nutritious food that meets their needs and food preferences for an active and healthy life” (Food and Agriculture Organization, 2006, p. 1). Based on this definition, it can be concluded that access to economic means directly affects food security. Nevertheless, the definition is likely to bring controversy as people may not always have access to sufficient, safe and nutritious food in practical life situations. For example, over 70% of Malawians live on US\$1.90 a day, which is below the International Poverty Line (World Bank, 2018b). This has substantial effects on their disposable income to buy food and tracks very closely with food insecurity (Weinhardt et al., 2017).

Food insecurity and low socioeconomic status have been identified as important risk factors for the development of type 2 diabetes (Heerman et al., 2016). Food insecurity refers to limited or uncertain availability of nutritionally adequate and safe foods or the compromised ability to acquire these foods in socially acceptable ways (Bickel, Nord, Price, Hamilton, & Cook, 2000). Looking closely at this definition highlights financial instability, which significantly compromises people’s ability to acquire nutritionally sound foods. Food insecurity is associated with limited access to healthy food, poor adherence to general dietary recommendations and skipping meals (Heerman et al., 2016)

In an effort to examine the relationship between economy and food security, Dzanja et al. (2015) investigated the role of social capital on rural household food security using Malawi as a case study. Their seminal study incorporated household survey data into a household social welfare model to test the impact of social capital on food security of rural households in Malawi (Dzanja et al., 2015). According to the authors, social capital is the ability to secure benefits by virtue of membership in social networks, such as community-based groups (Dzanja et al., 2015; Putnam, 2000). Social capital in the Malawi context also means receiving or offering help in cash during economic crises (Dzanja et al., 2015). Social capital has been shown to cushion social and economic

adversities in developing countries (Suckall, Fraser, & Forster, 2016). The study by Dzanja et al. (2015) showed that food security improved by membership to farmers' club.

The strength of this study lies in its desire to examine the linkage between two important variables, namely economy and food security, given the chronic poverty and food insecurity in Malawi (Harrigan, 2008). Also, the increase in food security with social capital captured by this study is in line with a cross-country study conducted in sub-Saharan Africa (Tiwari et al., 2016). The major shortfall of this study is that it only focused on the linear association between economy and social capital, thereby ignoring the different dimensions of social capital of people in Malawi, such as community-based economic groupings. Therefore, future research can examine further the complex roles of such dimensions of social capital on food security.

When people are food insecure, their concern is less of quality than quantity of food, and they substitute calorie-dense, processed and less nutritious foods for healthy and nutritious foods (Berkowitz, Baggett, Wexler, Huskey, & Wee, 2013). Also, as food insecurity escalates in rural areas, people migrate to urban areas in search of social and economic opportunities but may end up in poor living conditions (Haggblade et al., 2016). This results in urban poverty which pushes people into eating cheaper food, but with low nutritional value (Nnyepi et al., 2015). These unhealthy but affordable food options are known as obesogenic foods and have been shown to significantly increase the risk of type 2 diabetes (Swinburn et al., 2013; Vandevijvere & Swinburn, 2014).

2.2.2 Food quality and nutrition

According to the Honest Food Model, food quality centres on the belief that food should be healthy, nutritious and reduce exposure to nutrition-related conditions (Hebda, 2014). The concept of food quality is consistent with the food security concept described in the previous section. Just as with food security, food quality also focuses on the availability of safe and nutritious food to achieve a healthy life (Nyantakyi-Frimpong et al., 2017). Food quality is also synonymous with healthy eating and healthy diet in nutrition circles. Although the concept of healthy eating is becoming popular these days, the global food system is often described to be in crisis because it has failed to provide

safe, nutritious and affordable food to people, particularly the most vulnerable populations in the world (Akram-Lodhi, 2013; Rosin, 2013).

Before going further with the analysis of healthy eating, it is worthwhile to consider what constitutes healthy eating or a healthy diet. There are various definitions of a healthy diet. However, according to WHO (2015), a healthy diet contains fruits, vegetables (e.g. lentils, beans), nuts and whole grains (e.g. unprocessed maize, millet, oats), less than 10% of total energy intake from free sugars, less than 30% of total energy intake from unsaturated fats and less than 5g (equivalent to one teaspoon) of iodised salt per day. This recommended diet has been demonstrated to protect against all forms of malnutrition, including noncommunicable diseases, such as diabetes, heart disease, stroke and cancer (WHO, 2015).

However, these dietary guidelines, together with other dietary recommendations, have not escaped criticism. The major drawback includes mistrust of the health information itself due to an overabundance of messages and contradictions between messages, confusion and uncertainty on portion sizes and food marketed by multinational companies as “healthy eating” (Hill, Knox, Hamilton, Parr, & Stringer, 2002; O’Key & Hugh-Jones, 2010).

Another serious weakness with these dietary guidelines is that their publication does not appear effective for prevention and control of nutrition-related problems (Swinburn et al., 2015). This is because the guidelines focus on getting individuals to change their eating habits, but they do not consider systemic factors or make improvements in food environments, which are the key drivers of obesity and type 2 diabetes, at local, national and international levels (Swinburn et al., 2011). Taking into consideration the wider factors that influence people’s eating patterns rather than just individual behaviours is in tandem with the new public health perspective. To achieve nutritional targets, policies and guidelines should adequately address the complex conditions that influence people’s eating patterns and nutritional status.

Thus, improving food environments and systems will ultimately lead to a decreased risk of obesity and type 2 diabetes in the general population because it addresses collective physical, economic, policy and sociocultural surroundings, factors, opportunities and conditions that significantly affect people’s food and beverage choices and nutritional

status (Kumanyika, 2013). Moreover, policy interventions which aim to address these complex factors are also likely to reduce health inequities in the general population (WHO, 2014).

According to the Malawi nutrition guidelines (Ministry of Health, 2007), nutrition hinges on six food groups, namely green leafy and yellow vegetables (e.g. pumpkin leaves, tomato), fruits (e.g. mangoes, banana), legumes and nuts (e.g. beans, peas), animal foods (e.g. fish, meat), fats (e.g. groundnuts, cooking oil), and staples (e.g. maize, potato and cassava). Furthermore, the MOH (2007) recommends the following practices to be followed to ensure healthy eating habits:

- Identifying foods that are available and in season
- Eating a variety of foods from the six food groups
- Eating whole grains and seeds rather than highly refined foods
- Eating locally available fresh foods rather than exotic or highly processed foods
- Eating a fruit after every meal
- Using little sugar and less sugary foods
- Always using iodised salt
- Drinking at least two litres of water everyday
- Adding oil-rich foods, such as groundnuts, soy flour or cooking oil when cooking green leafy and yellow vegetables to enhance vitamin A absorption in the body.
- Eating green leafy vegetables and yellow fruits, such as citrus fruits with vitamin C to facilitate iron absorption from the vegetables.
- Exercising regularly every day, such as walking and jogging.

The above nutrition guidelines and recommendations seem attractive and comprehensive to prevent nutrition-related diseases and promote good health. However, what are the actual current eating practices or habits in Malawi? Research to date has not yet been found to explore what the Malawian general population is eating, apart from a handful of studies that focused on eating habits among vulnerable populations in Malawi, such as pregnant women and children (Ashorn et al., 2015; Chiutsi-Phiri et al., 2017; Hjertholm et al., 2018; Hurley et al., 2016; Thakwalakwa et al., 2015). This is worrisome considering the soaring trends of diabetes and other noncommunicable diseases in Malawi.

Mphwanthe, Mtande, and Weatherspoon (2017) took a step to investigate food consumption and overweight/obesity among adults diagnosed with type 2 diabetes in Lilongwe, Malawi. This was a cross-sectional study conducted on a convenience sample of adults diagnosed with type 2 diabetes at Kamuzu Central Hospital in Malawi (Mphwanthe et al., 2017). Given the paucity of research on nutrition and diabetes in Malawi, the study can be described as seminal because it attempted to address an area with scant research. The findings of this study indicated that the frequently consumed foods were a stiff maize porridge (*nsima*) (95.2%) and green leafy vegetables (77.8%) at least two to three times a day (Mphwanthe et al., 2017). Protein rich foods, such as fish (46%) and beans (31.7%) were consumed at least two to four times a week. These findings are consistent with results from a study on glycaemic responses to maize flour by Mlotha, Mwangwela, Kasapila, Siyame, and Masamba (2016) which identified *nsima*, fish and green leafy vegetables as the popular traditional dish for Malawi.

Mphwanthe et al. (2017) also reported that 73% of their participants were overweight or obese, with females being more overweight than males. These findings are in line with findings from other studies in Malawi and 24 other African countries, which indicated a rise in obesity proportions, with obese females outnumbering their male counterparts (Amugsi, Dimbuene, Mberu, Muthuri, & Ezech, 2017; Msyamboza et al., 2014). However, the study by Mphwanthe et al. (2017) only focused on a small group of type 2 diabetes patients and, therefore, does not provide adequate information on what the Malawian general population is eating, whether diabetic or not. Moreover, the study did not assess whether there was any transition taking place in the diets of the participants. Nevertheless, the authors admitted that further studies to investigate dietary patterns in the Malawi general population are necessary (Mphwanthe et al., 2017).

2.2.3 Food biodiversity and seeds

The concept of food diversification has dominated global research over the past decade. What does biodiversity mean? It refers to diversity among and within plant and animal species in an environment (Dwivedi et al., 2017). Diversification in rural environments is considered to be a dynamic adaptation process in response to threats and opportunities by which farmers can manage risks as well as gain income, resources and improve their living standards (Asfaw et al., 2015). Food diversification is also linked to healthy and

sustainable diets (Remans, Wood, Saha, Anderman, & DeFries, 2014). Healthy and sustainable diets are defined as diets that provide all essential nutrients including minerals and vitamins, but with low environmental impact (Dwivedi et al., 2017).

In Malawi, nutrition is closely linked to agriculture due to its ability to generate food and income, reasons already discussed in this chapter in the economy and food security section. The link between agriculture and nutrition is not only important because agriculture produces food, but also because many of Malawi's undernourished people are smallholder farmers (Koppmair, Kassie, & Qaim, 2017). The immediate question that comes to my mind is, why would these farmers experience poor nutrition? A recent study by Koppmair et al. (2017) appears to have provided an answer to this question. The survey analysed the association between farm production diversity and dietary diversity in rural smallholder households in Malawi (Koppmair et al., 2017).

The key findings of this study indicated that farm production diversity was positively associated with dietary diversity, but the estimated effects were minimal (Koppmair et al., 2017). Other factors, such as access to markets for buying food and selling farm produce and the use of fertilisers were demonstrated to be stronger determinants of food diversity than farm production diversity (Koppmair et al., 2017). These findings are consistent with findings from a study which identified market access as having more positive effects on dietary diversity than just increasing farm production diversity (Sibhatu, Krishna, & Qaim, 2015). Overall, although evidence suggests that more diversified agricultural and food market systems are key to improving dietary quality and nutrition (Berry, Dernini, Burlingame, Meybeck, & Conforti, 2015; Bowman & Zilberman, 2013; Pingali, 2015), it is unlikely that this is occurring in Malawi, where most smallholder farmers practice undiversified agriculture (Qaim & Sibhatu, 2018).

A longstanding public health recommendation is for people to have a diverse diet, where they eat everything in moderation (de Oliveira Otto, Padhye, Bertoni, Jacobs, & Mozaffarian, 2015). The question is whether there is evidence that diet diversity will lead to reduction in the risk of obesity and type 2 diabetes. Research indicates that the central issue in measuring the effects of dietary diversity is to establish whether the diversity is for more healthy foods or less healthy foods (de Oliveira Otto et al., 2015). For instance, a previous study by McCrory et al. (1999) showed that diversity of

vegetable intake was negatively associated with body fat; however, greater diversity of intakes of unhealthy foods such as bakery desserts, salty snacks and carbohydrates was positively associated with body fat. Excessive accumulation of adiposity or body fat is a risk factor for type 2 diabetes.

2.2.4 Culture and community

The Honest Food Model recognises sustainable food systems as those that contribute to human communities (Hebda, 2014). Furthermore, a sustainable food system is characterised by its ability to conserve and share traditional and local agro-ecological practices and fosters local adaptation and resilience (Hebda, 2014). Taking a close look at this component, it is concomitant with the Malawi national nutrition guidelines, which recommend that people eat locally grown food rather than exotic or highly processed foods (MOH, 2007). This recommendation sounds essential enough, but its practicability given chronic poverty and food insecurity situations in Malawi is limited.

Literature on traditional and local agro-ecological practices including consumption of locally grown crops in Malawi remains scarce. Research indicates that 90% of the Malawian general population is reliant on maize as a traditional grain for survival (Mlotha et al., 2016; Mphwanthe, Kalimpira, & Geresomo, 2016; Mphwanthe et al., 2017). However, evidence also shows that with increasing demographic shifts, such as urbanisation, people's eating patterns are changing in Malawi. For instance, people who move from rural to urban areas adopt untraditional foods, such as processed foods and snacks as part of their normal diet (Oniang'o et al., 2003). This situation has led to the sprawling of fast food outlets in cities of many African countries (Nnyepi et al., 2015). These fast and snack foods have been demonstrated to have high proportions of harmful fat, starch and sugar (Oniang'o et al., 2003). Excess fat and sugar in the body result in overweight and obesity which increase people's risk for type 2 diabetes (Vandevijvere et al., 2015).

Culture and community form the socio-cultural environment which shapes people's eating patterns, food identities and choices and lifestyles (Issaka, Lamaro, & Renzaho, 2016). This is supported by the social identity theory, which states that individuals' behaviours are formed by structures and processes within the broader context of larger society units, such as groups, organisations and cultures (Hogg, 2006). Attitudes and

perceptions on food patterns are culturally constructed in sub-Saharan Africa, most of which are associated with the risk of type 2 diabetes (Issaka et al., 2016). A typical example of a socio-cultural belief in many sub-Saharan African countries is the one whereby people perceive being overweight or obese as a symbol of wealth and prosperity (Kiawi et al., 2006; Pastakia et al., 2017; Renzaho, 2004).

Food culture and attitudes towards processed foods also correspond with nutrition transition in developing regions, such as sub-Saharan Africa (Lin, Teymourian, & Tursini, 2018). Transition from traditional diets, which are typically low in sodium, saturated fat and glycaemic indexes to processed food is often perceived as a sign of prosperity or economic development in Malawi and other African countries (Holmes et al., 2018). This has resulted in swift changes in eating patterns as well as the popularisation of processed foods in developing countries (Lin et al., 2018). These modern eating patterns are associated with high-energy and fat intakes, which significantly contribute to overweight and obesity (Lobstein et al., 2015).

Another important aspect of demographic transition that has characterised many African communities is urbanisation. In Malawi and other African countries, urbanisation refers to migration of people from rural to urban settings in search of more choices (such as good quality housing), opportunities (such as employment) and better services (such as education and health care) (Mberu, Béguy, & Ezeh, 2017). Historically, the foundations that colonial masters lay in African countries ensured that industrial investments, commerce, social amenities and educational and financial institutions heavily concentrated in urban areas, thereby neglecting rural areas (Amugsi et al., 2017; Mberu et al., 2017). As such, urban settings are still perceived as “islands of privilege” where people can go and embrace a better life (Cohen, 2004). However, the unfortunate reality is that such a movement of poor people from rural to urban areas only increases the urbanisation of poverty (Mberu et al., 2017). Many of these “urbanites” end up in urban poverty and their food choices are reduced to cheaper and unhealthy options, such as processed food and snacks (Oniang'o et al., 2003).

2.2.5 Climate change

Climate change continues to be a global health priority despite efforts by the international community to promote climate action. Although other scholars believe

that the real effects of climate change are yet to be experienced, the reality is that our climate is already changing. The Intergovernmental Panel on Climate Change (IPCC) has already declared climate change and its adverse health effects as the biggest global health threat of the 21st century (Bickton, 2016). Among many changes, unprecedented increases in warm days, erratic rainfall patterns, ecological variability, and decreased water levels are negatively impacting on the health and wellbeing of the general population (Intergovernmental Panel on Climate Change, 2014). In southern Africa, excessive heat, depletion of water sources and biodiversity, and soil erosion have decreased subsistence farming resulting in widespread food insecurity (Rankoana & Mothiba, 2015).

Climate change is of particular concern to Malawi because of its reliance on rain-fed agriculture (Msowoya, Madani, Davtalab, Mirchi, & Lund, 2016). Given the significance of the rain-fed staple grain, maize, for consumption, labour force and GDP, the effects of climate change impose threats on crop production and present the potential to reverse almost all the gains in food security. There is an inverse association between climate change and rain-fed maize production in Malawi. For instance, Msowoya et al. (2016) investigated the effects of climate change on maize in Lilongwe district, the largest maize growing district in Malawi. The study showed that maize production may decrease up to 14% by mid-century due to climate change, and up to 33% loss by the end of the century (Msowoya et al., 2016). These findings are in line with a sub-Saharan African study on predictions of climate change effects on food security, which showed increasing trends of food insecurity with worsening climate change effects (Richardson et al., 2018).

Although the declines in food production presented by Msowoya et al. (2016) appear to be minimal, they have the potential to eventually harm Malawi's food production and economy. The projected low GDP due to unsustainable agricultural production can substantially retard socioeconomic development (Msowoya et al., 2016). This will also lead to internal mobilisation of people from declining farms to urban areas in search of better opportunities, only to increase overcrowded urban slums with poor living conditions (Haggblade et al., 2016; Msowoya et al., 2016). The result of this unprecedented shift is urban poverty, which has been shown to drive people to eat cheap, unhealthy food (Haggblade et al., 2016). Also, as already discussed, food

insecurity compromises people's ability to acquire nutritionally safe foods and influences people to substitute unhealthy, affordable food for healthy, nutritious food.

2.2.6 Ecological integrity

Ecological integrity is both a holistic concept and framework that focuses on conserving native biodiversity and promoting resilience (Wurtzebach & Schultz, 2016). Within the Honest Food Model, food systems ought to avoid harm to the ecosystem and contribute to water quality, soil formation and ecological processes (Hebda, 2014). This way of thinking is also in tandem with the concept of agro-ecology, which seeks to mimic natural systems through in-depth knowledge of crop, insect and disease ecology, increased agro-biodiversity, and attention to the natural landscapes (Gliessman, 2015; Nyantakyi-Frimpong et al., 2017).

A complex question is whether agricultural practices in food insecure countries, such as Malawi, could pay attention to natural environment preservation. Nyantakyi-Frimpong, Mambulu, Bezner Kerr, Luginaah, and Lupafya (2016) discuss the two main perspectives of African agriculture: the use of "green revolution" and diverse farming systems. The former includes the use biotechnology, fertilisers, hybrid seeds, and pesticides to address the problems of hunger and food insecurity in sub-Saharan Africa (Hartmann, 2012). However, it can be argued that this agricultural perspective places too much emphasis on increasing agricultural produce and, by so doing, ignores the long-term impact on the environment. Conversely, diverse farming systems combine agricultural production with attention to inequality at multiple scales as effective ways to address food security issues as well as have positive environmental benefits (Moseley, Schnurr, & Bezner-Kerr, 2016; Snapp, Blackie, Gilbert, Bezner-Kerr, & Kanayama-Phiri, 2010). A typical example of environment-friendly agriculture is the concept of vertical farms. Vertical farms use automation to pile farms on top of each other, thereby utilising land effectively and producing 80% less waste than traditional farms (Visual Capitalist, 2017).

The Ottawa Charter for Health Promotion (WHO, 2018b) recognises inextricable links between people and their environment. Moreover, evidence shows that a flourishing natural environment is associated with population health (Lewis & Townsend, 2015). However, the planetary environment is rapidly deteriorating mainly due to human activities, thereby posing serious threats to food production and security and human

health (IPCC, 2013). Maintaining ecosystems is a good example of climate action, and has shown to mitigate impacts of climate change, such as food insecurity and poverty. As already discussed, the food insecurity-poverty nexus drives people to overcrowded urban conditions where they eat unhealthy, affordable food, thereby heightening the risk for noncommunicable diseases, such as diabetes. Overall, it can be concluded that nutritional or health guidelines, policies and initiatives that are based on socioecological and ecosystem approaches represent a profound re-orientation of public health thinking, away from medically oriented models towards the inclusion of the natural environment in health strategies (Charron, 2012; Patrick, Capetola, Townsend, & Hanna, 2011).

2.3 Chapter summary

This chapter has critically analysed the food system and wider social, economic and environmental factors, and has demonstrated how these affect people's eating patterns and corresponding diseases, particularly diabetes. The analysis has been made through the lenses of the Honest Food Model and the new public health, given the complex factors that affect food availability and consumption in Malawi. The components of the Honest Food Model include economy and food security, food quality and nutrition, food biodiversity and seeds, culture and community, climate change and ecological integrity. It is important to note that climatic effects on food production in Malawi can lead to food insecurity, famine as well as a significant retardation in socioeconomic development. These effects appear to be modest at first sight with seemingly no direct bearing on the prevalence of noncommunicable diseases, such as diabetes. However, they substantially compromise people's ability to acquire nutritionally safe food and influence them to substitute obesogenic but affordable food for healthy foods. Such dietary shifts are known as nutrition transition. These dietary patterns are also associated with the epidemic of obesity and type 2 diabetes. Overall, the chapter represents a new public health thinking which focuses on wider social determinants of nutrition and health rather than just individual or behavioural factors.

Chapter 3 Methodology

3.1 Introduction

This chapter discusses the theoretical and methodological underpinnings that guided and informed this research. The study adopted a participatory research methodology, using photovoice to explore eating patterns associated with diabetes in Malawi. The researcher used photovoice lens to provide visual data and insights into what Malawians are eating currently and how this relates to the risk of type 2 diabetes. The incorporation of photovoice was also a powerful tool for the discussion by families about their eating habits, and how these have changed over time. Moreover, as a study focusing on families, there was a need to carefully select a method that would match the intergenerational composition of the family. In this regard, photovoice was chosen because of its multi-dimensional, participatory nature as opposed to other conventional research methodologies (Martin, Garcia, & Leipert, 2010). The study asked the following questions:

- What is the current situation of the Malawi food system, and how might this be influencing diet and increased prevalence of type 2 diabetes?
- What are families in Malawi currently eating and what has changed?
- How might Malawian family eating patterns be linked to the increased prevalence of type 2 diabetes?

