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**An exploration of dietary practices and associated factors amongst
Ghanaians living in Europe**

By:

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“Tell me what you eat, and I will tell you who you are”

(Anthelme Brillat-Sarvarin, 1825)

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Declaration

I, Hibbah Araba Osei-Kwasi hereby declare that no part or whole of the work referred to in this thesis has been submitted to any other University or institution of learning other than the University of Sheffield, for the purpose of award of an academic degree or any qualification of that sort.

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Abstract

Background: Migration from low to high-income countries is associated with dietary change, but the particular patterns of dietary change and the mechanisms underlying such change are poorly understood. This research seeks to explore dietary practices and associated factors amongst people of Ghanaian descent living in Europe.

Methods: This PhD consists of three studies: a systematic mapping review of factors influencing dietary behaviour of ethnic minority groups in Europe more generally, followed by an empirical, mixed method study amongst people of Ghanaian descent living in Europe. The mixed methods study comprised qualitative in-depth interviews focussing on the experiences of participants living in Greater Manchester and secondary data analysis from a larger European study.

Results: The mapping review identified a broad range of factors that influence dietary behaviours among ethnic minority groups that were sorted into seven clusters. The mixed method study showed bicultural dietary patterns were discernible among people of Ghanaian descent living in different European settings. In the qualitative study, three sets of dietary practices emerged amongst participants living in Greater Manchester. The three dietary practices reflected varying degrees of continuity or change from traditional Ghanaian dietary practices. The importance that participants associated with cultural identity, having Ghanaian social networks and the availability of ethnic shops in the UK were crucial in maintaining traditional dietary practices. Important factors that increased the likelihood of adopting UK dietary practices were being a second-generation migrant, having non-Ghanaian social networks and having a busy lifestyle. Analysis of secondary data showed differences between the dietary intake of Ghanaians living in Ghana and Ghanaians living in Europe; an indication of dietary change following migration. However, the quantitative secondary data analysis failed to find consistent evidence for the role of acculturation in dietary change amongst people of Ghanaian descent living in Europe based on the measures applied in this PhD. Furthermore, the study gave limited support to the differential changes in diet suggested by the predominant model for dietary pattern changes following migration.

Conclusion: This PhD provides insights on the complexity of change in dietary practices following migration, indicating that it is not a linear process and it is dependent on several inter-related factors. The typologies of dietary practices and clusters of factors identified in this PhD offers a way for nutrition researchers and practitioners to understand the complexity of dietary change amongst West African migrants.

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Glossary

Table: Definition of frequently-used key concepts in the thesis

Terms/ acronym	Definition
Acculturation	Acculturation is described as a process by which migrant groups adopt cultural patterns, including language, beliefs of the country (host population) they migrate to (Satia-Abouta et al., 2002). Acculturation is simply referred to as cultural change following migration.
Dietary acculturation	Dietary acculturation is a process that occurs when migrant origin groups adopt dietary behaviours of the majority population [often the host country] (Satia-Abouta et al., 2002).
Dietary behaviours	The manner in which an individual acts or performs in relation to diet. This includes food choice, eating behaviour and dietary intake (Stok et al., 2016).
Dietary intake	Dietary intake consists of all foods consumed or outcomes related to what is consumed, e.g. fruits and vegetable intake and healthy versus unhealthy.
Determinant	A determinant is factor that has a demonstrated causal relationship with an outcome such as behaviour or health (DEDIPAC KH 2013).
Eating behaviour	This comprises outcomes to do with the actual act of eating (e.g. dieting and food neophobia) (Stok et al., 2016).
Ethnic group	An ethnic group is defined as a group that has a shared history, ancestry, and identity, and that shares characteristics such as a geographical affiliation, culture and traditions, language, and religious tradition (Stronks et al., 2013).

Factors	Anything (circumstance, influence or fact) that has a relationship with a behaviour (DEDIPAC KH, 2013).
Food choice	This consists of outcomes preceding the actual consumption (e.g. produce purchase and intentions) (Stok et al., 2016).
Food security	According to Food and Agriculture organisation, “Food security exists when people at all times have physical and economic access to sufficient, affordable, safe and nutritious food for a healthy life, and the security of knowing that this access is sustainable in the future” (FAO, 1996).
Migrant	A migrant is defined by the UN as “a person who moves to a country other than that of his or usual residence for a period of at least a year” (UNDESA, 1998).
Social network	A network of personal relationships and interactions.
Traditional diet	Diets that are thought to be particular to a migrant’s country of origin.