3.2 Photovoice as a qualitative research methodology

The photovoice methodology was first developed and proposed by photography-based researchers Caroline Wang and Mary Ann Burris in the 1990s (Sutton-Brown, 2015). According to Wang and Burris (1997), photovoice is a “process by which people can identify, represent, and enhance their community through a specific photographic technique” (p. 369). This implies that photovoice uses photographic techniques to help people reflect on their ways of living and, if necessary, bring change to their lives (Sutton-Brown, 2015). Figure 2 below presents a diagrammatic summary of the objectives of photovoice.

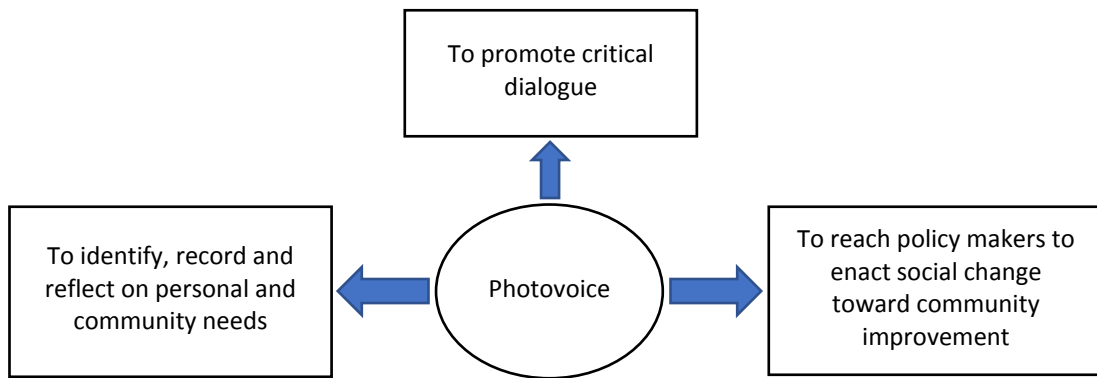


Figure 2: A summary of the primary objectives of photovoice (Sutton-Brown, 2015)

Figure 2 above suggests that photovoice engages people in a critical reflection and dialogue to present their issues to relevant authorities. As a research process, photovoice involves people photographing their everyday moments, such as health and work realities and participating in group discussions about their photographs (Sutton-Brown, 2015). Photovoice is, therefore, able to highlight personal and community issues of greatest concern and provides a means to reach policy makers, health planners, community leaders and other people to enact change (Evans-Agnew, Boutain, & Rosemberg, 2017).

3.3 Rationale for using photovoice in this study

Firstly, photovoice was used in this study given its documented effectiveness in community health assessment and promotion (Downey, Ireson, & Scutchfield, 2009; Jurkowski & Paul-Ward, 2007; Novek, Morris-Oswald, & Menec, 2011; Wang & Burris, 1997; Wang, Yi, Tao, & Caravano, 1998). Photovoice has the capacity to tap into people's personal and public behaviours related to health and present them in a much more physical way than other research methodologies (Jurkowski & Paul-Ward, 2007). For instance, in this research, photovoice was used to capture the visual aspects of the food Malawian families eat to see whether that could increase the risk of developing type 2 diabetes. According to Novek et al. (2011), photovoice is best suited to capturing physical or more tangible features of phenomena.

Secondly, photovoice enhances participation and democratises the research process (Castleden, Garvin, & Huu-ay-aht First, 2008; Novak, 2010; Novek et al., 2011). Photovoice can also empower participants both individually (through taking pictures

and reflective activities, such as journaling), and collectively through group discussions related to photographs (Jurkowski & Paul-Ward, 2007). This implies that photovoice is in line with an Afrocentric or culturally enabling paradigm because it emphasises on enabling people to define reality for themselves, within their socio-cultural and geographical context (Harley, Hunn, Elliott, & Canfield, 2015). In this research, participants participated in the photography of their daily meals and recorded them in food diaries. Also, they participated actively in focus group discussions where they discussed, argued, quizzed and supported each other regarding their family's food pictures. This further supports the original photovoice notion that participants "examine images and react to cues present in those images more carefully than would have been expected using written or spoken cues alone" (Dempsey & Tucker, 1994, p. 169). Moreover, partnership and participation in photovoice enhance the trustworthiness of the data as participants feel comfortable to share information (Faucher & Garner, 2015; Turk & Kalarchian, 2014).

Thirdly, photovoice was used in this study because it is an appropriate methodology for studies focusing on families. Photovoice utilises more active and tangible methods for data collection, for instance photography, which is a better fit for studies on dynamic, living systems, such as families (Deacon, 2000). Moreover, populations such as children, adolescents and those with limited verbal or writing skills, may be able to better respond to methods that match their active, continually developing context (Deacon, 2000).

Having a community capture videos and photos may seem like a challenge (Martin et al., 2010). However, the purpose of generating and using photos and videos in social research is not to produce professional quality images, but to capture observations and experiences through the eyes of the camera user (Luttrell, 2010). The critical aspect in this study was for the participants to produce images that represented the food they eat. Therefore, amateur skills were accepted as in other photography projects focusing on health and social problems (Luttrell, 2010; Nash, 2014) with some assistance from the researcher in the field.

A challenge also lies in the ethics of photovoice (Martin et al., 2010). Although photovoice has been successfully used in health and illness research (Creighton et al., 2017), it suffers ethical issues, namely invading people's privacy; potentially disclosing

embarrassing facts; and the risk that photographs may be used for commercial purposes (Martin et al., 2010; Novek et al., 2011). This implies that all researchers using photovoice must be aware of these ethical concerns and take necessary steps to address them. In this study, only photographs of food were collected, and it was emphasised that no human photographs or any photographs with personal identifications would be allowed. In addition, a very succinct, separate consent form outlining how the pictures would be used was discussed with the study participants prior to the commencement of the study. Furthermore, a plan of measures to ease the practical mechanics of using smartphone cameras was submitted for ethics approval.

Photovoice can also be expensive and time-consuming, similar to some longitudinal studies (Novek et al., 2011). This is because a lot of investment goes into purchasing photographing devices and orientating participants on the use of camera. This study utilised second hand smartphones to minimise the costs and ensure effective communication with the participants. Camera orientation was done at a family level to save time. Despite the costs, when proper attention is paid to ethical issues and the practical mechanics of using a camera, photovoice can provide researchers with a unique opportunity to tap into participants' physical and social contexts.

3.4 Theoretical underpinnings of photovoice

Three theoretical frameworks underpin the epistemological roots of photovoice, namely, feminism or feminist theory, empowerment education for critical consciousness, and documentary photography (Ciolan & Manasia, 2017; Latz, 2017; Wang & Burris, 1997).

3.4.1 Feminism/ feminist theory

Feminism, also known as feminist theory or critical feminist theory is an important theoretical underpinning of photovoice (Evans-Agnew et al., 2017; Wang & Burris, 1997). It is based on the belief that all women experience oppression or exploitation to a certain extent; there is a need to understand how oppression works; and interventions should aim to fight against oppression (Latz, 2017; Maguire, 1987). According to Maguire (1987), photovoice is one of the best approaches to doing feminist research. For instance, photovoice has the capacity to give voice to a group of people who may be

perceived as oppressed or marginalised due to their gender, racial or socioeconomic status.

Feminist theory is in sharp contrast with positivist research methods (Latz, 2017). Positivism is a paradigm or worldview that emphasizes “the importance of objectivity, systematic and detailed observation, testing hypotheses through experimentation and verification” (Grant & Giddings, 2002, p. 13). One of the most well-known strengths of positivist research is that the knowledge found through experimental and non-experimental methodologies is regarded as facts or evidence which in turn guides professional decision making and practice (Grant & Giddings, 2002). However, one major drawback of positivist research is that it focuses too much on the objective definition of truth, and this reduces all relationships to a statistical level, with research participants being treated as objects (Baum, 2008; Grant & Giddings, 2002). Therefore, photovoice uses participatory methods to create space for participants to be authors of and authorities on their own lived experiences (Latz, 2017).

This study investigated the eating patterns associated with diabetes among semirural Malawian families. The study is not largely influenced by feminism as it is not primarily focused on issues of gender. However, literature indicates that rural and semirural people in Malawi experience social inequities, such as low economic opportunities and do not have a voice in the formulation of health policies (Price et al., 2018). Moreover, these are populations that have limited access to health services and information while other groups in society continue to enjoy full access to health services and information (NSO & ICFI, 2016). The critical aspect of uncovering the source of inequities and empowering marginalised populations inherent in critical feminism is, therefore, equally important here as will be discussed below.

3.4.2 Empowerment education for critical consciousness

Photovoice is also underpinned by Freirean education for critical consciousness, an approach proposed by Paulo Freire (Freire, 1970; Wallerstein & Bernstein, 1988). He engaged people to discuss problems affecting their lives and develop the solidarity to solve them through action (Evans-Agnew et al., 2017). Freire used images and photographs as codes in order to allow people to engage with each other in emancipatory dialogue (Freire, 1970). Photovoice takes Freire’s concept a step further

so that images of the people are made by the people themselves and then the people enter into dialogue with each other (Evans-Agnew et al., 2017; Latz, 2017; Wang & Burris, 1997).

Freire's concept of empowerment education for critical consciousness is similar to feminist theory in the sense that they both seek to encourage individuals to work against oppression or any form of injustice. However, Freire took a step further by identifying three levels of consciousness that influenced how individuals interpret their realities and in turn influence their behaviour (Freire, 1970; Latz, 2017). The lowest level of consciousness is magical, whereby individuals perceive themselves as inferior while silently existing and maintaining status quo (Latz, 2017). The middle level of consciousness is naïve, whereby individuals perceive their social structures as corrupt but still liveable (Freire, 1970; Latz, 2017). The highest level of consciousness is critical in which people realize that their actions can either maintain or disrupt their social realities (Carlson, Engebretson, & Chamberlain, 2006; Freire, 1970).

This research was guided by the theoretical base of critical consciousness by engaging the participating families in a discussion of what they eat; a reflection on how that might have changed; and a reflection on issues of health and diet modification. It is the process of self and group reflection which is highly conducive for empowerment as it allows people to consider and explore their situation and develop strategies to solve any issues of their concern (Budig et al., 2018; Duffy, 2011; Wilson et al., 2007).

3.4.3 Documentary photography

Documentary photography has been used since the 1930s mainly to raise awareness about people and societies (Latz, 2017). It is characterised as the social science presented in visual imagery (Rosler, 1989; Wang & Burris, 1997). Documentary photography has been used to describe a variety of visual styles, genres and commitments (Wang & Burris, 1997). In one of the most powerful definitions, documentary photography was referred to as "the things to be said in the language of pictures" (Wang & Burris, 1997, p. 371). Documentary photography was pioneered by Roy Striker, the chief of the U. S. Farm Security Administration, who dispatched a staff of photographers to capture the relationship between rural poverty and improper land

use, the decline of the small farming community and the growth of urban decay (Striker, 1977; Wang & Burris, 1997).

Consistent with feminist theory and critical consciousness, documentary photography empowers vulnerable populations to capture and express their subjective stories about the world (Ciolan & Manasia, 2017). By so doing, people's experiences and views become tools for enacting change (Kuo, 2014). Although documentary photography provides a vital base for photovoice, its initial form lacked participatory components (Latz, 2017). This called for the development of such a photography-based research method with a more participatory dimension as seen in the current photovoice. The participatory aspect of photovoice allows for empowerment of participants and increases the rigor of data. These fundamental aspects of photovoice inspired me to engage with semirural families, whose voices may not be well represented in health policy formulation processes.

3.5 Researcher's position

The researcher positions himself as a co-researcher on exploring current eating patterns with people in a participatory way in rural and semirural areas of Malawi. Among the many advantages of photovoice, Wang and Burris (1997) point out that the process of photovoice has the capacity to affirm ingenuity and the perspective of society's vulnerable populations. For example, people in rural or semirural areas of Malawi are more likely to be less educated, poor, having limited access to social and health services and information and also more likely to suffer the worst economic burdens of chronic noncommunicable diseases than their urban counterparts (Price et al., 2018). Therefore, the researcher is interested in research which offers an opportunity to put families' voices at the centre of the research, and that has a practical dimension in exploring solutions to health problems.

The researcher's other motivation was to use a research methodology that goes beyond traditional approaches. Photovoice was found to provide participants with an opportunity to convey their perspectives on food in multiple, flexible and untraditional ways rather than traditional methodologies (LaVela, Balbale, & Hill, 2018). Placing a camera in the hands of the participants to capture the food they eat by themselves also demonstrated the partnership that existed between the researcher and the participants.

Moreover, the dialogue or discussion steps in photovoice encouraged research participants to participate actively in the research process. The following sections discuss the process of the current research.

3.6 Data collection and analysis

This section discusses data collection, interpretation and analysis processes employed in this study. The sampling and recruitment methods for the photovoice participants and data collection methods and instruments are also discussed. Then the ethical processes and considerations that guided the study are presented. Lastly, the analytical processes utilised by the study are also discussed.

3.6.1 Data collection

The data collection methods utilised in the study were taking photos of meals, supported by food diaries, which itemised the food eaten, and focus group discussions. It is a normal practice in photovoice to give participants journals or logbooks in order to capture more details of a particular photograph (Evans-Agnew et al., 2017). This was communicated to the participants at the outset of the study. This helps to prepare the participants and give them time to decide the photographing stage (Sutton-Brown, 2015). The photography of meals and journaling was done in four days because this was a small-scale study. A smartphone was provided to each of the participating families to use for the photography of their daily meals. A brief informal discussion on the photos to be collected was held with each participating family. Youthful members of the family were very keen to take pictures of the family meals. The research team monitored the taking of photos and provided some assistance to families that had problems with picture taking.

After the photography of the meals, a semi-structured focus group discussion guide was developed to guide the discussion of the food pictures (see Appendix B). These guide questions were useful for prompting discussions on the food pictures the families captured. Focus group discussions were conducted with each family separately to ensure privacy and promote their freedom of expression. It was very captivating to see how family members argued, questioned and supported each other during the discussions. Additional details were sought on their opinions on their current eating

patterns and the strategies they would employ if they were given a chance to modify their diets. The guide questions were as follows:

- How would you describe your family meals, starting from the time you wake up to the time you go to sleep (i.e. breakfast, lunch, and supper or any snacks)?
- What is your opinion on current eating patterns?
- Having seen the food pictures, what would you want to add about ways people currently eat, for example, do people have snacks and drinks between meals? And if so, what type?
- How does the food you eat now differ from what you used to eat before?
- If you were given a chance, would you change your current eating patterns? How and why?
- Do you have anything to say about current eating patterns?

Recruitment of photovoice participants

The study recruited four semirural Malawian families to explore their current eating patterns and ascertain whether the food they eat could contribute to the risk of diabetes. The semirural population was chosen because it is a target for sprawling food markets in Malawi (Nnyepi et al., 2015). Furthermore, the study focused on the semirural community because about 85% of Malawians live in the rural and semirural areas (World Bank, 2016). The following recruitment criteria were utilised:

Each participating family had to meet the following recruitment criteria:

- Malawian family living in the semirural area of Blantyre district
- Having at least five intergenerational members (at least one or two adults aged above 40 and children at least five years old and above)
- Willing to participate in photography of their meals and focus group discussions

Sampling techniques

The study utilised purposive sampling techniques. This is a non-probability selection technique by which research participants to be studied are chosen on the basis of the knowledge and professional judgement of the researcher or the expert (Duignan, 2016). Ciolan and Manasia (2017) adds that purposive sampling should be adopted in a photovoice study to attract people based on gender or ethnicity criteria.

The initial call for families to participate in the study was made at a local Presbyterian church because this is a gathering place for community members in the semirural areas of Malawi. Additionally, posters or recruitment notices were pasted on all trees and notice boards in the semirural area of Blantyre district. Prospective participants/families were asked to communicate with the researcher, whose contact details were given on the recruitment poster. Upon expressing their interest to participate in the study, each family was paid a preliminary visit to discuss the activities involved in the study. Many of them were interested in the photographic component of the study. As a result, four families that expressed interest to participate in the study and met the above inclusion criteria were recruited. Four families were considered to be an adequate sample because this was a small-scale study.

Ethics

As research dealing with human subjects, this photovoice study was required to meet the ethical standards set by the Auckland University of Technology's Ethics Committee (AUTEC). The study was granted ethical approval by AUTEC after successfully meeting the ethical requirements. Ethical approval was granted on 10 March 2017, with AUTEC reference number 17/13 (see Appendix A). Furthermore, ethics approval was sought from the Malawi National Health Sciences Research Committee (NHSRC). The study was approved by NHSRC on 5 April 2017, approval number 1759 (see Appendix A). There were no particular ethical issues with this study.

The purpose, potential benefits and risks in participating were explained in an information sheet and were communicated to potential participants. Information about the study was simplified to the level of participating children as required by AUTEC. Photovoice involves participants taking pictures in their homes, therefore, consent has to be sought for both the photography and release of the pictures (Sutton-Brown, 2015). The first consent form was sought prior to the commencement of the study to signify participants' voluntary participation. Parents gave consent on behalf of their children aged below 14 years. However, assent was sought from children who were old enough to comprehend the study activities. The second consent form was called consent and release form. This was done to seek participants' permission to be photographed and use photographs for publication and other forms of public distribution.

The photography and discussion processes

Each participating family was asked to capture the food they ate for a period of four days. All participating families were interested to take pictures of their main meals including snacks using the smartphones provided. The researcher ensured that all participating families were comfortable to use a smartphone camera before the commencement of data collection. A meeting was also convened with the participating families to discuss their responsibilities and the expectations of the researcher. This is important because the photography method of research is associated with risks, power and ethics (Sutton-Brown, 2015). Ethical and safety issues in photovoice are clearly stated by Wang, Cash, and Powers (2000) that “no picture is worth taking if it begets the photographer harm or ill will” (p. 87).

At the end of the photography period, food pictures were collected, and a focus group discussion was organised with each of the participating families. Children in these families had their own set of questions based on their level of understanding and as per AUTECH's requirement. The sharing of pictures is a crucial step in photovoice because it prompts a critical dialogue (Sutton-Brown, 2015). Although images are a powerful representation of a topic, it is the accompanying dialogues that have the potential to tap into participant's strengths and emotions (Hergenrather, Rhodes, Cowan, Bardhoshi, & Pula, 2009). Each focus group discussion lasted about 90 minutes and provided an opportunity for participants to go in-depth about their eating patterns and how they have changed over time. At the end of the session, the researcher provided refreshments and *koha* (a packet of washing powder) to each family in appreciation for their time.

3.6.2 Data analysis

Photographs and focus group transcripts were organised and coded separately to minimise coding challenges (Chapman, Wu, & Zhu, 2016). Photographs were analysed by linking them to coded text and analysing the relationship between coded data. The study utilised thematic analysis to analyse the data collected. Thematic analysis is a method of identifying, analysing and reporting patterns within data (Braun & Clarke, 2013). This analysis method allowed me to identify and analyse themes from both the pictures and the discussion transcripts. Themes were formulated based on the research questions. The data analysis followed the following steps: first, I made enough copies of

food pictures, focus group transcripts and field notes; second, all transcripts were read closely, and key points in relation to the photographs to understand the context; third, I grouped key words into themes; and connections were made between themes (Braun & Clarke, 2013; Murry & Nash, 2016).

3.7 Chapter summary

This chapter has discussed photovoice as a qualitative methodological approach. The chapter has critically analysed the theoretical underpinnings of photovoice, with emphasis on the relevance of traditions in critical consciousness and documentary photography. The rationale for using photovoice in the current study has also been discussed. Among other strengths, photovoice can be used across all ages and has the potential to tap into personal and social contexts in a way that other research methods would not. This chapter has also discussed the process of photovoice research by applying to the steps this study followed. Data were collected in form of photographs and texts. Data analysis was guided by thematic analysis. Photovoice methodology has been demonstrated to enhance the rigor of the data, by increasing the trustworthiness of findings, achieved through meaningful partnerships between participants and the researcher. Although ethical and safety issues may arise in photovoice research, its ability to encourage participant participation as partners rather than research subjects, and its capacity to give a voice to people who may otherwise be voiceless are key reasons to justify the use of this approach.

Chapter 4 Findings: Traditionally attached to staples but embracing processed food and snacks

4.1 Introduction

This chapter presents and interprets the findings of this study. It draws on the data collected through photography of meals, food diaries and focus group discussions with the four participating Malawian families. Data were analysed using thematic analysis. The main themes from this study are presented to reflect the specifics of what Malawians are eating currently and opinions on current eating patterns. These themes are presented and discussed. Overall, the findings show that traditional staples, such as maize, are still important and form the basis of a meal in Malawi. However, there is also evidence of increased consumption of high energy, processed food, snacks and sugar-sweetened beverages. At the beginning of a focus group discussion with each participating family, trends of diabetes including risk factors and the aim of the study were explained in a readily understandable manner. Therefore, this is reflected in some of the family members' responses. Below are demographic characteristics of the participating families and a summary of key themes of this study.

Table 1. Participant demographics

Family number	Name	Role	Age	Education level
Family 1	Mase	Parent	50	Primary school drop-out
	Wako	Parent	30	Secondary school drop-out
	Miranda	Child	20	Secondary school drop-out
	Kondwani	Child	18	Secondary school student
	Talandira	Child	15	Primary school student
	Chikondi	Child	11	Primary school student
Family 2	Ulemu	Parent	35	Secondary school drop-out
	Mutu	Parent	30	Primary school drop-out
	Sarah	Child	17	Secondary school student
	Gift	Child	14	Primary school student
	Mphatso	Child	12	Primary school student
Family 3	Moses	Parent	45	Secondary school drop-out
	Lara	Parent	38	Primary school drop-out
	Bob	Child	20	Secondary school student
	Maya	Child	14	Primary school student
	Zanga	Child	10	Primary school student
Family 4	Ulendo	Parent	50	Secondary school drop-out
	Wani	Parent	40	Secondary school drop-out
	Mega	Child	21	Secondary school student
	Ufulu	Child	15	Primary school student
	Noma	Child	15	Primary school student
	Tinyade	Child	10	Primary school student

Table 2. Summary of themes

Themes
<p>The food people eat</p> <ul style="list-style-type: none"> • Driven by the availability of sugar • Focusing on the taste-sweet enough • Whatever is available makes a snack • Keeping space for the next meal • Eating to feel it in the tummy • Good relish means eating more <i>nsima</i> (local staple) • Eating rice as a miracle-high cost of alternative food • Eating other food as sleeping on an empty stomach <p>Opinions on current eating patterns</p> <ul style="list-style-type: none"> • Current food as modern and a replacement for traditional food • Desirability/attractiveness • Way too deep into modern cooking styles • Mostly bought from the market • Filled with chemicals; leading to ill-health <p>Strategies to improve eating patterns</p> <ul style="list-style-type: none"> • Re-introducing local foods into the meal; a mountain to climb • Responsibility on what to eat; family-based sugar and salt rules • Food inspection and banning the sale of unhealthy food • Controlling what children eat in school • Food import regulation • Increasing awareness of nutrition-related conditions • More research on foods and corresponding health effects

4.2 The food people eat

Food is not only important for the health and wellbeing of an individual; it is also a social tool for enhancing family togetherness and communication (Berge et al., 2018). Families that share their mealtimes are often perceived as united and this produces social order and boundaries within the families (Skafida, 2013). Similarly, most of the eating in

Malawi takes place in the family, and this is a normal pattern (Nelson, Masulani-Mwale, Richards, Theobald, & Gladstone, 2017).

4.2.1 Breakfast

Breakfast in this study was defined as the first main meal each participating family had in the morning. The study utilised food diaries to record each family's breakfast for four days. The table below presents a summary of the food each participating family had for breakfast for a period of four days.

Table 3.
A summary of breakfast taken by the participating families

	Day 1	Day 2	Day 3	Day 4
Family 1	Tea (3 sugar tablespoons in the pot) with white bread and sweet potatoes	Soya porridge* (3 sugar tablespoons per plate) with groundnut powder	Tea (3 sugar teaspoons per cup) with sweet potatoes and groundnuts	Tea (3 sugar teaspoons per cup) with boiled sweet potatoes
Family 2	Tea (3 sugar tablespoons in the pot) with white bread and home-baked flitters	Tea (3 sugar tablespoons in the pot) with boiled potatoes	Tea (3 sugar teaspoons per cup) with boiled sweet potatoes and bananas	Soya porridge* (3 sugar teaspoons per plate) and pumpkins
Family 3	Tea (4 sugar teaspoons per cup) with white bread and boiled sweet potatoes	Soya porridge* (with 3 sugar tablespoons per plate)	Soya porridge* (with 3 sugar tablespoons per plate)	Tea (3 sugar teaspoons per cup) with white bread and sweet potatoes
Family 4	Tea (3 sugar tablespoons in the pot) with rice and tomato soup	Tea (3 sugar tablespoons in the pot) with white bread and avocado pears	Tea (2 sugar teaspoons per cup) with white bread and sweet potatoes	Tea (1 ^{1/2} sugar tablespoons per cup) with sweet potatoes

*Porridge made from soy bean flour

Carbohydrate composition of the breakfast

According to Table 3 above, carbohydrates formed the bulk of the food consumed during breakfast. The most common energy sources ranged from simple, refined sugar and white bread to complex carbohydrates, such as sweet potatoes and soya porridge. Only two meals included fruits, namely bananas and avocado pears. Figure 3 below is the pictorial presentation of the breakfasts the families ate for four days.

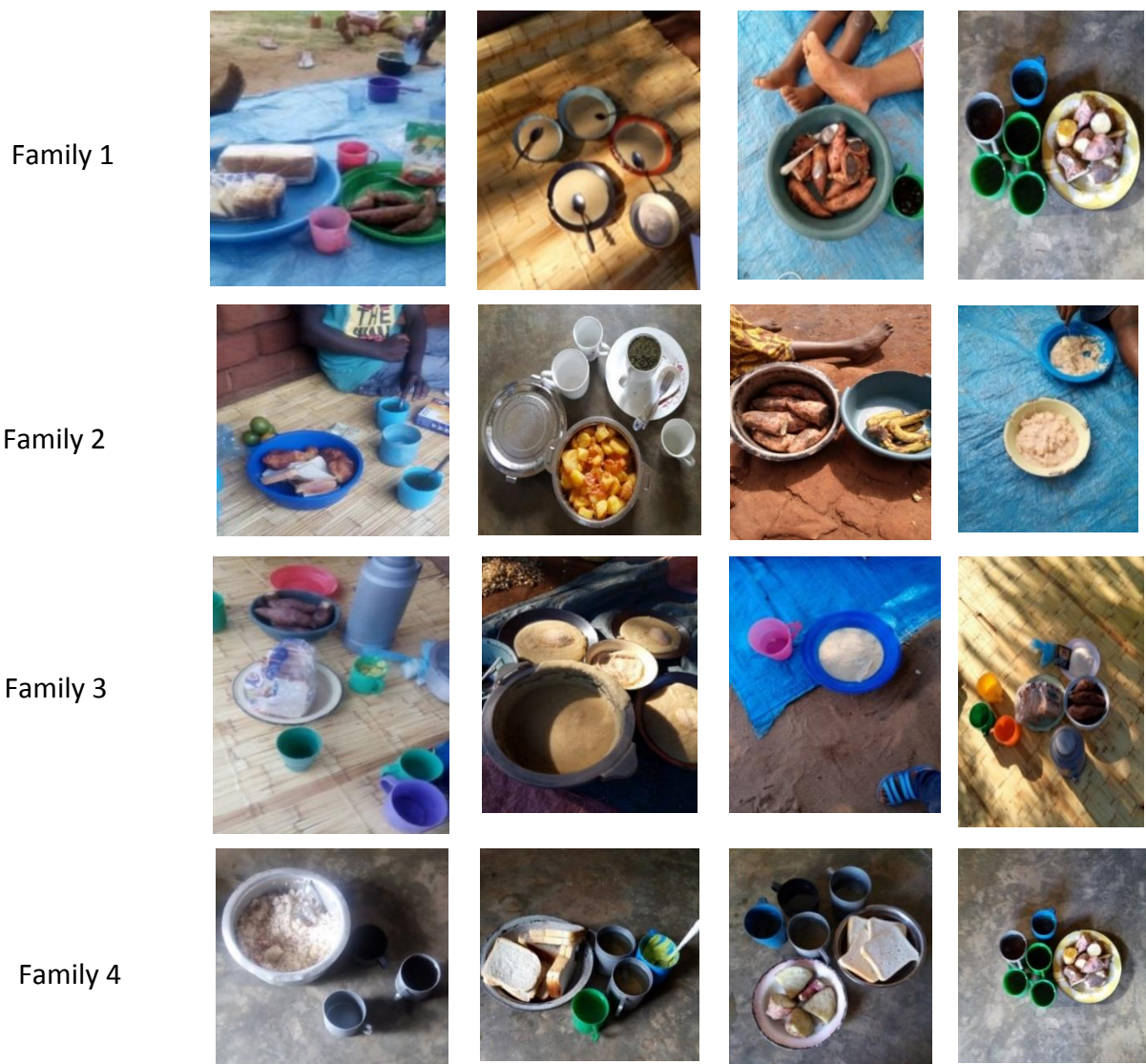


Figure 3: Photographs of breakfast taken by the participating families

Figure 3 and Table 3 above show that tea was the most common drink for breakfast in all the participating families, seconded by soya porridge. Tea and porridge are eaten with sugar in Malawi. Tea production and consumption in Malawi date back to the early decades of the 20th century, making it the third largest export earner after tobacco and

sugar (Taulo & Sebitosi, 2016). Historically, the Malawi sugar consumption per capita was as low as 2.4kilograms in the 1960s because people relied on fruits as the main source of sugar; however, it reached an all-time high of 15kilogram per capita in 1995 (Helgi Analytics, 2018). It is a common practice in Malawi to add sugar to the whole tea or porridge pot, as this is considered economical. However, other families also allow members to add sugar individually, but they have family rules on sugar usage. Focus group data suggest that the basis for the choice of breakfast was the availability of sugar in the family. The findings further revealed that sugar usage was largely determined by taste rather than specific measurements.

Driven by the availability of sugar

According to the findings, the two main breakfast options for the families were tea and porridge. Driving these two options is the availability of sugar in the family. If sugar is available, people will drink two to three cups of tea or more. They usually put about four teaspoons of sugar into the cup or pot of tea. Similarly, they added about three tablespoons of sugar to each plate of soya porridge. A one-kilogram sugar packet usually costs Malawi Kwacha (MK) 800, an equivalent of US\$1.1. White, refined sugar is the most preferred type of sugar in Malawi. This sugar packet can last about five days for a family of five. The findings of this study suggest that the availability of sugar in the house determined how much tea people can take in the morning. Wako from family 1 shared that the availability of sugar determines the number of tea cups she takes in the morning.

Wako: Mmm. It all depends on the amount of sugar available. If we have enough sugar (In the house) I can take two to three cups of tea in the morning. I can only take one cup if we are running low on sugar. We usually do not take tea in the afternoon because of the same issue of sugar.

Focusing on the taste—sweet enough

The study sought to explore how much sugar family members took on a daily basis by asking the number of spoons of sugar they add to their tea or porridge. The dominant theme under this category was the family members' focus on taste (*"kutsekemera"* a Chichewa word for "sweet enough") rather than the number of spoons of sugar they add to their tea or porridge.

The findings of this study further highlight variations in the consumption of sugar by family members depending on preferences, especially taste. While others estimated the amount of sugar they usually apply to their porridge or tea, Sarah from family 2 presented her honest opinion on the usage of sugar in her family.

Sarah: In terms of the amount of sugar we add to the tea, to be honest on that one, we do not necessarily measure; we don't have a specific amount of sugar. We just add as much as can make it sweet enough. So yeah, we do not focus on the quantity; we focus on the taste.

Although several ingredients are required to prepare a typical breakfast at household level, sugar availability was considered a key driver of what to eat and how much to take in the family. The findings indicate that sugar was the most common ingredient mentioned by family members, both tea and porridge lovers.

4.2.2 Snacks

Whatever is available makes a snack

A snack in this study referred to any food that was taken between main meals or whenever a person felt hungry (except the three major meals). The findings suggest that seasonal fruits made the most of snacks among the families. The examples of these seasonal fruits are mangoes, avocado pears, oranges and bananas. However, the dominant theme in this section was the eating of whatever is available; this can range from bread to breakfast leftovers. During the focus group session with family 1, Talandira made it clear that the choice of a snack is pitted against whatever is available, seasonal fruits or breakfast leftovers.

Talandira: I mostly take bread or whatever is available as a snack, mainly leftovers from breakfast. It also depends on the season; if it is a season of fruits, such as mangoes, we eat such fruits. Generally speaking, we eat whatever is available.

Keeping space for the next main meal

The findings reveal that most family members preferred eating something light to avoid interfering with the next main meal. Upon probing further on what they considered light food and not interfering with the next meal, family members indicated biscuits, potato chips, Kamba puffs and soft drinks, such as coke or Fanta, and freezes as examples. Gift

from family 2 was explicit enough by mentioning the examples of food that is light enough and does not interfere with the next meal.

Gift: I love taking Kamba puffs, soft drinks like coke, jiggies or biscuits in the morning as I await another main meal, such as lunch. I like taking something light because I want to keep space in my tummy and avoid interfering with the next main meal.



Figure 4: Coke as a refreshment taken by family members before a main meal



Figure 5: Kamba puffs, cookies and custard biscuits considered light snacks by the families

4.2.3 Lunch

Lunch in this study was defined as a main meal taken by the family between breakfast and supper. This meal often comes in the afternoon hours but can hinge on family

convenient times. Each family's lunchtime meals were recorded in form of food diaries and pictures. The table below presents a summary of the food participating families had for lunch for four days.

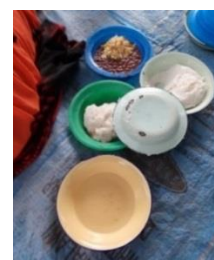
Table 4.
A summary of lunch taken by the participating families

	Day 1	Day 2	Day 3	Day 4
Family 1	<i>Nsima</i> * with meat and green vegetables	<i>Nsima</i> * with pumpkin leaves and groundnut powder	<i>Nsima</i> * with beans and cabbages	<i>Nsima</i> * with meat and beans
Family 2	<i>Nsima</i> * with chicken and vegetables	<i>Nsima</i> * with peas and rape (greens)	<i>Nsima</i> * with dried fish and vegetables	Rice with meat and cabbages.
Family 3	<i>Nsima</i> * with beans and vegetables	<i>Nsima</i> * with beef offal's and vegetables	Tea with fried chips	<i>Nsima</i> * with peas and vegetables
Family 4	<i>Nsima</i> * with fried eggs and grasshoppers	<i>Nsima</i> * with fried eggs and vegetables	<i>Nsima</i> * with beans	<i>Nsima</i> * with dried fish

*A stiff porridge made from maize flour

The pictures below illustrate the food participating families had for lunch for four days.

Family 1



Family 2



Family 3



Family 4



Figure 6: Photographs of lunch taken by the participating families

Carbohydrate composition of lunch

Table 4 and Figure 6 above suggest that *nsima* was the highest consumed staple among the participating families. Alternatively, only two meals were comprised of rice and fried potato chips. In most families, carbohydrates – mostly *nsima* – constituted three quarters of the total meal consumed. Cooked, green leafy vegetables, animal-based protein and legumes formed the relish for *nsima* among the participating families. Focus group data suggest two main reasons for the high consumption of *nsima*. These are: eating to feel it in the tummy; and eating based on the type of relish available.

Eating to feel it in the tummy

Nsima is a stiff porridge made from maize flour (Lunduka, Fisher, & Snapp, 2012). Its popularity in Malawi is primarily driven by the fact that *nsima* is stiff in nature and satisfies people faster than other food options, such as rice. The study revealed that consumption of this local staple among family members was very high, representing one of the highest intakes of calorie-dense foods.

Life in the village in Malawi is also equated with doing a lot more physical work than what their counterparts do in urban settings. The families indicated that one way to ensure that they have enough energy to carry out physical work is to eat something that will satisfy their hunger and make their stomachs full. Ulemu from family 2 noted that eating three to four portions of *nsima* per meal is the solution to the problem of hunger and this enables him to carry out his daily farm work.

Ulemu: *You know life here in the village is characterised by physical work unlike in town. The work we do here in the village is mostly physical, such as gardening so it makes us feel very hungry. One of the foods that satisfy us is nsima because it is heavier than other foods and you can feel it in the tummy. When I take three to four portions of nsima, I feel strong enough to do my daily farm work*

Good relish means eating more nsima

In Malawi, relish is similar to a sauce or stew prepared from boiled legumes, vegetables, or meat/poultry or fish/eggs (Ferguson, Darmon, Briend, & Premachandra, 2004). Relish is usually eaten with *nsima* or other food options, such as rice. It is a common belief among family members that good relish influences them to eat more *nsima*. Apart from the fact that *nsima* is a staple food, the type of relish appears to be a critical determinant of how much *nsima* one can take. Ufulu from family 4 put it very clearly as to how much *nsima* she takes depending on whether it is with good or just regular relish.

Ufulu: *I normally take three to four pieces of nsima depending on the relish we have on that particular day. If it is good relish like meat, I can take up to four portions of nsima; if it is with vegetables or other regular relish like beans, I just take two or three portions.*

4.2.4 Supper

Supper in this study referred to the last main meal the families took before going to sleep. There were variations in the times this meal was taken, with some families having it early while others ate late at night. Each family's supper was recorded in a food diary. The table below shows the food each participating family had as supper for four days.

Table 5.
A summary of supper taken by the participating families

	Day 1	Day 2	Day 3	Day 4
Family 1	<i>Nsima</i> * with meat, fish and vegetables	Rice with chicken	Rice with beans	Boiled pumpkins and water
Family 2	<i>Nsima</i> * with dried peas and vegetables	<i>Nsima</i> * with dried fish and vegetables	<i>Nsima</i> * with dried fish and vegetables	Bread and home-made sweet beer
Family 3	<i>Nsima</i> * with dried fish and vegetables	<i>Nsima</i> * with meat and vegetables	<i>Nsima</i> * with beef offal (organ meats) and vegetables	<i>Nsima</i> * with chicken and cabbage
Family 4	<i>Nsima</i> * with fried eggs and grasshoppers	<i>Nsima</i> * with fried eggs and vegetables	<i>Nsima</i> * with beans and fish	Rice with chicken and vegetables

*A stiff porridge made from maize flour

The photographs below illustrate the food the families had for supper for four days.

Family 1



Family 2



Family 3



Family 4

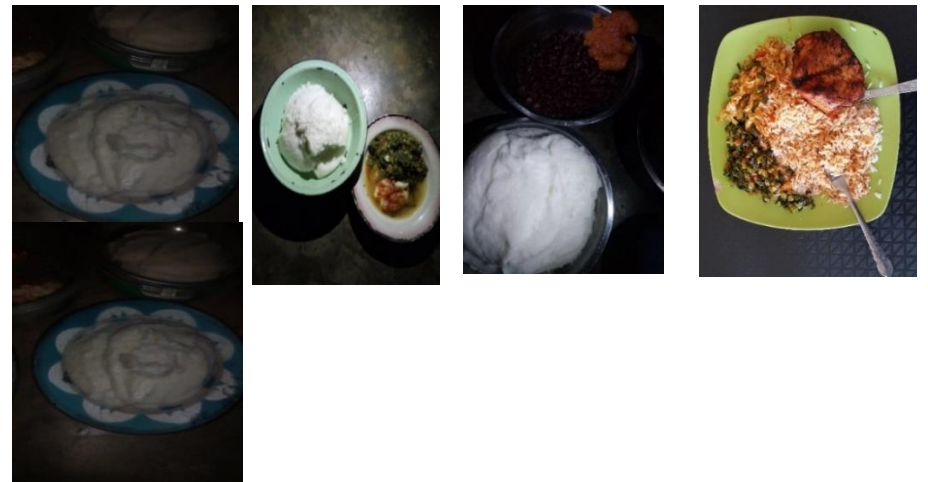


Figure 7: Photographs of supper taken by the participating families

Carbohydrate content of supper

The summary of supper in

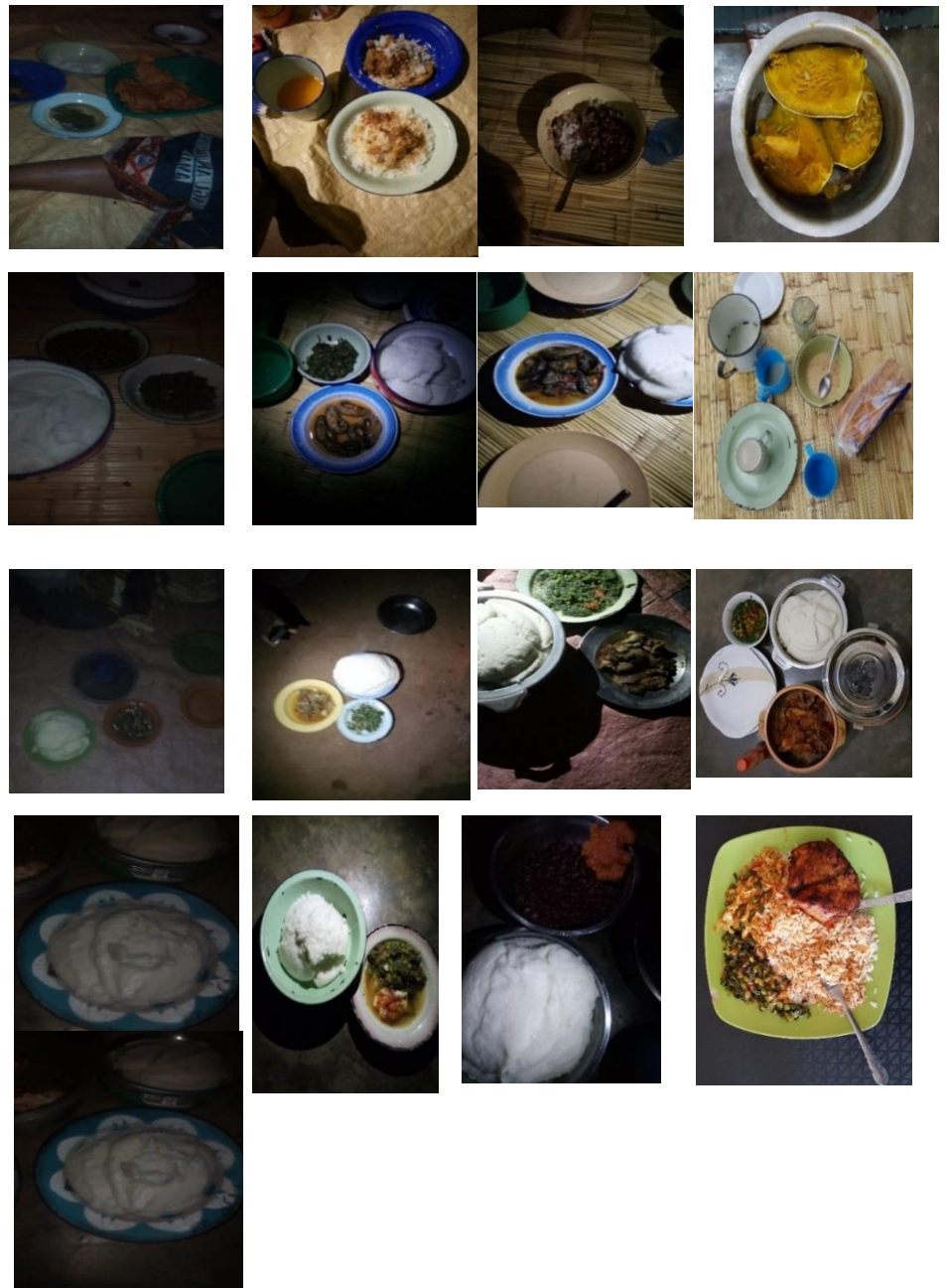


Figure 7 and Table 5 shows that *nsima* was the most common carbohydrate-containing food consumed by the families. Alternative energy sources included rice, boiled pumpkins, bread and sweet beer. Sweet beer is a traditional non-alcoholic drink prepared from maize, millet and sorghum and is usually taken with sugar (Kerr & Nyantakyi-Frimpong, 2016). Focus group data revealed mixed perceptions among family members regarding the choice of food for supper. While some opted for *nsima* as supper, others expressed displeasure of *nsima* but did not have any choice because of the high cost of alternative food.

Eating rice as a miracle — high cost of alternative food

The findings indicate that the family members were more likely to have *nsima* again for supper because of limited food choices. *Nsima*, the local staple, was the most readily available food option. However, other family members expressed reluctance to have *nsima* again for dinner. They preferred different food, such as rice but such food stuffs were regarded as delicacies. Maya from family 3 mentioned that they would occasionally be privileged to have something different from *nsima* or when they have been paid a surprise visit by a friend, referred to as a miracle.

Maya: *We usually take nsima again before going to bed unless it is a special day like Christmas or Easter or a miracle of some sort has occurred (laughs). Well, if we have a visitor and has brought us some food like rice, that's when we taste it. Otherwise it's not easy to get. It is one of our delicacies here.*

The main issue surrounding family members' limited food choices rests upon the fact that the alternative food options, such as rice and pasta are expensive in Malawi. While maize, the staple, is usually grown at household level, rice and other food options are only grown in schemes of selected districts in Malawi. Therefore, this affects the prices of rice and other food options on the market. People in the village hardly afford such food because of lack of money. This was clearly expressed by Mutu from family 2 during the focus group discussion with his family.

Mutu: *We always want to have something different from nsima, but we end up eating the same because we can hardly afford other food options like rice. The price of rice or other foods is high on the market and we don't have money to buy it here in the village. The thing is, such food options, including fruits, are quite pricey here.*

Eating other food as sleeping on an empty stomach

The findings also indicated that some family members were not willing to have something different than the local staple food, *nsima*. They were so much used to eating this readily available staple that they felt like they had not eaten anything if they had rice or potatoes or pumpkins for dinner. Although some family members expressed a strong displeasure to have *nsima* for supper again, others expressed worry over making

other food options dinner, rather than the traditional food. Wani from family 4 explained further on this.

Wani: *I like eating something different in the evening. Like now, this is harvesting time and we have other food options we can easily find, such as potatoes and pumpkins. We can boil sweet potatoes and pumpkins to make our supper. The problem is that other family members think they have slept on an empty stomach.....they are so rooted in the staple food, nsima.*

4.3 Opinions on current eating patterns

Current food as modern and a replacement for traditional food

A strong voice behind the families' opinions on current eating patterns is that current food is different from what people used to eat in the past. The participants agreed that both current food and the eating patterns are different from what was happening about two decades ago or more. Moreover, current food was considered as aimed at gradually replacing traditional food. The differences were presented in terms of the nature, composition, taste and preparation of the food including the effects it has on people's health. Mase from family 1 used her age and experience to suggest that the food people eat currently is different and modern.

Mase: *Yes, I strongly think the food we eat nowadays is different from what we used to eat in the past. As you can see, I am now old and my kids call me granny (laughs)....I have seen eating change over time. Most of the local foods, such as wild greens, are nowhere to be seen. What you see out there is just modern food; maybe it is replacing the old food.*

Desirability/attractiveness

The findings suggest that current food is desirable and attractive to people. The study sought to explore further on what makes current food desirable. According to the study, the most common criteria that make food desirable are variety, appearance (beautiful) and taste (delicious).

First, the study revealed that current food offers a "wide range of nutrients, therefore, good for people's wellbeing". This was a dominant theme in all the four focus group discussions. Traditional food was criticised for providing a limited source of nutrients. The findings indicate that in the past, people had limited food preference because there

were no diverse food options. Conversely, modern food was commended for offering a variety of nutrients, thereby positively contributing to people's health and wellbeing. Having looked at his family's photographed meals, Mutu from family 2 noted that the food they ate seemed to belong to several food groups, therefore, good for health.

Mutu: *I think the food we have been eating as a family these days belongs to a wide range of food groups. We are eating different food stuffs, such as fish, Irish potatoes, tomatoes, chicken and many more unlike in the past when we were just obsessed with nsima and beans. This is a good thing because it contributes to our good health.*

Food is not just something people eat; it starts with the way the food looks or tastes. This can either attract or put somebody off the food. The findings of this study suggest that current food is beautiful, attractive and appetising. This is contrary to the characteristics of traditional food options, which are perceived to be just food and unattractive. Moses from family 3 explained very clearly that modern food is delicious and attractive unlike the traditional food options.

Moses: *I think the food we eat these days looks and tastes good. You can easily tell that there are nice ingredients in there; if it is relish, you can see tomatoes and cooking oil there (laughs). So yeah, the food is attractive and tasty. This is quite different from the local food we have been eating before; just food but not really attractive.*

It was quite surprising that none of the participants mentioned sweetness of modern food as a basis for desirability, given the high preference and usage of sugar among the families. They just singled out variety, appearance and taste of ingredients, such as tomatoes and other spices. This aspect of the findings was quite unexpected.

Way too deep into modern cooking styles

Although current food is perceived to be tasty and attractive, the way it is prepared leaves a lot to be desired. One of the issues that came out of all the four focus group discussions is the use of too many ingredients in the preparation of food currently as opposed to how people used to prepare their food in the past. According to the family members, there is excessive use of ingredients, such as cooking oil, salt and other spices. This was believed to be harmful to the body. Maya from family 3 explicitly alluded to the modern methods or techniques of cooking.

Maya: *I think we have gone way too deep into modern ways of cooking. I can say that we have lost our usual ways of cooking and embraced modern techniques. As you can see on the pictures, these days we like eating food with a lot of oils and spices. In the past, we were just boiling our relish (.....) nowadays, we are frying almost everything.*

Findings further suggest that the use of sugar within the family is also excessive. This sharply differs from the way people used ingredients, such as sugar in the past. As already presented, sugar availability determines the amount of tea or porridge a person can take in the morning. Moreover, there is no specific measurement of the sugar applied to tea or porridge; it all depends on the taste of the individual. Sarah from family 2 shared her opinion on the current usage of sugar at family level in comparison to how people used sugar in the past.

Sarah: *Yes, another difference is in the way we use sugar currently. I think we're excessively using sugar in our tea or porridge. In the past we were just cooking say porridge and add groundnut powder (.....) we were eating it just like that. Nowadays if you prepare porridge like that, just know that nobody is going to eat it.*

Mostly bought from the market

Buying food from the market was found to be another common modern practice in this study. Findings suggest that many people have stopped growing crops for food; they rely on the food that is sold on the market. Conversely, people were growing crops to feed themselves in the past. In the abundance of bushes people used to hunt wild animals for food. However, deforestation has resulted in extinction of wild animals. The habit of buying food from the market was found to be making local people's lives hard, as money is not easy to find in the village. Family members also feared that people often consume food that is available on the market without carefully considering its effects on their health. Mega from family 4 shared her agony regarding the practice of buying every food from the market in the face of economic hardships.

Mega: *(...) we're eating food that is sold on the market; we buy almost everything these days. I can give you an example: we used to hunt wild animals like hares, birds and mice and we were having them as relish. Nowadays you cannot even find mice because people have cleared all the bushes. This makes us buy everything. The problem is that we don't even know whether the food we're buying is safe or not. Moreover,*

buying everything has only made our lives harder because money isn't easy to find here.

The findings further present fears among family members over the wanton cutting down of trees. The family members expressed worry over the current trends of deforestation, which leaves them with no option but to buy food they previously grew within the home. They indicated that the current situation makes the future uncertain. Gift from family 2 could not hide her fears over what life will be like in the future.

Gift: *Yeah, things have really changed here. We used to have our own gardens of cucumbers and other foods but now we buy them from the market. We were having plenty of mangoes here a few years ago but people have cut down most of the mango trees and we can't have any fruits. This is sad because we wonder what life will be like in the coming 10 years, if things are like this now.*

Other family members observed that people nowadays are more inclined to ready-made food than that prepared by themselves. According to the findings, people would rather spend their time on entertainment than preparing their own food. As a result, the habit of buying ready-use food from the market is becoming more common these days than before. Mase from family 1 clearly shared her observation on the practice of buying already prepared food.

Mase: *I think people have less time to prepare their own food than before; they would rather spend their time on entertainment than in the kitchen. People these days like to buy ready-made street food and food from restaurants. This is a problem.*

This section of the focus group discussion prompted debate, as some families thought differently about buying ready-made food from restaurants. Wako from family 1 strongly disagreed with Mase by indicating that eating from a restaurant or buying ready-made food provides a kind of fun.

Wako: *I think it is becoming a common practice to eat outside the home these days. However, I don't think it's fair to say that this is a problem. This doesn't mean that you are lazy, or you can't prepare your own food; it just provides fun.*

Filled with chemicals; leading to ill-health

Although modern food was largely perceived as beautiful, attractive and delicious, findings further reveal a profound belief by family members that it is full of chemicals. These chemicals can be applied for different reasons. For instance, chemicals can be used to treat and protect crops from pests; as fertiliser to foster growth and maturity of crops; and as drugs to speed up chicken and cattle (or other domesticated animals) growth and development. This, according to the family members, is different from what was happening in the past, where people just grew crops and reared animals using natural farming methods, such as the use of home-made manure. Talandira from family 1 shared her perception of how chemicals are being utilised to grow crops.

Talandira: I think the food we eat nowadays is different from the food we were having in the past. In the past crops like maize and vegetables were just being grown without applying fertiliser. Nowadays we apply fertiliser. In addition, we harvest the maize and bring it home only to apply chemicals to protect it from pests like weevils. Almost everything is being treated with chemicals, which I think is dangerous.

In agreement with Talandira, Kondwani from family 1 shared her views regarding the use of chemicals in the animal husbandry. She explained how rapidly chickens grow due to the use of chemicals.

Kondwani: These days everything is being treated with chemicals. I will give you an example of chickens. I heard that people give chicken drugs to make them grow faster. You can imagine a chick being ready for consumption in just six weeks because it has been given doses and doses of drugs. In the past, we were just growing our own chickens and fed them local maize and flour.

Whereas most family members thought that the problem is with the people who apply fertilisers and chemicals to their crops, others thought that the problem is to do with loss of land fertility. Moses from family 3 thought that people should not be blamed for the use of fertilisers because they are just coping with the lost land fertility.

Moses: I think the problem is with the land and not the people. Think about this: these days people use fertiliser to grow crops including maize and vegetables because the land has become less fertile than before. I think this is just a way of coping with the changing world.

Findings further suggest that these chemicals could lead to development of various health conditions in the long run. Modern food was mainly criticised for bringing about strange diseases, which never existed before, such as cancer, high blood pressure and sugar disease. Miranda from family 1 linked consumption of food with chemicals to the occurrence of modern diseases.

Miranda: I think the food we eat these days is full of chemicals and is responsible for the occurrence of certain strange diseases. For example, treated chickens will cause different types of cancer; sweetened beverages will cause sugar disease; and excessive salt will cause high blood pressure. Our bodies are weaker these days because we are exposed to a lot of chemicals.

Modern food was also found to be overly accelerating growth and development, including the way people look these days. The findings suggest that people these days look much older than their age because of what they eat. This contrasts sharply with the way people in the past appeared in relation to their age. Ulemu from family 3 could not hide her opinion on the modern food and its health effects by making a comparison of people's appearances.

Ulemu: I think we are not having a longer and healthier life than people in the past simply because of the food we eat these days. You will find that a 60-year-old person these days looks old and not consistent with their age. Conversely, a 60 year-old person in the past was so strong and almost youthful-looking (.....) I think there is a problem with what we eat.

Although most family members expressed concerns over the escalation of ill-health because of consumption of modern food, others perceived current food as nutritious. Some family members cited food fortification as an example of how modern food has been made more nutritious than traditional food. Food fortification is the practice of deliberately increasing the content of essential micronutrients, such as vitamins and minerals, to improve the nutritional quality of the food (Allen, de Benoist, Dary, Hurrell, & WHO, 2006). Fortification of food, such as flour and sugar with vitamin A, iron, calcium and other micronutrients is currently underway in Malawi to combat malnutrition and boost immunity. In a focus group discussion with his family, Bob from family 3 shared that fortification makes current food more nutritious than traditional food.

Bob: *I think modern food is more nutritious than traditional food because the manufacturers of modern food add necessary nutrients to the food to improve the population's nutrition status. I will give you an example of sugar: these days you hear that sugar has vitamin A already packed. This means you get extra nutrients just by taking sugar. I think this is leading to good health; such things never happened before.*

4.4 Strategies to improve eating patterns

Re-introducing local foods into the meal; a mountain to climb

Family members reported that local food was gradually disappearing from the meals at the passage of time. They suggested that families deliberately introduce local foods into the meals because it has health benefits, such as protecting people from illnesses and making the body strong and healthy. Although local food has such potential benefits, family members questioned how realistic it would be for people to adapt to it because they are used to modern food, which is presumably tasty and attractive. Wani from family 4 expressed his dilemma regarding the reversal to local food and the challenges associated with this change.

Wani: *My immediate thought is that we should go back to the same local foods we were eating in the past. We shouldn't just be carried away with modern food, such as refined oil and processed food. We should embrace our local foods in our diet, such as locally grown pumpkin leaves with groundnut powder instead of cooking oil. But, how realistic would this be? Maybe only if we did it gradually (.....) but still, it would be a mountain to climb.*

Findings further suggest that parents or heads of the family have responsibility to educate family members on the health benefits of local food as opposed to modern processed food. This strategy came as a way of promoting consumption of locally grown foods, rather than processed or refined food. Lara from family 3 shared her opinion on the role parents have in educating family members to motivate them to eat local foods.

Lara: *I think as a parent, I can teach my children the importance of taking local food stuffs rather than all-hybrid foods. I would teach them the health problems associated with exotic food, such as treated chicken. I know this may take time, but I believe they could change over time.*

Responsibility on what to eat; family-based sugar and salt rules

The study shows that families have responsibility for regulating what and how members eat on a daily basis. The family can establish rules on the amount of sugar each family member should take per day. Parents were singled out as authorities in the family who can ensure that members are taking recommended amounts of sugar every day. The findings recommend each family to have established sugar or salt measurements, which every family member should adhere to. The members also suggested that whosoever is preparing the meal can just apply the sugar in the pot as a way of avoiding individual usage of sugar, for example, in tea or porridge. Ulendo from family 4 used her parental role to illustrate how a parent can regulate the use of sugar in the family.

Ulendo: As a parent I feel compelled to regulate the amount of sugar being added to tea, porridge and other meals. We can establish some rules within the family to ensure that everyone is adhering to them. We can set limits for sugar usage, like no more than two teaspoons per cup. Alternatively, those preparing the meals can have a standard measuring cup for sugar or salt and just apply it right in the kitchen. I know it would be hard (.....) but we can get used to it over time.

Food inspection and banning the sale of unhealthy food

Although responsibility for consumption of healthy foods was perceived to rest on an individual, the findings of this study indicate that the families believe that the authorities are also supposed to effectively play their role to ensure that the food that is sold on the markets is healthy. The families expressed concerns over lack of protection by the authorities from harmful or unhealthy food stuffs. They reported that authorities have the legal mandate to examine the food that is being sold to the general public and take necessary action when the food is harmful to people or does not meet the commercial standards. Noma from family 4 gives an example of the sale of expired chicken in markets which goes almost unnoticed.

Noma: I think it's high time our authorities acted against the sale of harmful food stuffs to people. I will give you an example: there is a company that dumps expired packed chickens somewhere here. You'll find that people go and pick such expired chickens and sell them on the market. They usually sell them at a give-away price, so people get attracted. I'm sure authorities are aware of this practice, but they haven't done

anything to stop this bad practice. Somehow, I feel like we're not protected as citizens of this country.

Further to the issue of citizen protection by those in authority, Mega from family 4 observed that corruption is one of the contributing factors to the failure of authorities to curb the sale of expired chickens. She explained that such unscrupulous traders find their way into the market by bribing authorities in some cases.

Mega: Yeah, I just wanted to echo what she has said. Nobody regulates the sale of expired chickens here. Harmful foods are even being sold in schools through corruption. These tradesmen can bribe school or market authorities just to find their way into the school or market. By the end of the day, it is us who suffer the health consequences (.....) authorities should take necessary action.

Controlling what children eat in school

According to the findings of this study, schools are among top places where unhealthy food is frequently sold. The family members assumed that people who sale junk food to schools take advantage of primary school children's lack of judgement between healthy and unhealthy food. Examples of food stuffs that are sold in schools are fizzy drinks, biscuits, Kamba puffs and sweets. These are either sugar- or salt-filled drinks or snacks that are cheap and seemingly attractive to school children.



Figure 8: A popular fizzy drink called *malambe* juice that is mostly sold in school

The fizzy drink above is made by mixing sugar with food colorants and water. The drink is very sweet and popular among the school age population. One of the children, Zanga from family 3 admitted that the drink is loved by many children in school.

Zanga: When I go to school, I usually buy malambe juice. Many children at my school also love it because it tastes so good. Actually, it is sweet. Other children also pour it into the porridge we receive at school.

The findings revealed that the sugar used for the preparation of this juice is not an ordinary one, but a concentrate known as “number one sugar”. This sugar is reported to be used for commercial purposes because of its economical characteristics; just a little bit but can sweeten the whole bucket.



Figure 9: A sugar concentrate known as “number one sugar” used for *malambe* juice preparation

The findings of this study suggest that parents believe they have responsibility to ensure that their children eat healthy food while in school. One way of achieving this is by preparing food for the children to take to school, rather than giving children money to buy the food they like in school. This is because children do not make a proper judgement regarding what to eat and can easily be carried away by any food that looks appealing. Bob from family 1 offered advice to parents regarding their role to ensure that their children eat healthy food in school.

Bob: I think parents should control what their children eat in school as much as they do in the family. Parents should stop giving their children money to buy the food they want. Rather, they should prepare some food and give it to the children to eat during break time. Children are

easily attracted to whatever looks yummy and can easily find themselves in tasty but unhealthy food options.

Schools can also work together with existing structures to ensure that healthy food is being sold to school children. The findings indicate that parents believe that school authorities have the mandate to ban the sale of any food that is suspected to be unsafe or harmful to children. On the other hand, school authorities can also promote the sale of healthy food to school children. This role can be enhanced by collaborating with school structures, such as school committees and parents and teachers' associations, including food companies. Ufulu from family 4 shared an experience whereby school authorities and parents acted against the sale of unhealthy food.

Ufulu: *Yes, I think schools should work together with parents and school committees to ensure the sale of safe foods to children. I remember there was a situation whereby a certain business guy sold expired biscuits at a certain primary school here. All children who ate these biscuits had diarrhoea. It was a very bad situation especially for young infants who fell prey the most. School authorities and parents met and agreed to ban all those who were selling potentially harmful items at this school. There was no outbreak after that incident. I think we can do the same with these sugary drinks.*

Food import regulation

The findings of this study reveal that an influx of imported food items is also contributing to consumption of unhealthy foods among family members. Family members explained that these imported food items may even be cheaper than local food and may also be easy to find. Examples include sugary drinks, soya pieces, margarine and snacks. The unfortunate reality is that sometimes the nutrition composition of such food items is not adequately displayed. This may contribute to consumption of food that has harmful ingredients, which might predispose the people to certain health conditions. Mutu from family 2 called for reinforcement of import laws and vigilance of border posts to ensure that the citizenry is protected from harmful products.

Mutu: *I think the border posts need to be more vigilant when it comes to regulating what comes into this country. They should properly examine the food items that come into the country to see if they are safe for human consumption. The food laws or biosecurity laws should also be reinforced on any food items that are not safe for consumption.*

Increase awareness of nutrition-related conditions

The findings of this study indicate that there is low awareness of noncommunicable diseases, such as diabetes among people. This is largely attributed to the lack of access to such information. Family members reported that information regarding diabetes and other chronic diseases is not easy to find and differs sharply from their access to information on infectious diseases, such as malaria, tuberculosis and HIV/AIDS. Information about these infections is readily available on radios, but not that of diabetes and other chronic diseases. Mase from family 1 shared her concern over the scarcity of diabetes information and emphasized that diabetes is not as popular as other diseases.

Mase: *To be honest, information regarding diabetes is very scarce here. They don't even mention diabetes on the radio. They only air out messages regarding malaria, TB and HIV/AIDS. You only know about diabetes when someone close to you is affected, otherwise it is not as popular as other diseases like AIDS. They need to sensitise us so that we can be empowered through knowledge. I can assure you that in this village only a few people know what causes diabetes.*

More research on foods and their corresponding health effects

The study reveals that there is a need for further research on the food people eat in Malawi and their health effects. Such research findings can be used as evidence for policy implementation by authorities. These studies can also investigate the health conditions that are emerging as a result of unhealthy eating in order to form the basis for sensitisation messages. Family members expressed concerns over lack of evidence to implement certain policies or regulations. Sarah from family 2 shared a story that happened in Malawi as an example of action without evidence.

Sara: *I think there is a need for further research on what people are eating these days and how safe these foods are. The research can also go further to explore the associated health outcomes. This can be the basis for certain actions by the government. I remember the government issued a ban on a certain fizzy drink sometime back. However, a few days later the manufacturer of the drink sued the government because there was no evidence that the drink was unsafe for consumption. Such incidents can be avoided when there is sufficient evidence.*

4.5 Chapter summary

This chapter has presented findings of the study. The findings illustrate the food Malawian families eat currently and how this is compared to traditional patterns of eating. The food commonly eaten by families includes tea for breakfast, with the critical determinant being sugar availability; *nsima* (a local maize paste) with consumption based on the type of relish; and rice only during special occasions, such as Christmas or Easter. The findings also reveal that the usage of sugar and other ingredients is based on taste rather than amount. On the families' opinions on current eating patterns, the findings indicate that modern food offers a variety of nutrients; is beautiful, tasty and attractive; is based on the food that is available on the market; and filled with chemicals which would lead to various health problems. The family members suggest that local food be re-introduced into their meals; unhealthy food be banned from markets; school authorities advocate for healthy food in schools; awareness and research on noncommunicable diseases be increased; and strengthening food import regulations to promote healthy eating in the family. In general, traditional staples are still being highly consumed in Malawi as processed food is finding its way into the family meals.

Chapter 5 Discussion

5.1 Introduction

This study set out to investigate current eating patterns among Malawian families to see whether these might be contributing to the risk of type 2 diabetes in the general population. This was a photovoice-based study conducted with four purposively selected semirural Malawian families. The study asked the following questions:

- What is the current situation of the Malawi food system and how might this be influencing diet and increased prevalence of type 2 diabetes?
- What are families in Malawi currently eating and what has changed?
- How might Malawian family eating patterns be linked to the increased prevalence of type 2 diabetes?

This chapter presents a discussion on how the study findings addressed these questions. It also relates the findings to the literature on the wider food system, explored earlier in the thesis, locally and globally with respect to the risk of type 2 diabetes. The chapter begins with a critical summary of the findings. The chapter goes on to discuss some implications of the study findings for policy and practice relating to the food system in Malawi with a glimpse of the future food system for Africa.

5.2 Summary and analysis of findings

5.2.1 Food people currently eat

This research recorded, for the first time, food semirural Malawian families ate for breakfast, lunch, supper and snacks. Tea drinking was central to breakfasts and was seconded only by soya porridge. Tea was usually taken with sweet potatoes and bread. The families indicated adding at least four tea spoons of sugar into their cups of tea or as much as could make it sweet enough. The number of cups of tea taken each day ranged from two to three and was largely driven by the availability of sugar in the house. The availability of sugar in the house appeared to be a key determinant of what and how much to eat in the morning. In Malawi, as in other sub-Saharan African countries, sugar typically means white granules of sucrose refined from sugarcane sap (Myers et al., 2017).

The results are in accord with recent studies indicating increased consumption of sugar and sweetened beverages in Malawi and South Africa (Kalimbira & Gondwe, 2015; Myers et al., 2017). Existing research on adult sugar consumption in Malawi and Africa is rare, with only a few studies focusing on the consumption of sugar-sweetened beverages among the school going population (Hunter et al., 2017; Moodley, Christofides, Norris, Achia, & Hofman, 2015; Nortje, Faber, & de Villiers, 2017; Reddy et al., 2011; Singh et al., 2015). The goal of the current dietary guidelines concerning sugar restrictions is to prevent dental caries rather than obesity or noncommunicable diseases (Steyn & Mchiza, 2014). This partly confirms the low recognition of the significance of obesity and corresponding chronic diseases in developing countries (Stuckler, McKee, Ebrahim, & Basu, 2012). This study assessed, among others, the consumption of sugar among semirural families in Malawi and revealed a persistently high intake of added sugar in this population. These findings are in line with those obtained in South Africa, where added sugar intake was high among rural participants (Vorster, Kruger, Wentzel-Viljoen, Kruger, & Margetts, 2014).

This study also investigated the snacks people eat in between meals as these are an important component of eating patterns. Although some participants mentioned seasonal fruits and breakfast leftovers as snacks, the majority indicated their preference for soft drinks and biscuits or Kamba puffs in between main meals. A soft drink in this case means a sugary drink that is sold locally. Examples of soft drinks include fanta, coke, fizzes, *malambe* (baobab) juice, sprite and cherry plum (Kalimbira & Gondwe, 2015). These findings are also supported by existing information on the high consumption of sweetened beverages and snacks in the Malawian population (Kalimbira & Gondwe, 2015). The findings show that rural populations are also slowly going into nutrition transition in Malawi and other African countries. Nutrition transition, defined as changes in dietary intakes with urbanisation, economic development and acculturation of rural populations is prevalent in rural areas of Malawi and is consistent with increased sugar intake (Vorster et al., 2014).

The study also reveals an increased intake of *nsima*, a stiff porridge made from maize flour. This signifies an increased intake of carbohydrate-containing food. Most family members in this study reported eating *nsima* more than once a day because this is one of the heaviest filling foods. They also indicated that consumption of other food options

rather than *nsima* was like “sleeping on an empty stomach”. Other participants indicated that they needed this staple food to carry out their daily physical work, mostly farming. Although other participants expressed the desire for other food options than *nsima*, they were unable to do so because they believed these alternatives were very expensive.

The findings of this study are concomitant with existing research on the consumption of *nsima* among populations in Malawi. In the context of Malawi, maize-based diets are a major source of energy accounting for more than 70% of daily calorie intake as well as nutrients (Ecker & Qaim, 2011). Therefore, this renders maize the most important of all cereals in Malawi. A study on consumption and wastage of maize products in the northern region of Malawi also revealed a high consumption of *nsima* by rural participants (Mphwanthe et al., 2016). This is not a surprising result given the long history of consumption of *nsima* in Malawi, and the importance people attach to it. Although most of all farming households grow maize in Malawi, less than one-fifth of them produce surplus and sell their produce (Ecker & Qaim, 2011). The intricacies of food security in Malawi will be explained in the implications section.

The findings on current eating patterns provide early indications of dietary patterns associated with the risk for type 2 diabetes. However, these results must be approached with caution because Malawian diets have not undergone total modification over time, as energy-intensive staples still form the bulk of most meals. On the one hand, the emerging obesogenic products in Malawian diets, such as sugar, saturated fats, salty, processed snacks and sweetened beverages constitute a significant risk factor for type 2 diabetes. On the other hand, these results do not rule out the influence of other risk factors for type 2 diabetes, such as sedentary lifestyles. Thus, in order to make conclusions one needs to take into consideration the possible effects of other factors, such as reduced physical activity.

5.2.2 Comparison of current eating patterns to traditional eating patterns in Malawi

All the participants in this study admitted that eating patterns have changed in Malawi. Although the findings in other sections may indicate that some Malawians still adhere to their staple food, *nsima*, the participants were quick to mention that current food is

different from traditional foods. Among other aspects, the participants indicated that there is more variety in the current foods than traditional foods. They described traditional food as “just food” which does not offer a wide range of nutrients. Conversely, they characterised current food as very diverse and nutritious; delicious, attractive and desirable; prepared using modern methods of cooking; mostly bought from the market; and filled with chemicals.

These findings are commensurate with existing literature on the nutrition transitions occurring in sub-Saharan Africa. Haggblade et al. (2016) describe sub-Saharan Africa as the last region to undergo nutrition transition with an increased demand for processed food, but with a high probability to bend the curve of dietary changes and prevent corresponding illnesses if prompt action is taken. Sub-Saharan Africa was previously known for its traditional food cultures, such as consumption of whole grains and insects as a source of protein (Van Huis, 2003). However, this practice is slowly fading as processed food – which is low in fibre and nutrients – finds its space into societies marked by accelerated urbanisation and a pervasive demand for convenient food (Abrahams, Mchiza, & Steyn, 2011; Cockx, Colen, & De Weerd, 2017). Moreover, as illuminated by this research, the key drivers of people’s choice for modern food include availability, taste, price, mass-marketing campaigns, peer pressure and socioeconomic status (Vorster et al., 2014).

5.2.3 Unexpected findings

The participants’ awareness of and concern for chemicals in modern food was quite surprising. Participants comprised of semirural Malawian families whose food choices are presumed to be largely dependent on their socioeconomic status. Moreover, they did indicate that they lacked access to health information regarding noncommunicable diseases, such as type 2 diabetes. Contrary to expectations, all the participants expressed worry over the use of chemicals in agriculture as well as in food preparation. Most participants feared that they would be at a high risk for chronic diseases, such as cancer, heart diseases and diabetes, just by consuming such chemical-filled food items.

A possible explanation for this might be the current usage of electronic devices in Malawi. The wide usage of mobile phones including in the rural areas, unlike in the past, means that people are exposed to diverse sources of information. The worrisome aspect

is the credibility of the sources considering that most of the information emanates from web-based sources. This often results in incorrect or highly exaggerated information, which could also be misleading. This assertion is supported by some research on health information among rural Malawian mothers on nutrition which revealed misconceptions and misplaced beliefs regarding nutrition (Fitzsimons, Malde, Mesnard, & Vera-Hernández, 2016).

However, the use of information and communications technologies (ICT) has been shown to have the potential to improve health outcomes of the general population (Blaya, Fraser, & Holt, 2010). For instance, using mobile phones and other communication technologies allows transfer of health information from community health workers to millions of people in developing countries (Mastellos et al., 2018). Although there are credibility threats to the use of ICT, research has demonstrated that it is an opportunity to inform people better and also serves as a tool for advocacy (Goga et al., 2017).

5.2.4 Suggestions on strategies to promote healthy eating

The findings of this study reveal, for the first time, that some Malawians believe that current food is contributing to ill health, hence, the need to change eating habits. Among other suggestions, they recommended: reintroduction of local foods to the diet; selling healthy food in schools; food import regulation; awareness campaigns on nutrition-related conditions; and more research on foods and their corresponding health effects. The participants offered these recommendations against a belief that modern unhealthy diets are contributing significantly to emerging noncommunicable diseases.

Existing research supports such interventions and emphasizes that these are responses which can help bend the curve of dietary changes and associated illnesses towards healthier outcomes in sub-Saharan Africa. For instance, Haggblade et al. (2016) advocates for indigenous food entrepreneurship in order to develop products that are already favoured by local palates. These entrepreneurial initiatives may also include boosting local market gardening, the use of local produce in schools and cafes, and support for local, precision-based agricultural industry (Garrity et al., 2010). However, these not easy strategies to implement as they require adequate funding and creation of fair and responsive market policies by the government. Also, one needs to consider

the role of Big Food, defined as multinational food and beverage companies with unprecedentedly huge market power (Brownell & Warner, 2009). This is a complex issue because such companies have monopolised the global food system and largely influence what people eat (Stuckler et al., 2012). Making it even more complicated, these powerful companies often have strong ties with governments (Stuckler & Nestle, 2012).

Research also backs the sale of healthier food in school and provision of home-made food to school children (Stupar et al., 2012). Stated differently, a healthy food environment needs to be created in schools to break the trajectory of childhood obesity, which is a key driver of the type 2 diabetes epidemic (Malik, Popkin, Bray, Despres, & Hu, 2010). However, such strategies should not ignore the role of foreign direct investments, which are the basis for nutrition transition from traditional, simple diets to highly processed foods including in schools (Hawkes, 2005; Hawkes et al., 2015). Instead, there should be working partnerships between government, communities, private sector and donors, for example, through developing links between schools and food manufacturers to ensure supply of healthy foods to school children (Stupar et al., 2012). Additionally, issues of cost need to be considered carefully as such school health interventions are costly (Waterlander et al., 2018).

Studies have also demonstrated that women can contribute substantially towards healthy eating in the family because they are the cornerstone of family food production and nutrition in Africa (Manhanzva et al., 2017). Moreover, older women in southern Africa are involved in shaping cultural and social spheres of families as they provide counselling on wellbeing and support for younger families (Aboyade, Beauclair, Mbamalu, Puoane, & Hughes, 2016). However, the role of women in household nutrition is changing as they take on new roles in the society, such as employment and leadership (Manhanzva et al., 2017). For instance, women in Africa are increasingly having less time to grow crops and cook food than in the past (Idamoyibo & Idamoyibo, 2016). Although women empowerment is a fundamental element of the SDGs, changing roles of women in households have substantial effects on the overall family nutrition (Manhanzva et al., 2017).

Health and nutrition education has been demonstrated to increase nutritional awareness about healthy foods and improve dietary behaviours (Gokah & Gumpo, 2010;

Haggblade et al., 2016; Muchiri, Gericke, & Rheeder, 2016). This works on the belief that when people have the knowledge of healthy foods, they are very likely to make healthy food choices. However, nutrition education alone is inadequate since there are numerous factors that influence people in making food choices. One of the factors is income availability (Abrahams et al., 2011). Some people only buy certain food because of its affordability. Temple and Steyn (2011) vividly argue that only educating people about the importance of taking a healthy food approach should not be expected to yield healthy eating because people's food choices are driven by a host of complex factors, such as socioeconomic status and environment. Instead, targeted actions such as subsidies and taxation have shown to improve people's consumption of healthy food (Temple & Steyn, 2011).

5.3 Implications for policy and practice

Nutrition transition, as evidenced in this research, significantly contributes to the risk of developing type 2 diabetes (Haggblade et al., 2016; Msyamboza et al., 2014; Popkin, 2015). In Malawi, diabetes was not a common health problem in the 1970s, but it is becoming a problem in line with a nutritional transition (Msyamboza et al., 2014). This transition is concomitant with economic factors, agricultural systems and subsequent growth of the food service sectors (Popkin, 2015). Malawi is a southern African country whose economy is agro-based and heavily relies on maize grain production at household level for subsistence (World Bank, 2016). Therefore, it is important to look at the wider food system through a critical lens, and beyond a biomedical focus on the issue (Baum & Fisher, 2014), to better understand how this might be influencing diet and the prevalence of type 2 diabetes.

Considering the wider social, economic and environmental factors associated with the food system in Malawi, this section will utilise the Honest Food Model to discuss implications for policy and practice relating food security and consumption. This model has been described comprehensively in chapter 2. The six main categories of the model, namely economy and food security; ecological integrity; climate change; culture and community; food biodiversity and seeds; and food quality and nutrition will be used to discuss the findings of this study as they relate to policy and practice (Hebda, 2014).

5.3.1 Economy and food security

This study has presented families' resounding phrases, such as "without money.... hard to buy food" and "eating what we can afford". These phrases are made in the context of household food availability or security and, in a sense, signpost the association between economy and food security. When people are economically stable, they can buy food for consumption and store the surplus. In agro-based economies, such as Malawi, this implies that economically stable people can also afford farm inputs and mechanise their food production. Although higher socioeconomic status can increase access to nutritionally healthy products, caution must be taken because more wealth may also mean easy access to convenient, unhealthy food (White, 2012).

Malawi is a landlocked country in sub-Saharan Africa which is ranked one of the poorest countries in the world and is driven by an undiversified agro-based economy (World Bank, 2016). It is a known fact that chronic food insecurity and chronic poverty are closely related in Malawi (Dzanja et al., 2015). This association is two-fold: poverty can compromise the capacity to produce food and become food secure, thereby opting for low-cost, processed food low in nutritional value, but high in sugar, salt and saturated fats (Stuckler & Nestle, 2012); also, chronic food insecurity will exacerbate poverty by compromising people's health and productivity.

The poverty-food insecurity nexus is a complex issue. In the recent years, the Government of Malawi introduced a large-scale input subsidy program in order to increase agricultural productivity among smallholder farmers (Karamba & Winters, 2015). A recent evaluation of the subsidy program demonstrated that it has significantly increased agricultural productivity (Karamba & Winters, 2015). However, the absence of widespread irrigation and precision agriculture still reverses the gains made by smallholder subsistence farmers (Grote, 2014). Precision agriculture is a big agricultural revolution and provides new hope for agriculture in Africa as it uses technology to enable the farmer to precisely place seeds, fertiliser and other chemicals (Fraser, 2018). Moreover, subsidies on grains alone in developing countries have led to the dominance of food environments by grains, which do not have an optimal nutritional value (Snapp et al., 2010). This was evidenced in this study as the stiff maize porridge, *nsima*, was highly accessible to the families and was consumed in large quantities.

The Malawi farm input subsidy programme has been shown to have serious weaknesses. Although it may have contributed to increased maize production, it is surprising to note a nationwide increase in maize prices on the market and constant maize importation by the government (Lunduka, Ricker - Gilbert, & Fisher, 2013). Moreover, evidence shows that better-to-do families benefit from this subsidy programme than poorer households, thereby bringing doubt on the ability of this programme to reduce food insecurity and poverty (Chinsinga & Poulton, 2014; Lunduka et al., 2013). Poverty and food insecurity reduce people's access to nutritionally healthy products, as they tend to eat what they can afford (Berkowitz et al., 2013). This was evident in the current study as participants indicated that they could only eat what was affordable for them. These cheaper but unhealthy food options are highly processed, calorie-dense, rich in sugar, salt and saturated fats (Stuckler & Nestle, 2012). Such foods have been shown to escalate obesity, which is a key driver of type 2 diabetes (Vandevijvere et al., 2015).

5.3.2 Ecological integrity

This research indicates that deforestation is negatively affecting ecological integrity and food security in Malawi. Participants expressed concerns over wanton cutting down of trees and corresponding soil infertility and unreliable rainfall patterns. As defined by Wurtzebach and Schultz (2016), ecological integrity is a holistic concept or framework that focuses on conserving native biodiversity and promoting resilience. Within the Honest Food Model, food systems ought to avoid harm to the ecosystem and contribute to water quality, soil formation and ecological processes (Hebda, 2014). Deforestation, as revealed in concerns from the study participants, is against the concept of conservation agriculture, which seeks to reduce soil disturbance and promote soil fertility (Thierfelder et al., 2015). As deforestation and environmental degradation persist, farming-dependent people in the rural areas tend to migrate to urban settings in search of employment opportunities. Because of urban overcrowding and urban poverty, people are driven to eat affordable, processed but unhealthy foods thereby escalating overweight or obesity which increases the risk for type 2 diabetes.

Malawi largely depends on agriculture as the key driver of its economic development and subsistence (Kawaye & Hutchinson, 2018). Therefore, this implies that all efforts focused on improving agricultural production will address food insecurity and, in turn, improve the health of the general population. However, agricultural practices that do

not pay attention to natural environmental landscapes are not only harmful but also shatter the hopes for environmental sustainability (Nyantakyi-Frimpong et al., 2016). The fears expressed by participants in this study over excessive use of chemicals, such as fertiliser could be a misconception of the use of biotechnology for agriculture in Malawi. Yet, the use of chemical fertiliser is an adaptation mechanism to the loss of soil fertility in Malawi (Coulibaly, Gbetibouo, Kundhlande, Sileshi, & Beedy, 2015). Chemical fertiliser usage is one of the modern agricultural technologies focusing on increasing agricultural production and reducing food insecurity (Koppmair et al., 2017). Increased diversified agricultural production has the potential to improve food security and enhance optimal human diets which offer protection against chronic diseases, rather than processed foods which significantly heighten the risk of obesity and type 2 diabetes (Berkowitz et al., 2013).

A close look at Malawi's heavy reliance on agriculture and effects on the environment compels me to think about future agricultural innovations in Africa. I ask myself: will there be a way to stop or substantially reduce pollution of ecosystems due to agriculture? Technological innovation seems to offer new hope. For example, automated vertical farms which stack farms on top each other using automation can produce 100 times more effectively per acre than traditional agricultural techniques (Visual Capitalist, 2017). These vertical farms can grow crops with 40% less power, produce 80% less food waste, and use 99% less water than conventional outdoor fields (Visual Capitalist, 2017). Together with precision agriculture, vertical farming offers a potential advantage of a clean and green source of food with biosecurity and reduced emission of fossil fuels (Benke & Tomkins, 2017). However, the major challenge of this innovation in developing countries, such as Malawi, is cost in terms of investment capital and training a skilled workforce (Benke & Tomkins, 2017).

5.3.3 Climate change

The findings of this study indirectly tapped into the issue of climate change, biotechnology and agroecology. The issue of growing crops using local inputs, such as manure as opposed to chemical fertiliser persistently emerged from this study. Previous research indicates that the use of biotechnology, chemical fertilisers and pesticides have substantial effects on land productivity and ecological integrity and can escalate threats of climate variability (Hartmann, 2012; Thierfelder et al., 2015).

Climate change is of concern to the southern African region because of its reliance on rain-fed agriculture. The region continues to experience intense drought that is stretching from the 2015-2016 agricultural season (Bickton, 2016). This has resulted in nearly 29 million people falling into the trap of food insecurity in southern Africa (Bickton, 2016). Chronic food insecurity results in malnutrition, and vulnerable populations such as children, nursing mothers, the elderly and those with chronic diseases tend to suffer the most. If not approached with careful considerations, effects of climate change have the potential to reverse the gains made in combating malnutrition in the African continent. Taken together, these climate change effects also suggest that people have a limited capacity to acquire food and eventually increase poverty (Leichenko & Silva, 2014; Watts et al., 2015). As poverty levels increase, many people opt for cheap, unhealthier food options (Stuckler & Nestle, 2012). This is likely to have multiplying effects on their risk for noncommunicable diseases, such as type 2 diabetes.

5.3.4 Culture and community

This study has revealed indications of changes in the traditional food cultures in Malawi towards westernized or styles. For example, some participants reported “eating outside” as a symbol of economic prosperity and a source of fun. Eating outside means buying or eating food prepared outside the home, especially from fast food outlets (Zong, Eisenberg, Hu, & Sun, 2016). Previous studies indicate that most of the eating in sub-Saharan African countries took place at home and this was considered one of the culturally good eating habits, also associated with consumption of healthy and nutritionally sound food (Ekpenyong & Akpan, 2013). Conversely, increased consumption of meals prepared outside the home, particularly fast foods, is associated with lower dietary quality, excess weight gain and an increased risk of type 2 diabetes (Zong et al., 2016).

A close association exists between culture and food in southern Africa. In food circles, culture is defined as a set of ideas, rituals and rules about access to and the utilisation of food (Bonnekessen, 2010). These are also known as cultural constructs that operate within the dimension of food availability and consumption (Trefry, Parkins, & Cundill, 2014). In this research, participants often reported high consumption of *nsima* as culturally constructed and that there was no substitute for this heavy, filling staple food.

These cultural beliefs are deeply rooted and enormously prescribe people's food choices (Williams-Forson, 2014). On top of the consumption of carbohydrate-intense staples, this study has also indicated that these families believed eating a traditional diet is healthy and, therefore, embrace processed high-energy snacks and sugar-sweetened drinks. This represents a high energy food intake consistent with weight gain and the risk of type 2 diabetes. Literature attributes this to the broken link between traditional eating patterns, and the problem is even worse in urban areas (Cockx et al., 2017).

5.3.5 Food biodiversity and seeds

The results of this study highlight food diversity as “variety”. Food diversity is directly related to good nutrition and health (Koppmair et al., 2017). Also, dietary diversification is associated with agricultural diversification (Berry et al., 2015). However, climate variability, associated with farm-income variability, is one of the key challenges of diversification in developing countries, including in Malawi (Asfaw et al., 2015). Malawi is one of the countries in sub-Saharan Africa that is facing extreme weather events, such as drought. This implies that it is necessary for such a country to adopt adaptive mechanisms to maintain crop production. However, most Malawian farmers are locked into subsistence farming with maize being the staple that is commonly grown for consumption (World Bank, 2016). Most of these farmers are not using modern technology in their crop production. In view of this situation, there is a need to motivate and empower local farmers with knowledge, skills and inputs to maximize diversification.

Farm production diversity has the potential to influence diversity of household diets towards healthy and sustainable nutrition (Jones, Shrinivas, & Bezner-Kerr, 2014). Healthy and sustainable diets are associated with reduced weight gain and help prevent chronic diseases, such as type 2 diabetes and heart diseases (Koppmair et al., 2017). To be more successful, diversification needs to have a multi-sectoral approach in Malawi, such as collaborations between agricultural, finance and education ministries. Concerted efforts by various departments will yield better results. It is, therefore, presumed that sustainable food systems will also sustain the diversity of life through diversity of crop varieties and food production in biodiverse landscapes (Hebda, 2014).

5.3.6 Food quality and nutrition

This study reveals, for the first time, rural people's desire to improve their nutrition through quality food consumption. Ideally, every individual ought to have the right to get easily accessible, readily available, relatively inexpensive and sufficiently promoted healthy food (Vandevijvere & Swinburn, 2014). However, does this also reflect the reality of healthy food on the ground? The unfortunate reality is that unhealthy, processed food products are increasingly dominating over healthy foods, making environments unhealthier, and having adverse effects on health (Monteiro, Levy, Claro, de Castro, & Cannon, 2011; Swinburn et al., 2013). The findings of this study highlight people's beliefs that modern diets are healthier than traditional diets. Nevertheless, these modern dietary patterns have been strongly associated with the rising rates of chronic diseases, such as diabetes and heart diseases (Haggblade et al., 2016; Msyamboza et al., 2014; Popkin, 2015).

Formulation and implementation of healthy food policies is a promising strategy to effectively tackle the problem of unhealthy processed food across the globe (Swinburn et al., 2013). However, the implementation of vibrant government healthy food and nutrition policies is lagging in many countries, mainly because of clever and effective food industry influences (Vandevijvere & Swinburn, 2014). Malawi is a typical example of a country with weak (almost non-existent) government healthy food and nutrition policies. This has multiplying effects on the prices of food and the quality of local as well as imported food. The voices of participants in this study, such as "we need to be protected by the government on food issues" and "the government should do something to protect its citizens from harmful food" are just a manifestation of such a policy vacuum.

Food systems are only sustainable and responsive when they produce healthy, nutritious food and foster healthy diets (Hebda, 2014). This is a challenge to many developing countries, where food systems are largely promoting unhealthy diets due to weak government policies. Sub-Saharan Africa, therefore, has an opportunity to reverse the current unhealthy food environments because it is the last region to undergo nutrition transition (Haggblade et al., 2016). It is important to note that this could be mere rhetoric unless there is strong political will to bring about change through sound and strong government-led healthy food and nutrition policy implementation. To go

deeper into the discussion of sustainable food systems, the section below examines the possibility of using food and agricultural technology in Africa.

5.4 Food, technology and Africa

Following the evaluation of the MDGs in 2015, a multifaceted strategy involving the application of science and technology has been proposed to address the challenges of global food insecurity, particularly in Africa (Abass et al., 2018). In the future, appropriate and new technology will be vital to producing high quality food for Africa. First, technology can be used to mechanise large-scale agricultural fields. Mechanisation of agricultural fields refers to the application of equipment, machinery including engineering technologies and implements in farm activities to improve the productivity of farm labour and land, in order to maximise agricultural and food production (Clarke & Bishop, 2002). Also, technology can be used to preserve food. The country's capacity to preserve food is determined by its level of technological development (Abass et al., 2018). People in many African countries have a low capacity to preserve food (Sanchez, 2015). This contributes to food and nutrition insecurity; limited capacity to generate employment in the rural areas; and failure to reduce rural-urban migration (Aworh, 2008).

Several challenges continue to hinder the use of technology in food and agricultural production in Africa. The application of technologies such as mechanical power, automation, control and robotics in Africa is limited by technology compatibility with the environment; availability of resources to facilitate the technology adoption; cost of technology purchase; government policies; adequacy of technology; and appropriateness in addressing the needs of the population (Onwude, Abdulstter, Gomes, & Hashim, 2016). This has resulted in inadequate use of the available resources by farmers, who continue to rely mostly on conventional means of agricultural production, using traditional tools and equipment (Onwude et al., 2016). For instance, most of the farmers in Malawi still use inefficient equipment, such as hoes in crop production because of high costs of technology and unfavourable government policies. This high cost of production is a critical contributing factor to low agricultural production.

Is there any hope for advancements in agricultural technology in Africa, given the increasing population, diminishing water supply and climate change? The answer to this worrying question lies in the future food systems, namely automated vertical farming and precision or environment-controlled agriculture (Benke & Tomkins, 2017). As already seen under the ecological integrity section, vertical farms will enable producers to produce more food from fewer resources with less harm on ecosystems (Visual Capitalist, 2017). Precision agriculture refers to techniques that monitor control machinery to systematically apply fertilisers and chemicals to land and feed animals in a more efficient way than conventional farming techniques (Fraser, 2018). Despite the costs, these innovations are suitable for African food production systems because they have environmental, social and political advantages (Benke & Tomkins, 2017).

Sub-Saharan Africa has the potential to increase its agricultural productivity from three to five tonnes per hectare, the level of productivity seen in China (Sanchez, 2015). This requires robust reforms in production, processing and markets, technology and a certain degree of information technology (IT) literacy (Sanchez, 2015). Millions of young, educated Africans are expected to harness technology to enhance these stated areas. Although numerous reasons exist to be pessimistic about the prospects of plentiful food production in sub-Saharan Africa, technology and crop diversity with political will offer new hope for a food secure and healthy sub-Saharan African region and beyond (Massawe, Mayes, & Cheng, 2016).

5.5 Chapter Summary

This study meets the purpose of exploring eating patterns associated with diabetes among semirural Malawian families using photovoice. The findings have responded to the questions of what Malawians are eating currently, what has changed and whether this, together with the food system, is linked to the increased prevalence of type 2 diabetes. The study reveals emerging dietary patterns among semirural Malawian families, such as increased sugar intake, consumption of processed snacks and sugar-sweetened beverages, and eating outside the home, all of which are associated with obesity pandemics and a substantial risk for noncommunicable diseases, such as type 2 diabetes. Most of the findings of this research are supported by existing literature, which singles out sub-Saharan Africa as the last region to undergo a nutrition transition. Implications for policy and practice have been discussed using the Honest Food Model,

which critically examines the wider food system against socioeconomic and environmental factors. An examination of technology and food production reveals challenges associated with mechanisation of agricultural fields. However, agricultural innovations such as automated vertical farms and precision agriculture offer a ray of hope for a food secure Africa and a possibility to reverse the trajectory of noncommunicable diseases, such as diabetes, with optimal diets and clean ecosystems.

Chapter 6 Conclusion

6.1 Contribution of this study

The findings of this study suggest that eating patterns in Malawi are changing. It is important to note that Malawian diets have not undergone total modification, as traditional staples still form the basis of a meal. For instance, *nsima* is still being consumed in large amounts. However, there are indications of consumption of obesogenic products, such as refined, unhealthy sugars, salty processed snacks, saturated fats and sugar-sweetened beverages, all of which contribute significantly to the risk of type 2 diabetes. According to the results of this study, all these unhealthy products were previously uncommon in Malawi as opposed to the present day. Considering the role these obesogenic products play in the epidemiology of type 2 diabetes, it can be concluded that the current eating patterns in Malawi are consistent with nutrition transition contributing to the risk of type 2 diabetes in sub-Saharan Africa.

The study makes two noteworthy contributions to the field of noncommunicable disease research in Malawi. To begin with, this is the first study to investigate eating patterns associated with diabetes in Malawi. Therefore, the study provides primary evidence with respect to nutrition transition that may be taking place in Malawi. Furthermore, the current findings add to a growing body of literature on nutrition transition occurring in sub-Saharan Africa and provides a base for future studies. Secondly, the study has also revealed a policy vacuum relating to the food system in Malawi. Hence, the study serves to inform policy on healthy food and nutrition in Malawi.

Another hallmark of this study is its ability to tap into food and agriculture systems, which are a missing aspect in discussions of health system reforms nowadays (Jaacks & Bellows, 2017). Consequently, only few food systems researchers and policymakers consider collaboration between local food, agriculture and health as an opportunity (Jaacks & Bellows, 2017). Moreover, the United Nations High-Level Meeting on Prevention and Control of Non-communicable Diseases overlooked the roles of agribusiness and processed food in obesity (Stuckler & Nestle, 2012). Yet, the relationship between agriculture, food systems and health outcomes is a vivid one

(Jones & Ejeta, 2016). Therefore, this study explores the issue of diabetes through the lenses of food and agriculture systems.

This study has also illuminated the complexity of current eating patterns and the advent of Big Food companies. Evidence shows that these multinational companies are profit-oriented, have strong ties to and influence over national governments and do not prioritise optimal human diets (Stuckler & Nestle, 2012). This study supports a multipronged, multi-faceted and multi-sectoral approach to processed food which helps align Big Food's profit goals with public health goals (Stuckler & Nestle, 2012). If Big Food is not engaged in solving public health problems, all efforts by public health workers to change people's eating patterns are bound to fail.

Malawi is one of the countries in sub-Saharan Africa facing a double burden of communicable and noncommunicable diseases amid a lack of funding for healthcare (Lupafya, Mwangombi, Hosig, Maseko, & Chimbali, 2016). This means there is a need to accelerate preventive efforts to effectively break the trajectory of noncommunicable diseases in Malawi. This study indicates decreased awareness levels of diabetes among the rural Malawian populations that are hardly reached with health information. This provides an opportunity for primary health workers to provide accurate information to people on the prevention of type 2 diabetes.

This study utilised photovoice to explore eating patterns among semirural Malawian families to see if these might be linked to the increased prevalence of diabetes in the general population. Among other benefits, the use of photovoice enhanced participation by the participating families; generated rich data; and overly made the project motivating for both the researcher and the participants. The methodology used for this study may be applied to other studies elsewhere in the world.

6.2 Limitations of the study

The study only recruited a small number of participants to explore eating patterns. These findings may not be generalizable to the entire Malawian population. Although there could be some differences between urban and rural settings, it is also important to note that Malawi is a largely rural country with over 85% of the total population living in rural and semirural settings (World Bank, 2016). Therefore, the study represents

primary efforts to research on nutrition transition taking place in Malawi. The study provides rich data and a basis for further research on nutrition transition taking place in Malawi.

Another limitation of this study is the low volume of Malawian literature on nutrition and diabetes, including other noncommunicable diseases. This can be attributed to the fact that Malawi, as with other developing countries, is still grappling to understand the epidemiology of noncommunicable diseases as obesity is still perceived as an indicator of progress in combating undernutrition (Stuckler & Nestle, 2012). As such, little research has been conducted on these emerging diseases. More emphasis is placed on infectious diseases such as HIV/AIDS, malaria and tuberculosis. However, the Government of Malawi through the Ministry of Health has included noncommunicable diseases in the National Health Research Agenda and this is expected to prompt more research in this important emerging area. Therefore, sub-Saharan African literature was reviewed to establish the context of this research.

6.3 Recommendations for future research

The current study represents primary efforts to understand the epidemiology of diabetes in Malawi. The study marks a small-scale exploration of an emerging epidemic. Therefore, a nationwide epidemiological research on eating patterns among Malawians and the resultant health outcomes is required. Such a study would also clearly delineate differences between eating patterns in urban and rural settings.

This study also recommends further research on the factors influencing dietary changes in the Malawian general population. Larger scale participatory projects would uncover complex factors contributing to dietary shifts as well as allow empowerment of people. This information will help policymakers to identify unique strategies to address the issue of unhealthy eating. In addition, the role of community-based organisations and media needs to be investigated to identify their influences on current eating patterns in Malawi.

Further studies should also explore the use of technology in the promotion of healthy eating. There are early indications in this study that people are using technology to access health information. However, the specifics of the use of technology in accessing

health information among rural communities are largely unknown. Therefore, further research is required to assess how technology is being utilised to access health information. This would also be a platform for environmental and socioeconomic changes.

6.4 Final thoughts

This study is not just a fulfilment for the academic requirement. It is a product of the passion for contextualised, culturally adapted research to investigate what Malawians are eating currently, and how this might be increasing the risk of type 2 diabetes. The findings suggest that there are emerging obesogenic or diabetogenic foods in the Malawian diets. These foods range from sugar-sweetened beverages to highly processed foods. Also, poverty has substantial effects on eating patterns as it often makes diets less diversified. While it is acceptable to believe that this nutrition shift has not reached many rural areas yet, it is also important to note that the extension of this trend is inevitable, bearing in mind the increasing economic growth, as evidenced in the semirural areas of this study.

This study is a call to policymakers to incorporate wider determinants of diet and health in the formulation of policies in Malawi. Moreover, the study suggests the need for a multipronged and integrated approach for prevention of diabetes through policy-based health education, crop diversity, regulation of the Big Food, and creation of nutritious food environments. Economic empowerment and pricing on unhealthy food also have the potential to reduce diabetes risk. Diabetes will continue to impose both public health and socioeconomic burdens unless multi-sectoral efforts are accelerated to break its trajectory. There is no better time than now for Malawi to halt the rise of diabetes, when the prevalence is still below 10%. A healthy population is a key driver of economic development, hence, the need for action against diabetes in Malawi.

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Appendix A: Ethics approvals



AUTEC Secretariat

Auckland University of Technology
D-88, WU406 Level 4 WU Building City Campus
T: +64 9 921 9999 ext. 8316
E: ethics@aut.ac.nz
www.aut.ac.nz/researchethics

10 March 2017

Cath Conn
Faculty of Health and Environmental Sciences

Dear Cath

Re Ethics Application: **17/13 Exploring eating patterns associated with diabetes in Malawi using photo voice-based food diaries**

Thank you for providing evidence as requested, which satisfies the points raised by the Auckland University of Technology Ethics Committee (AUTEC).

Your ethics application has been approved for three years until 10 March 2020.

As part of the ethics approval process, you are required to submit the following to AUTEC:

- A brief annual progress report using form EA2, which is available online through <http://www.aut.ac.nz/researchethics>. When necessary this form may also be used to request an extension of the approval at least one month prior to its expiry on 10 March 2020;
- A brief report on the status of the project using form EA3, which is available online through <http://www.aut.ac.nz/researchethics>. This report is to be submitted either when the approval expires on 10 March 2020 or on completion of the project.

It is a condition of approval that AUTEC is notified of any adverse events or if the research does not commence. AUTEC approval needs to be sought for any alteration to the research, including any alteration of or addition to any documents that are provided to participants. You are responsible for ensuring that research undertaken under this approval occurs within the parameters outlined in the approved application.

AUTEC grants ethical approval only. If you require management approval from an institution or organisation for your research, then you will need to obtain this. If your research is undertaken within a jurisdiction outside New Zealand, you will need to make the arrangements necessary to meet the legal and ethical requirements that apply there.

To enable us to provide you with efficient service, please use the application number and study title in all correspondence with us. If you have any enquiries about this application, or anything else, please do contact us at ethics@aut.ac.nz.

All the very best with your research,

Kate O'Connor
Executive Secretary
Auckland University of Technology Ethics Committee

Cc: mnyalapa@kcn.unima.mw; mac.nyalapa@gmail.com

Telephone: + 265 789 400
Facsimile: + 265 789 431

All Communications should be addressed to:

The Secretary for Health and Population



In reply please quote No.

MINISTRY OF HEALTH AND POPULATION

P.O. BOX 30377
LILONGWE 3
MALAWI

5th April, 2017

McDonald Nyalapa
Auckland University/KCN
Lilongwe

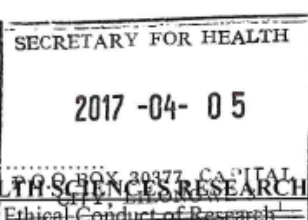
Dear Sir,

RE: PROTOCOL # 17/03/1759: EXPLORING EATING PATTERNS ASSOCIATED WITH DIABETES IN MALAWI USING PHOTOVOICE-BASED FOOD DIARIES

Thank you for the above titled proposal that you submitted to the National Health Sciences Research Committee (NHSRC) for review. Please be advised that the NHSRC has **reviewed** and **approved** your application to conduct the above titled study.

- **APPROVAL NUMBER** : 1759
- The above details should be used on all correspondences, consent forms and documents as appropriate.
- **APPROVAL DATE** : 05/04/2017
- **EXPIRATION DATE**
This approval expires on **04/04/2018**. After this date, this project may only continue upon renewal. For purposes of renewal, a progress report on a standard form obtainable from the NHSRC Secretariat should be submitted one month before the expiration date for continuing review.
- **SERIOUS ADVERSE EVENT REPORTING:** All serious problems having to do with subject safety must be reported to the NHSRC within 10 working days using standard forms obtainable from the NHSRC Secretariat.
- **MODIFICATIONS:** Prior NHSRC approval using forms obtainable from the NHSRC Secretariat is required before implementing any changes in the protocol (including changes in the consent documents). You may not use any other consent documents besides those approved by the NHSRC.
- **TERMINATION OF STUDY:** On termination of a study, a report has to be submitted to the NHSRC using standard forms obtainable from the NHSRC Secretariat.
- **QUESTIONS:** Please contact the NHSRC on phone number +265 888 344 443 or by email on mohdoccentre@gmail.com.
- **OTHER:** Please be reminded to send in copies of your final research results for our records (Health Research Database).

Kind regards from the NHSRC Secretariat.



For: **CHAIRPERSON, NATIONAL HEALTH SCIENCES RESEARCH COMMITTEE**

Executive Committee: Dr B. Chilima (Chairperson), Dr B. Ngwira (Vice-Chairperson)
Registered with the USA Office for Human Research Protections (OHRP) as an International IRBIRB
Number IRB00003905 FWA00005976

Appendix B: Tools, including translated versions

23 January 2017

page 35

Appendix E1: Indicative questions for focus group discussions for families



Questions for younger family members:

- Which food do you love eating the most? (or give them a piece of paper and a pencil to draw their favourite food).
- Do you eat this food in the morning, afternoon or night time? (follow up based on the response).

Questions for the older family members:

- How would you describe your family meals, starting from the time you wake up to the time you go to sleep?
- What is your opinion on your family's current eating patterns?
- How does the food you eat now differ from what you used to eat before?
- Having seen the food pictures (food diaries), what do you want to add about ways people currently eat—for example, do people have snacks and drinks between meals and if so, what type?
- Do you think current eating patterns have negative effects on people's health?
- If so, what do you think are the health problems associated with current eating patterns?
- Do you think you can modify your diet to ensure that it does not contribute to health problems such as those mentioned above?
- If so, what do you think you can do as a family to ensure that the family members are eating foods that do not bring about health problems you have mentioned?
- Do you have anything to say about the current eating patterns in the family?

Approved by the Auckland University of Technology Ethics Committee on 20th February 2017 AUTECH Reference number 17/13 and National Health Sciences Research Committee Reference Number.....



Appendix E2: Indicative questions for focus group discussion with families (Chichewa translated version)

Mafunso otsogolera zokambirana za pagulu

Mafunso kwa ana m'banja

- Kodi ndi zakudya ziti zomwe umazikondetsetsa? (kapena mwana apatsidwe pepala ndi pensulo kuti ajambule chakudya cha kumtima kwake).
- Kodi chakudya chimenech umadya mmawa, masana kapena madzulo? (mafunso otsatira malinga ndi yankho la mwana).

Mafunso kwa akulu m'banja

- Mungafotokoze bwanji zakudya zomwe mumadya pa banja panu, kuyambira nthawi yomwe mwadzuka mpaka nthawi yomwe mukukagona?
- Kodi maganizo anu ndi otani pa kadyedwe pa banja masiku ano?
- Kodi kadyedwe kameneka kakusiyana bwanji ndi momwe anthu amadyera m'baja kale?
- Mutaona zithunzi za zakudya zomwe mwakhala mukudya kwa masiku anayiwa, mungafotokoze bwanji momwe anthu akudya kapena za zakudya masiku ano? Mwachitsanzo, kodi anthu amatolola chiyani pakati pa nkhomaliro ndi mgonero?
- Kodi mukuganiza kuti zakudya zomwe anthu akudya masiku ano zingabweretse matenda?
- Ngati ndi choncho, ndi matenda ati omwe angabwere chifukwa cha madyedwe kapena zakudya zimene anthu akudya masiku ano?
- Mukuganiza kuti mungasinthe kadyedwe komwe kakubweretsa matenda omwe mwatchulawa?
- Ngati ndi choncho, ndi njira ziti zimene mungatsate kuti muonetsetse kuti inu ndi apabanja panu mukudya zakudya zimene sizikubweretsa matenda mwatchulawa?
- Pomaliza, muli ndi ndemanga iliyonse pa zakadyedwe ka pabanja masiku ano?

Yavomerezedwa ndi bungwe loona za kafukufuku wa zaumoyo pa sukulu ya AUT pa 20th February 2017 nambala 17/13 komanso bungwe loona za kafukufuku wa zaumoyo m'Malawi la NHSRC Nambala.....

Appendix A1: Participant Information Sheet

Date Information Sheet Produced:
8 November 2016



Project Title

Exploring eating patterns associated with diabetes in Malawi using photovoice-based food diaries.

An Invitation

Hello,

My name is McDonald Nyalapa, a Malawian and currently studying for my master's degree in public health at Auckland University of Technology (AUT) in New Zealand. I would like to invite you to participate in my research that aims for exploring eating patterns associated with diabetes in the rural area of Blantyre in Malawi using photovoice-based food diaries. This research is part of my thesis requirement for completion of my qualification for master's degree.

Your participation in this research is voluntary and you may withdraw at any time prior to the completion of data collection without any adverse consequences. I would like to assure you that your choice whether to participate or not will neither advantage or disadvantage you in any way.

What is the purpose of this research?

The overall purpose of this research is to fulfill the requirements for the researcher's award of the Master's Degree in Public Health. The findings of this study will also be used for conference presentations and publications. The study aims to explore the current, specific eating patterns, and how these could be linked with diabetes in Malawi. The study will generate specific information on dietary patterns, that could be incorporated in diabetes prevention messages, hence, the study will be a basis for a bigger study on nutrition-based diabetes prevention. The study will also discuss implications of the findings for policy and practice relating to preventing diabetes in families, communities and wider society. Participants, who will be intergenerational family members, will be given the opportunity to share their accounts of how eating has changed in the family.

How was I identified and why am I being invited to participate in this research?

This study will involve recruitment of families through a local church. You were identified and are being invited to participate in this study because you live in either Chigumula or Khwisa Village; your family has intergeneration members, such as parents aged above 30 years, youth and children. You have been purposively selected because you meet the above criteria.

How do I agree to participate in this research?

Your participation in this research is voluntary (it is your choice) and whether or not you choose to participate will neither advantage nor disadvantage you. You are able to withdraw from the study at any time. If you choose to withdraw from the study, then you will be offered the choice between having any data that is identifiable as belonging to you removed or allowing it to continue to be used. However, once the findings have been produced, removal of your data may not be possible.

What will happen in this research?

The research involves having your normal food or even snacks photographed for four consecutive days. The pictures of your meals will be taken by your youthful family member and a research assistant using a smartphone. You are, therefore, requested to look after the smartphone, because it will be returned when the photography of meals is completed. After compiling the pictures of your meals, you will be asked to participate in a focus group discussion, through sharing your knowledge, experiences and views on eating patterns in the family. This focus group discussion will only involve you and your family members in order to foster your freedom of expression. The data collected will only be used for academic purposes.



What are the discomforts and risks?

There are no potential discomforts or risks in this study. However, if you experience any discomfort during the photography of meals or group discussions, you can inform the primary researcher or feel free to withdraw at any time.

What are the benefits?

The potential benefit of this research to the researcher is the award of the Master's Degree in Public Health. The findings of this study will also be used for conference presentations and publications. The study aims to explore the specific changes that have occurred in eating patterns at family level, and how these could be linked with diabetes. The study will generate specific information on dietary changes, that could be incorporated in diabetes prevention messages, hence, the study will be a basis for further research on nutrition-based diabetes prevention. The study will also discuss implications of the findings for policy and practice relating to preventing and managing diabetes in families, communities and wider society. Participants, who will be intergenerational family members, will be able to share their accounts of how eating has changed in the family. The participants will also be able to reflect on their own eating patterns, and any question that they may have on healthy diet will be answered.

How will my privacy be protected?

To protect and maintain your privacy, I will not use your real names in this research and any individual details that might identify you as a participant will not be revealed. Pseudonyms will be used in the FGDs to protect your identity. Although complete anonymity cannot be offered because the primary researcher will be interacting with you through FGDs, confidentiality will be assured as only the researcher and those directly involved in the study will have access to the data. All data and transcripts will be kept in a secure, locked cabinet in the supervisor's office, and consent forms will be stored separate from the data.

What are the costs of participating in this research?

The time that you will be required to give to this project is as follows:

Photovoice-based food diaries- your youthful family members will be required to take pictures of food eaten by your family at least twice a day for a period of four days.

Focus group discussion- each focus group discussion will take between 1 hour 30 minutes and 2 hours.

What opportunity do I have to consider this invitation?

You have one week to decide your participation in this study.

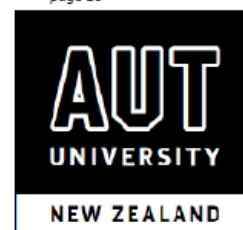
Will I receive feedback on the results of this research?

Yes. At the end of data collection, preliminary results will be shared with participating families, community leaders and community-based organizations implementing similar interventions. When my research is complete, I will also provide a summary of my findings and conclusions to the community through the mentioned structures.

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Dr Cath Conn, e-mail: cath.conn@aut.ac.nz Phone: +64 9 921 9999 ext 7407.

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, Kate O'Connor, ethics@aut.ac.nz +64 9 921 9999 ext 6038.



Whom do I contact for further information about this research?

Please keep this Information Sheet and a copy of the Consent Form for your future reference. You are also able to contact the research team as follows:

Researcher Contact Details:

McDonald Nyalapa, E-mail: mac.nyalapa@gmail.com , Phone: +265 884 092 002

Project Supervisor Contact Details:

Dr Cath Conn, Senior Lecturer, AUT University, E-mail: cath.conn@aut.ac.nz Phone: +64 9 921 9999 ext 7407.

Approved by the Auckland University of Technology Ethics Committee on 20th February 2017 AUTEK Reference number 17/13, and National Health Sciences Research Committee, Reference Number.....

Appendix A2: Participant Information Sheet (Chichewa translated version)**Uthenga kwa wotenga mbali mu kafukufuku**

Uthengawu wakonzedwa pa:
8 November, m'chaka cha 2016

**Mutu wa kafukufuku**

Kufufuza za kadyedwe komwe kakulimbikitsa matenda a shuga m'Malawi pogwiritsa ntchito njira ya zithunzi.

Kuyitana wotenga mbali mu kafukufuku

Moni,

Dzina langa ndi McDonald Nyalapa, nzika ya kuno ku Malawi koma ndikuchita maphunziro a zaumoyo wa anthu pa sukulu ya ukachenjere ya AUT m'dziko la New Zealand. Ndafuna kuti ndikuyitaneni ku kafukufuku yemwe cholinga chake ndi kufufuza za momwe kadyedwe kakukhudzanirana ndi matenda a shuga kuno ku Malawi pogwiritsa ntchito zithunzi za zakudya. Kafukufukuyu ndi mbali imodzi ya zofunikira kuti ndimalize maphunziro anga aukanjere pa zaumoyo wa anthu.

Mukufunsidwa kuthenga nawo mbali mu kafukufukuyu mwakufuna kwanu ndipo mukhoza kutuluka mu kafukufukuyu nthawi imene inu mwafna popanda kupatsidwa chilango chili chonse. Ndikufunanso ndikutsimikizireni kuti chisankho chanu chotenga mbali mu kafukufukuyu kapena ayi sichibweretsa kapena kuchotsa mwayi uliwonse pa moyo wanu.

Cholinga cha kafukufukuyu ndi chiyani?

Cholinga chachikulu cha kafukufukuyu ndi kukwaniritsa zoyenera za maphunziro a ukachenjere pa nkhani zaumoyo wa anthu. Zotsatira za kafukufukuyu zidzaulutsidwa kwa ophunzira ena komanso zidasindikizidwa. Kafukufukuyu adzathandiza kudziwa za kadyedwe kamakono ndi momwe izi zikukhudzanirana ndi matenda a shuga muno m'Malawi. Kafukufukuyunso adzathandiza kupeza zambiri za kadyedwe ka makono zomwe zidzayikidwe m'mauthenga a apewedwe ka matenda a shuga, komanso kafukufukuyu adzakhala maziko a kafukufuku wamkulu wothandiza kupewa matenda a shuga. Kafukufukuyunso adzathandiza kukonza ndondomeko za kapewedwe ka matenda a shuga m'manja, m'mudzi komanso m'dziko muno. Otenga mbali mu kafukufukuyu adzapatsidwanso mwayi wofotokozera mmene kadyedwe kasinthira m'banja masiku ano.

Kodi ndasankhidwa bwanji kuti nditenge nawo mbali mu kafukufukuyu?

Kafukufukuyu akukhudza manja omwe asankhidwa kudzera mu mpingo wa CCAP kuno ku Ntenjera. Mwasankhidwa mgulu la woyitanidwa kutenga nawo mbali mu kafukufukuyu chifukwa chakuti ndinu banja la mmudzi wa Chigumula kapena Khwisa; banja lanu liri ndi anthu a pakati pa zaka zochepera 10 komanso kuposera zaka 30. Mwasankhidwa chifukwa mukukwaniritsa zoyenera mu ndondomeko imeneyi.

Kodi ndingavomereze bwanji kutenga nawo mbali mu kafukufukuyu?

Mukufunsidwa kutenga nawo mbali mu kafukufukuyu mwa kufuna kwanu ndipo chiganizo chanu chotenga nawo mbali mu kafukufukuyu kapena ayi sichikubweretserani kapena kuchotserani mwayi uliwonse. Mungathe kutuluka mu kafukufukuyu nthawi iliyonse yomwe inu mwafuna. Ngati mwasankha kutuluka mu kafukufukuyu mudzapatsidwa mwayi wosankha kuti mauthenga anu usungidwebwe ndi kugwiritsidwa ntchito kapena ayi. Koma ngati zotsatira zatuluka kale, kuchotsa mauthenga omwe mwapereka kudzakhala kovuta.

Kodi zochitika mu kafukufukuyu ndi zotani?

Kafukufukuyu akukhudzana ndi kujambula zithunzi za zakudya zanu kwa masiku otsatizana anayi. Zithunzizi zidzatoledwa ndi wothandizira kafukufuku komanso wachinyamata wa pa banja panu pogwiritsa ntchito lamya ya m'manja. Mukupemphedwa kusamala lamyayi chifukwa idzabwenzedwa pakutha pa kutola zithunziku. Pambuyo pa kutolera zithunzi za zakudya, muzafunsidwa kutenga nawo mbali mu zokambirana, pogawana ndi apabanja panu zomwe munaona komanso zomwe mukudziwa pa kadyedwe ka pa banja. Zokambiranazi zizakhala pakati pa inu ndi apabanja panu ndi cholinga chakuti mudzakhale omasuka kupereka maganizo anu. Mauthenga otoleredwa mu kafukufukuyu adzagwiritsidwa ntchito pa maphunziro basi.



Kodi zoopsa za kafukufukuyu ndi zotani?

Palibe choopsa chilichonse chokhudzana ndi kafukufukuyu. Ngati muli ndi vuto lililonse pa za kujambula zakudya zanu kapena pa zokambirana za pagulu, chonde dziwitsani wochititsa kafukufuku kapena khalani womasuka kutuluka mu kafukufukuyu nthawi yomwe mwafuna kutero.

Kodi phindu la kafukufukuyu nchiyani?

Phindu lalikulu pa kafukufukuyu ndi kukwaniritsa zofunikira pa maphunziro a ukachenjeda a zaumoyo wa anthu. Zotsatira za kafukufukuyu zidzaulutsidwa kwa ophunzira ena komanso zidzasindikizidwa. Kafukufukuyu adzathandizanso kudziwa mmene kadyedwe kasinthira ndi momwe izi zikhudzanirana ndi matenda a shuga. Kafukufukuyunso adzathandiza kupeza zambiri za kadyedwe ka makono zomwe zidzayikidwe m'mauthenga a kapewedwe ka matenda a shuga, komanso kafukufukuyu adzakhala maziko a kafukufuku wamkulu wothandiza kupewa matenda a shuga. Kafukufukuyunso adzathandiza kukonza ndondomeko za kapewedwe ka matenda a shuga m'manja, m'mudzi komanso m'dziko muno. Otenga nawo mbali mu kafukufukuyu adzapatsidwa mwayi wounika kadyedwe kawo komanso mafunso onse okhudzana ndi kadyedwe koyenera adzayankhidwa.

Kodi ufulu wanga wodzisungira chinsinsi udzatetezedwa bwani?

Poteteza ufulu wanu wodzisungira chinsinsi, ine sindidzagwiritsa ntchito maina anu enieni mu kafukufukuyu ndipo maina ndi zizindikiro zonse za anthu sizidzaululidwa. Maina ongoperekedwa adzagwiritsidwa ntchito pa zokambirana za pa pagulu.

Ngakahale izi sizikupereka chitetezo chonse cha ufulu wodzisungira chinsinsi poganizira kuti wochita kafukufuku adzakhala akuyankhula nanu pa zokambiranazi, chinsinsi chidzasungidwa poonetsetsa kuti wochita kafukufuku ndi onse okhudzidwa ndi kafukufukuyu ndi okhawo omwe adzathe kudziwa za zotsatira za kafukufukuyu. Zotsatira zonse za kafukufukuyu zidasungidwa mosamala, mu kabati ya mu ofesi ya aphunzitsi.

Kodi ndi dipo lanji limene ndikuyenera kupereka mu kafukufukuyu?

Simukuyenera kupereka dipo lililonse mu kafukufukuyu kupatula nthawi yanu. Nthawi yomwe mukuyenera kupereka mu kafukufukuyu ili motere:

Kutola zithunzi za zakudya: wachinyamata wa m'banja mwanu adzafunsiwa kutola zithunzi za akudya zomwe mumadya kawiri pa tsiku kwa masiku otsatizana anayi.

Zokambirana za pagulu: zokambirana zidzakhala kwa ola loimodzi ndi mphindi makumi atatu mpaka maola awiri.

Ndi nthawi yayitali bwani yomwe ndikuyenera kuganizira za kutenga nawo mabali mu kafukufukuyu? Muli ndi sabata yathunthu yakuti mupange chisankho chotenga nawo mbali mu kafukufukuyu.

Kodi ndidzauzidwa zotsatira za kafukufukuyu?

Inde. Kafukufukuyu akadzatha, zotsatira zoyamba zidzaperekedwa kwa maanja otenga nawo mbali, atsogoleri a m'mudzi mwanu komanso mabungwe omwe akugwira ntchito zaumoyo m'mudzi muno. Pomaliza penipeni zotsatira za kafukufukuyu ndi mfundo zina zidzatumizidwa kudzera mu magulu ndatchulawa.

Kodi ndingatani ngati ndili ndi dandaulo pa kafukufukuyu?

Dandaulo lililonse lokhudzana ndi kafukufukuyu likuyenera kutumizidwa poyamba kwa woyang'anira kafukufukuyu, Dr Cath onn kudzera mu uthenga wa pa makina a intaneti pa adilesi iyi: cath.conn@aut.ac.nz kapena lamya pa +64 9 921 999.



Mukhoza kutumiza dandaulo lililonse lokhudza ufulu ndi chitetezo chanu monga wotenga mbali mu kafukufuku kwa mlembi wamkulu wa bungwe loteteza ufulu wa wotenga mbali mu kafukufuku la AUTEK, Kate O'Connor, kudzera mu uthenga wa pa makina a intaneti pa adilesi iyi: ethics@aut.ac.nz, kapena pa lamyayi: +64 9 921 9999.

Ndingayankhule ndi ndani ngati ndili ndi mafunso pa kafukufukuyu?

Chonde sungani mosamala pepalali ndi pepala la chilolezo chotenga nawo gawo mu kafukufukuyu. Mukhonzanso kuyankhula ndi wochititsa kafukufukuyu motere:

Mwini kafukufuku:

McDonald Nyalapa, kudzera pa uthenga wa pa makina a intanet pa adilesi iyi: mac.nyalapa@gmail.com, lamyayi: +265 884 092 002

Woyang'anira kafukufukuyu:

Dr Cath Conn, mphunzitsi wamkulu pa sukulu ya ukachenjede ya AUT, kudzera pa uthenga wa pa makina a intaneti ku adilesi iyi: cath.conn@aut.ac.nz lamyayi: +64 9 921 9999.

Yavomerezedwa ndi bungwe loona za kafukufuku wa zaumoyo pa sukulu ya AUT la AUTEK pa **20 February 2017** Nambala **17/13** komanso bungwe loona za kafukufuku wa zaumoyo muno m'Malawi la NHSRC Nambala.....

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Appendix G1: Participant Information Sheet (Child)**Date Information Sheet Produced:**

8 November 2016

**Project Title**

Exploring eating patterns associated with diabetes in Malawi using photovoice-based food diaries.

Invitation

You know me, my name is Mac, from here, but currently studying public health in New Zealand. I am inviting you to take part in my research concerning the food we eat everyday.

Why am I doing this research?

I know that you eat food everyday. I would like to know more about the food you eat everyday. By doing this we will be able to know what your family normally eats. This will help us to know whether the food you eat will cause diseases like diabetes in future.

Why me?

I am inviting you to take part in this because you are a child in this family. I am interested in hearing about the food which mum (or guardian) prepares for you everyday.

Do I have to take part?

No! You don't have to take part if you don't want to. Please read this sheet and talk to your mum, dad or guardian before you decide. If you don't want to take part, just say no, and I will let you go and play with your friends.

What will happen if I take part?

I will ask you and your mum, dad or guardian to write your names on a form to say you'd like to take part. Then I will ask you to draw or tell me your favourite food and the food mum usually prepares for you. We'll then discuss this with mum and dad and your family members.

Will anyone else know I'm doing research?

The people in our research team will know you're taking part. Nobody else will know because we will use a different name for the study instead of your real name.

What if I don't want to do the research anymore?

Just tell your mum, dad or guardian at any time. Even if you've started the discussion, you can still stop anytime. Just tell the researcher that you'd like to stop.

How can I find out more about the study?

Your mum, dad or guardian may be able to answer your questions for you. You can also ask the researcher to answer your questions.

For more information, please contact the primary researcher:

McDonald Nyalapa, E-mail: mac.nyalapa@gmail.com, Phone: +265 884 092 002

Approved by the Auckland University of Technology Ethics Committee on 20th February 2017 AUTECH

Reference number 17/13 and National Health Sciences Research Committee Reference Number.....

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Appendix G2: Participant Information Sheet- Child (Chichewa version)**Uthenga kwa wotenga mbali mu kafukufuku (Mwana)**

Uthengawu wakonzedwa pa:
8 November 2016

Mutu wa kafukufuku

Kufufuza za kadyedwe komwe kakulimbikitsa matenda a shuga m'Malawi pogwiritsa ntchito njira ya zithunzi.

Kuyitana wotenga mbali mu kafukufuku

Monga mukudziwa, dzina langa ndine Mac, wochokera m'dera lomwelino, koma ndikuchita maphunziro a zaumoyo m'dziko la New Zealand. Ndikukuyitana ku kafukufuku wokhudzana ndi zakudya zomwe timadya tsiku ndi tsiku.

Ndi chifukwa ninji ndikuchita kafukufukuyu?

Ndikudziwa kuti mumadya chakudya tsiku ndi tsiku. Choncho ndikufuna kudziwa zakudya zomwe umadya tsiku ndi tsiku. Poto tidzatha kudziwa zakudya zomwe mumadya, komanso kudziwa ngati zakudya zikhoza kuyambitsa matenda a shuga mtsogolo.

Ndi chifukwa ninji ndikuyitanidwa ku kafukufukuyu?

Ndikukumema kutenga nawo mbali mu kafukufukuyu chifukwa ndiwe mwana wopezeka m'banja lomwe likuchita nawo kafukufukuyu. Ndikufuna kudziwa zakudya zomwe mayi ako amakuphikira tsiku ndi tsiku.

Kodi ndikuyenera kutenga nawo mbali?

Iyai! Siukuyenera kutenga nawo mbali mu kafukufukuyu ngati siukufuna kutero. Chonde werenga uthengawu ndikufunsa mayi kapena bambo ako usanaganize zotenga mbali. Ngati usakufuna kutero, ukhoza kukana.

Chichitike nchiyani ndikatenga nawo mbali?

Ine ndiwapempha mayi kapena bambo ako kuti alembe dzina lako pa pepala, kutsimikiza kuti wavomereza kutenga nawo mbali mu kafukufukuyu. Kenaka ndidzakupempha kuti ujambule kapena kutchula chakudya chomwe umachikonda kwambiri komanso zakudya zomwe mayi ako amakupatsa pa tsiku. Zikatero tidzakambirana za zakudya ndi mayi kapena bambo ako pamodzi ndi a pa banja panu.

Kodi izi zidzatenga nthawi yaitali bwanji?

Zokambirana ndi wochititsa kafukufuku zidzatenga mphindi zisanu mpaka khumi. Zikatero udzakhalani ndi mwayi wopita kukasewera kapena kukachita zina.

Kodi anthu adzadziwa kuti ndikutenga nawo mbali m'kafukufukuyu?

Anthu okhawo omwe akuchita nawo kafukufukuyu ndi omwe adzadziwe kuti ukutenga nawo mbali mu kafukufukuyu. Kupatula apo palibenso wina adzadziwe kuti ukutenga nawo mbali chifukwa tidzagwiritsa ntchito dzina lina osati dzina lako leni leni.

Kodi ndingatani nditafuna kutuluka m'kafukufukuyu?

Chonde uza mayi, bambo ako kapena wokuyang'anira. Ngakhale utakhala kuti wayamba kale kafukufukuyu ukhoza kutuluka pouza wochititsa kafukufuku nthawi iliyonse.

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Kodi ndingadziwe bwanji zambiri za kafukufukuyu?

Mayi kapena bambo ako akhoza kukuyankha mafunso omwe ungakhale nawo pa kafukufukuyu.
Komanso ukhonza kufunsa wochititsa kafukufuku :

McDonald Nyalapa, kudzera pa uthenga wa pa makina a intanet pa adilesi iyi:
mac.nyalapa@gmail.com , lamya: +265 884 092 002

Yavomerezedwa ndi bungwe loona za kafukufuku wa zaumoyo pa sukulu ya AUT la AUTECH pa
20 February 2017 Nambala 17/13 komanso bungwe loona za kafukufuku wa zaumoyo
m'Malawi la NHSRC Nambala.....



Appendix B1a: Consent form for focus group with family members (aged above 16 years)

Project title: *Exploring eating patterns associated with diabetes in Malawi using photovoice-based food diaries.*

Project Supervisor: *Dr Cath Conn*

Researcher: *McDonald William Nyalapa*

- ☐ I have read and understood the information provided about this research project in the Information Sheet dated 8 November 2016.
- ☐ I have had an opportunity to ask questions and to have them answered.
- ☐ I understand that identity of my fellow participants and our discussions in the focus group is confidential to the group and I agree to keep this information confidential.
- ☐ I understand that notes will be taken during the focus group and that it will also be audio-taped and transcribed.
- ☐ I understand that taking part in this study is voluntary (my choice) and that I may withdraw from the study at any time without being disadvantaged in any way.
- ☐ I understand that if I withdraw from the study then, while it may not be possible to destroy all records of the focus group discussion of which I was part, I will be offered the choice between having any data that is identifiable as belonging to me removed or allowing it to continue to be used. However, once the findings have been produced, removal of my data may not be possible.
- ☐ I agree to take part in this research.
- ☐ I wish to receive a summary of the research findings (please tick one): Yes ☐ No ☐

Participant's signature:

Participant's name:

Participant's Contact Details (if appropriate):

.....

Date:

Approved by the Auckland University of Technology Ethics Committee on 20th February 2017 AUTECH
 Reference number 17/13 and National Health Sciences Research Committee Reference Number.....



Appendix B1b: Consent form for focus group discussion with family members (Chichewa translated version)

Kalata yovomereza kutenga nawo gawo pa zokambirana za pa gulu (Kwa apabanja a zaka kupyolera khumi zisanu ndi chimodzi)

Mutu wa kafukufuku: Kufufuza za kadyedwe komwe kakukhudzana ndi matenda a shuga m'Malawi pogwiritsa ntchito zithunzi.

Woyang'anira kafukufuku: Dr Cath Conn

Mwini kafukufuku: McDonald William Nyalapa

- Ndawerenga ndi kumvetsa uthenga wokhudzana ndi kafukufukuyu omwe waperekedwa wolembedwa pa 8 November, m'chaka cha 2016.
- Ndakhala ndi mwayi wofunsa mafunso ndi kuyankhidwa.
- Ndamvetsetsa kuti uthenga wozindikirika wa otenga mbali ena mu kafukufukuyu ndi zokambirana zonse ndi zachinsinsi kugululi komanso ndikuvomera kusuna izi mwachinsinsi.
- Ndamvetsetsa kuti mawu a mu zokambiranazi adzalembedwa nthawi ya zokambirana komanso adzatepedwa ndikulembedwanso.
- Ndamvetsetsa kuti kutenga nawo mbali mu kafukufukuyu ndi kosakakamiza komanso ndikhoza kutuluka mu kafukufukuyu nthawi iliyonse yomwe ndafuna opanda chilango chilichonse.
- Ndamvetsetsa kuti ngakhale kuli kovuta kufufuta mawu omwe ndayankhula pa zokambirana, ndidzapatsidwa mwayi wosankha pakati pa kuchotsa mauthenga anga ozindikirika kapena kupitiriza kugwiritsa ntchito mauthenga angawa. Koma pa nthawi yomwe zotsatira za kafukufukuyu zatuluka, kudzakhalakova kufufuta mauthenga angawa.
- Ndavomereza kutenga mbali mu kafukufukuyu.
- Ndikufuna ndidzalandire mitu ya zotsatira zakafukufukuyu (chonde sankhani): Eya ☐ Ayi ☐

Sayini ya wotenga mbali:

Dzina la wotenga mbali:

Nambala ya lamy ya wotenga mbali (ngati nkoyenera):

.....
.....

Tsiku:

Yavomerezedwa ndi bungwe loona za kafukufuku wa zaumoyo pa sukullu ya AUT la AUTEK pa 20th February 2017 Nambala 17/13, komanso bungwe loona za kafukufuku wa zaumoyo muno m'Malawi la NHSRC Nambala.....



Appendix B2a: Consent and release form for food photographs

Project title: *Exploring eating patterns associated with diabetes in Malawi using photovoice-based food diaries.*

Project Supervisor: *Dr Cath Conn*

Researcher: *McDonald William Nyalapa*

- I have read and understood the information provided about this research project in the Information Sheet dated 8 November 2016.
- I have had an opportunity to ask questions and to have them answered.
- I understand that taking part in this study is voluntary (my choice) and that I may withdraw from the study at any time without being disadvantaged in any way.
- I understand that if I withdraw from the study then I will be offered the choice between having any data that is identifiable as belonging to me removed or allowing it to continue to be used. However, once the findings have been produced, removal of my data may not be possible.
- I permit the researcher | artist to use the photographs that are part of this project and/or any drawings from them and any other reproductions or adaptations from them, either complete or in part, alone or in conjunction with any wording and/or drawings solely and exclusively for (a) the researcher's | artist's portfolio; and (b) educational exhibition and examination purposes and related design works; and (c) all forms and media for advertising, trade and any other lawful purposes as stated on the Information Sheet.
- I understand that any copyright material created by the photographic sessions is deemed to be owned by the researcher. However, I have a right to keep electronic or hard copies of the photographed meals.
- I agree to take part in this research.

Participant's signature:

Participant's name:

Participant's Contact Details (if appropriate):

.....

Date:

Approved by the Auckland University of Technology Ethics Committee on 20th February 2017 AUTEK Reference number 17/13 and National Health Sciences Research Committee Reference Number.....



Appendix B2b: Consent and release form (Chichewa translated version)

Kalata yovomereza kutola zithunzi za zakudya.

Mutu wa kafukufuku: Kufufuza za kadyedwe komwe kakukhudzana ndi matenda a shuga m'Malawi pogwiritsa ntchito zithunzi.

Woyang'anira kafukufuku: Dr Cath Conn

Mwini kafukufuku: McDonald William Nyalapa

- Ndawerenga ndi kumvetsa uthenga wokhudzana ndi kafukufukuyu omwe waperekedwa wolembedwa pa 8 November, m'chaka cha 2016.
- Ndakhala ndi mwayi wofunsa mafunso ndi kuyankhidwa.
- Ndamvetsetsa kuti kutenga nawo mbali mu kafukufukuyu ndi kosakakamiza komanso ndikhoza kutuluka mu kafukufukuyu nthawi iliyonse yomwe ndafuna opanda chilango chilichonse.
- Ndamvetsetsa kuti ndidzapatsidwa mwayi wosankha pakati pa kuchotsa mauthenga anga ozindikirika kapena kupitiriza kugwiritsa ntchito mauthenga angawa. Koma pa nthawi yomwe zotsatira za kafukufukuyu zatuluka, kudzakhalakovuta kufufuta mauthenga angawa.
- Ndapereka chilolezo kwa wochita kafukufuku kugwiritsa ntchito zithunzi zomwe zikukhudzana ndi ntchitoyi kapena zojambula zilizonse komanso zosindikiza zili zonse kapena zoonjezera / zochotsera zonse kwa (a) wochita kafukufukuyu; komanso (b) zionetsero zonse zothandizira pophunzitsa kapena polemba mayeso; komanso (c) zowulutsidwa kapena kusindikizidwa zomwe zaperekedwa mu uthenga wa wotenga mbali mu kafukufukuyu.
- Ndamvetsetsa kuti umwini wa zojambula zonse zokonzedwa udzakhala wa wochita kafukufukuyu. Ngakhale izi zili chomwechi, ndili ndi ufulu onse wosunga zithunzi za zakudyazi.
- Ndavomera kutenga nawo mbali mu kafukufukuyu.

Sayini ya wotenga mbali:

Dzina la wotenga mbali:

Nambala ya lamy ya wotenga nawo mbali (ngati nkoyenera):

.....

Tsiku:

Yavomerezedwa ndi bungwe loona za kafukufuku wa zaumoyo pa sukulu ya AUT la AUTECH
 pa 20 February 2017 Nambala 17/13 komanso bungwe loona za kafukufuku wa zaumoyo muno m'Malawi la
 NHSRC Nambala.....



Appendix B3a: Parent/Guardian consent form

Project title: *Exploring eating patterns associated with diabetes in Malawi using photovoice-based food diaries.*

Project Supervisor: *Dr Cath Conn*

Researcher: *McDonald William Nyalapa*

- ☐ I have read and understood the information provided about this research project in the Information Sheet dated 8 November 2016.
- ☐ I have had an opportunity to ask questions and to have them answered.
- ☐ I understand that notes will be taken during the interviews and that they will also be audio-taped and transcribed.
- ☐ I understand that taking part in this study is voluntary (my choice) and that I may withdraw my child/children and/or myself from the study at any time without being disadvantaged in any way.
- ☐ I understand that if I withdraw my child/children and/or myself from the study then I will be offered the choice between having any data that is identifiable as belonging to my child/children and/or myself removed or allowing it to continue to be used. However, once the findings have been produced, removal of our data may not be possible.
- ☐ I agree to my child/children taking part in this research.
- ☐ I wish to receive a summary of the research findings (please tick one): Yes ☐ No ☐

Child/children's name/s :

Parent/Guardian's signature:

Parent/Guardian's name:

Parent/Guardian's Contact Details (if appropriate):

.....

Date:

Approved by the Auckland University of Technology Ethics Committee on 20th February 2017 AUTEK Reference number 17/13 and National Health Sciences Research Committee Reference Number.....



Appendix B3b: Parent/ Guardian consent form (Chichewa translated version)

Kalata yovomereza kutenga nawo gawo mu kafukufuku yosayinidwa ndi kholo kapena woyang'anira mwana.

Mutu wa kafukufuku: Kufufuza za kadyedwe komwe kakukhudzana ndi matenda a shuga m'Malawi pogwiritsa ntchito zithunzi.

Woyang'anira kafukufuku: Dr Cath Conn

Mwini kafukufuku:

McDonald William Nyalapa

- Ndawerenga ndi kumvetsa uthenga wokhudzana ndi kafukufukuyu omwe waperekedwa wolembedwa pa 8 November, m'chaka cha 2016.
- Ndakhala ndi mwayi wofunsa mafunso ndi kuyankhidwa.
- Ndamvetsetsa kuti mawu a mu zokambiranazi adzalembedwa nthawi ya zokambirana komanso adzatepedwa ndikulembedwanso.
- Ndamvetsetsa kuti kutenga nawo mbali mu kafukufukuyu ndi kosakakamiza komanso ndikhoza kutuluka mu kafukufukuyu kapena kusiyitsa ana anga kafukufukuyu nthawi iliyonse yomwe ndafuna opanda chilango chilichonse.
- Ndamvetsetsa kuti ndidzapatsidwa mwayi wosankha pakati pa kuchotsa mauthenga anga ndi a ana anga ozindikirika kapena kupitiriza kugwiritsa ntchito mauthenga angawa ndi a ana angawa. Koma pa nthawi yomwe zotsatira za kafukufukuyu zatuluka, kudzakhalako kovuta kufufuta mauthenga anthuwa.
- Ndavomereza kuti mwana/ana anga atenge nawo mbali mu kafukufukuyu.
- Ndikufuna ndidzalandire mitu ya zotsatira zakafukufukuyu (chonde sankhani): Eya○ Ayi○

Dzina la mwana/ana :

Sayini ya kholo:

Dzina la kholo

Nambala ya lamyamba ya kholo:

.....

Tsiku:

Yavomerezedwa ndi bungwe loona za kafukufuku wa zaumoyo pa sukulu ya AUT la AUTECH
 pa 20th February 2017 Nambala 17/13 komanso bungwe loona za kafukufuku wa zaumoyo muno m'Malawi la NHSRC
 Nambala.....



Appendix B4a: Assent form (Optional)

For completion by people aged under 16 years.

Project title: Exploring eating patterns associated with diabetes in Malawi using photovoice-based food diaries.

Project Supervisor: Dr Cath Conn

Researcher: McDonald William Nyalapa

- ☐ I have read and understood the sheet telling me what will happen in this study and why it is important.
- ☐ I have been able to ask questions and to have them answered.
- ☐ I understand that notes will be taken during the interviews and that they will also be audio-taped and transcribed.
- ☐ I understand that I can stop being part of this study whenever I want and that it is perfectly ok for me to do this.
- ☐ If I stop being part of the study, I understand that then I will be offered the choice between having any information that that other people can know is about me removed or letting the researcher keep using it. I also understand that sometimes, if the results of the research have been written, some information about me may not be able to be removed.
- ☐ I agree to take part in this research.

Participant's signature:

Participant's name:

Participant Contact Details (if appropriate):

.....

Date:

Approved by the Auckland University of Technology Ethics Committee on 20th February 2017 AUTEK Reference number 17/13 and National Health Sciences Research Committee Reference Number.....



Appendix B4b: Assent form (Chichewa translated version)

Kwa ana osapitirira zaka makumi awiri, zisanu ndi chimodzi (16).

Mutu wa kafukufuku: Kufufuza za kadyedwe komwe kakukhudzana ndi matenda a shuga m'Malawi pogwiritsa ntchito zithunzi.

Woyang'anira kafukufuku: Dr Cath Conn

Mwini kafukufuku: McDonald William Nyalapa

- Ndawerenga ndi kumvetsa uthenga wokhudzana ndi kafukufukuyu omwe waperekedwa wolembedwa pa 8 November, m'chaka cha 2016.
- Ndakhala ndi mwayi wofunsa mafunso ndi kuyankhidwa.
- Ndamvetsetsa kuti mawu a mu zokambiranazi adzalembedwa nthawi ya zokambirana komanso adzatepedwa ndikulembedwanso.
- Ndamvetsetsa kuti kutenga nawo mbali mu kafukufukuyu ndi kosakakamiza komanso ndikhoza kutuluka mu kafukufukuyu kapena kusiyitsa ana anga kafukufukuyu nthawi iliyonse yomwe ndafuna opanda chilango chilichonse.
- Ndamvetsetsa kuti ndidzapatsidwa mwayi wosankha pakati pa kuchotsa mauthenga anga ozindikirika kapena kupitiriza kugwiritsa ntchito mauthenga angawa. Koma pa nthawi yomwe zotsatira za kafukufukuyu zatuluka, kudzakhala kovuta kufufuta mauthenga angawa.
- Ndavomera kutenga nawo mbali mu kafukufukuyu.

Sayini ya wotenga mbali:

Dzina la wotenga mbali:

Nambala ya lamy a wotenga mbali (ngati nkoyenera):

.....

Tsiku:

Yavomerezedwa ndi bungwe loona za kafukufuku wa zaumoyo pa sukullu ya AUT la AUTEK pa 20th February 2017 Nambala 17/13 komanso bungwe loona za kafukufuku wa zaumoyo muno m'Malawi la NHSRC Nambala.....

Appendix C: Confidentiality agreements

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Appendix C1a: Confidentiality Agreement

For someone transcribing data, e.g. audio-tapes of interviews.

Project title: *Exploring eating patterns associated with diabetes in Malawi using photovoice-based food diaries.*

Project Supervisor: *Dr Cath Conn*

Researcher: *McDonald William Nyalapa*

- ☐ I understand that all the material I will be asked to transcribe is confidential.
- ☐ I understand that the contents of the tapes or recordings can only be discussed with the researchers.
- ☐ I will not keep any copies of the transcripts nor allow third parties access to them.

Transcriber's signature:

Transcriber's name:

Transcriber's Contact Details (if appropriate):

.....

Date:

Approved by the Auckland University of Technology Ethics Committee on 20th February 2017 AUTEK Reference number 17/13 and National Health Sciences Research Committee Reference Number.....

Appendix C1b: Confidentiality agreement (Chichewa translated version)**Mgwirizano wa kusunga chinsisi***Kwa wolembe mauthenga otoleredwa, monga zokambirana zapagulu.***Mutu wa kafukufuku:** *Kufufuza za kadyedwe komwe kakukhudzana ndi matenda a shuga m'malawi***Woyanganira Kafukufuku:** *Dr Cath Conn***Mwini Kafukufuku:** *McDonald William Nyalapa*

- Ndamvetsetsa kuti zonse mawu onse omwe ndapemphedwa kulemba ndi achinsinsi.
- Ndamvetsetsa kuti ndikhoza kukambirana ndi mwini kafukufuku yekha pa za mawu omwe ajambulidwa.
- Sindidasunga chilichonse chokhudzana ndi zolembazi kapena kulola munthu wina kuti aone zolembazi.

Saini ya wolembe mawu:

Dzina la wolembe mawu:

Nambala ya lamy ya wolembe mawu (ngati nkoyenera):

.....

.....

.....

Tsiku:

Woyang'anira kafukufuku:

Dr Cath conn
 Senior Lecturer, Auckland University of Technology
 Phone: +64 9 921 9999
 E-mail: cath.conn@aut.ac.nz

Yavomerezedwa ndi bungwe loona za kafukufuku wa zaumoyo pa sukullu ya AUT la AUTEK
 pa 20 February 2017 Nambala 17/13 komanso bungwe loona za kafukufuku wa zaumoyo m'Malawi la
 NHSRC Nambala.....



Appendix C2a: Confidentiality agreement

For someone typing data, e.g. notes of interviews.

Project title: *Exploring eating patterns associated with diabetes in Malawi using photovoice-based food diaries.*

Project Supervisor: *Dr Cath Conn*

Researcher: *McDonald William Nyalapa*

- ☐ I understand that all the material I will be asked to type is confidential.
- ☐ I understand that the contents of the notes or recordings can only be discussed with the researchers.
- ☐ I will not keep any copies of the transcripts nor allow third parties access to them.

Typist's signature:

Typist's name:

Typist's Contact Details (if appropriate):

.....

Date:

Project Supervisor's Contact Details (if appropriate):

Dr Cath conn
 Senior Lecturer, Auckland University of Technology
 Phone: +64 9 921 9999
 E-mail: cath.conn@aut.ac.nz

Approved by the Auckland University of Technology Ethics Committee on 20th February 2017 AUTEK Reference number 17/13 and National Health Sciences Research Committee Reference Number.....



Appendix C2b: Confidentiality agreement (Chichewa translated version) Mgwirizano wa kusunga chinsisi

Kwa wolembe mauthenga otoleredwa (wotayipa), monga zokambirana zapagulu.

Mutu wa kafukufuku: *Kufufuza za kadyedwe komwe kakukhudzana ndi matenda a shuga m'Malawi*

Woyanganira Kafukufuku: *Dr Cath Conn*

Mwini Kafukufuku: *McDonald William Nyalapa*

- Ndamvetsetsa kuti zonse mawu onse omwe ndapemphedwa kulemba ndi achinsisi.
- Ndamvetsetsa kuti ndikhoza kukambirana ndi mwini kafukufuku yekha pa za mawu omwe ajambulidwa.
- Sindidasunga chilichonse chokhudzana ndi zolembazi kapena kulola munthu wina kuti aone zolembazi.

Saini ya wolembe mawu:

Dzina la wolembe mawu:

Nambala ya lamy ya wolembe mawu (ngati nkoyenera):

.....

Tsiku:

Woyang'anira kafukufukuyu:

Dr Cath conn
 Senior Lecturer, Auckland University of Technology
 Phone: +64 9 921 9999
 E-mail: cath.conn@aut.ac.nz

Yavomerezedwa ndi bungwe loona za kafukufuku wa zaumoyo pa sukullu ya AUT la AUTEK
 pa 20 February 2017 Nambala 17/13 komanso bungwe loona za kafukufuku wa zaumoyo m'Malawi la NHSRC
 Nambala.....



Appendix C3a: Confidentiality agreement

For an intermediary or research assistant.

Project title: *Exploring eating patterns associated with diabetes in Malawi using photovoice-based food diaries*

Project Supervisor: *Dr Cath Conn*

Researcher: *McDonald William Nyalapa*

- ☐ I understand that all the material I will be asked to record is confidential.
- ☐ I understand that the contents of the Consent Forms, tapes, or interview notes can only be discussed with the researchers.
- ☐ I will not keep any copies of the information nor allow third parties access to them.

Intermediary's signature:

Intermediary's name:

Intermediary's Contact Details (if appropriate):

.....

Date:

Project Supervisor's Contact Details (if appropriate):

Dr Cath conn
 Senior Lecturer, Auckland University of Technology
 Phone: +64 9 921 9999
 E-mail: cath.conn@aut.ac.nz

Approved by the Auckland University of Technology Ethics Committee on 20th February 2017 AUTEK Reference number 17/13 and the National Health Sciences Research Committee Reference Number.....

Appendix C3b: Confidentiality agreement (Chichewa translated version)

Mgwirizano wosunga chinsisi

Kwa wothandizira pa kafukufuku.



Mutu wa kafukufuku: *Kufufuza za kadyedwe komwe kakukhudzana ndi matenda a shuga m'malawi*

Woyanganira Kafukufuku: *Dr Cath Conn*

Mwini Kafukufuku: *McDonald William Nyalapa*

- Ndamvetsetsa kuti zonse mawu onse omwe ndapemphedwa kulemba ndi achinsinsi.
- Ndamvetsetsa kuti ndikhoza kukambirana ndi mwini kafukufuku yekha pa za mawu omwe ajambulidwa.
- Sindidasunga chilichonse chokhudzana ndi zolembazi kapena kulola munthu wina kuti aone zolembazi.

Saini ya wothandizira kafukufuku:

Dzina la wothandizira kafukufuku:

Nambala ya lamyā ya wothandizira kafukufuku (ngati nkoyenera):

.....

Tsiku:

Woyang'anira kafukufukuyu:

Dr Cath conn
 Senior Lecturer, Auckland University of Technology
 Phone: +64 9 921 9999
 E-mail: cath.conn@aut.ac.nz

Yavomerezedwa ndi bungwe loona za kafukufuku wa zaumoyo pa sukulu ya AUT la AUTEK pa 20 February 2017 Nambala 17/13 komanso bungwe loona za kafukufuku m'Malawi la NHSRC Reference Number.....

Appendix D: Notice

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Appendix D1: Poster



NOTICE

FOUR FAMILIES NEEDED FOR RESEARCH ON EATING PATTERNS ASSOCIATED WITH DIABETES

Are you a family living in Chigumula or Khwisa Village? We are looking for four volunteer families to participate in the 'eating patterns' research. As a participating family in this research, you would be asked to take pictures of the food you eat for four days and participate in a focus group discussion which will take approximately an hour and a half.

If you are interested, please contact the researcher,

[McDonald Nyalapa on 0884092002](tel:0884092002)

Thank you

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Appendix D2: Poster (Chichewa translated version)



CHIDZIWITSO

MAANJA ANAYI ODZIPEREKA AKUFUNIKA KUTI ATENGE NAWO MBALI MU KAFUKUFUKU WA ZAKUDYA

Kodi ndinu banja lochokera m' midzi ya Chigumula ndi Khwisa?

Tikufuna maanja anayi odzipereka kutenga nawo mbali mu kafukufuku yemwe cholinga chake ndi kufufuza zakudya zomwe zikuyambitsa matenda a shuga. Banja lili lonse limene lavomereza kutenga nawo mbali mu kafukufukuyu lidzafunsidwa kutola zithunzi za zakudya za pabanja pawo kwa masiku anayi. Pomaliza, banjalo lidzafunsidwa kutenga nawo mbali pa zokambirana kwa ola limodzi ndi mphindi makumi atatu.

Ngati muli osangalatsidwa kulowa nawo mu kafukufukuyu chonde yankhulani ndi mwini wa kafukufukuyu a **McDonald Nyalapa** pa **0884092002**.

ZIKOMO

Yavomerezedwa ndi bungwe loona za kafukufuku wa zaumoyo pa sukullu ya AUT la AUTEK pa 20 February 2017 Nambala 17/13 komanso bungwe loona za kafukufuku wa zaumoyo m' Malawi la NHSRC Nambala.....

Appendix E: Researcher safety protocol

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Appendix F: Reasearcher Safety Protocol

This study aims to explore eating patterns associated with diabetes in Malawi using photovoice-based food diaries and focus group discussion with four purposively selected families. The primary researcher will be required to interact with the families in their homes or at a preferred neutral venue, such as the church hall of Ntenjera Church in Blantyre, Malawi.

As part of the researcher safety protocol, the resarcher's brother, Douglas Nyalapa, can be contacted either by texting or calling on +265 888 343786 whenever necessary. He lives in the same community, therefore, he is the go-to-person when any safety issues arise. Also, the primary researcher's field supervisor, Assoc Prof Mercy Pindani, can be contacted on +265 1 751 486 in case of any safety issues.

Approved by the Auckland University of Technology Ethics Committee on 20th February 2017 AUTEK Reference number 17/13 and National Health Sciences Research Committee Reference Number.....