List of Abbreviations and Acronyms

BMI	Body Mass Index
DASH	Determinants of Adolescent well-being and Health
HABITS	Health and Behaviour in Teenagers Study
HSE	Health Survey for England
LCFS	Living Costs and Food survey
LIDNS	Low-Income Diet and Nutrition Survey
LMIC	Low and middle-income countries
NR-NCDs	Nutrition-related non-communicable diseases

SES	Socio-economic status
SSA	Sub-Saharan Africa
SIID	Sheffield Institute for International Development
T2D	Type II diabetes
NCMP	The National Child Measurement Programme
WHO	World Health Organisation

Publications from this PhD

- **Osei-Kwasi, H.A.,** Powell, K., Nicolaou, M. and Holdsworth, M. The influence of migration on dietary practices of Ghanaians living in the United Kingdom: A qualitative study. *Annals of Human Biology*, 2017. 44 (5): 454-463.
- **Osei-Kwasi, H.A,** M. Nicolaou, K. Powell, L. Terragni, L. Maes, K. Stronks, Holdsworth, M. Systematic mapping review of the factors influencing dietary behaviour in ethnic minority groups living in Europe: a DEDIPAC study. *International Journal of Behavioural Nutrition and Physical Activity*, 2016. 13 (1): 85. Available at <https://doi.org/10.1186/s12966-016-0412-8>
- **Osei-Kwasi, H.A,** Nicolaou, M. K. Powell, Holdsworth, M. “*I cannot sit here and eat alone when I know a fellow Ghanaian is suffering*”: *Perceptions of food insecurity and social support amongst Ghanaian migrants living in the UK* (in preparation).
- **Osei-Kwasi, H.A,** K. Powell, Holdsworth, M, M. Nicolaou. Acculturation and food intake amongst Ghanaian migrants living in Europe: Findings from the RODAM study (in preparation).

Presentation in Conferences

- **Osei-Kwasi H.A,** Nicolaou M, Powell K, Holdsworth M. Dietary Acculturation amongst Ghanaians Living in Greater Manchester, UK, 7th African Nutrition Epidemiology Conference (ANEC VII), Marrakech, Morocco. 2016.
- **Saeed, H.A,** Nicolaou, M, Powell, K, Holdsworth, M. Food insecurity and social support among Ghanaians living in Manchester, UK: A qualitative study. 2016. 6th European Conference on Migrant and Ethnic Minority Health, June, Oslo (Norway), abstract book p109.

- **Saeed H.A**, Nicolaou M, Powell K, Holdsworth M. Food insecurity and social support among Ghanaians living in Manchester, UK: A qualitative study” at the Sheffield Institute for International Development Postgraduate Research Conference. 2016.
- **Saeed H.A**, Nicolaou M, Powell K, Terragni L, Maes L, Stronks K , Holdsworth M. The determinants of dietary behaviours in minority ethnic groups in Europe: A systematic mapping review. Sheffield Institute for International Development Postgraduate Conference. 2015.
- **Osei-Kwasi, H.A**, Nicolaou, M. K. Powell, Holdsworth, M. *“I cannot sit here and eat alone when I know a fellow Ghanaian is suffering”* (to be presented at IUNS 21st International Congress of Nutrition. October 2017).

Blogs

- Perceptions of food insecurity among Ghanaians living in Greater Manchester Available at <http://siid.group.shef.ac.uk/blog/4431/>
- Determinants of dietary behaviour among Ghanaians living in the UK. Available at <http://scharr-ejournal.blogspot.co.uk/2014/08/socio-ecological-determinants-of.html>

PREFACE- a personal reflection

As a Nutritionist, I have always been interested in people's dietary behaviours, however, my recent research interest in dietary practices of migrant –origin groups developed after my two-year stay in Belgium for my Master's programme and also the few times I visited the UK prior to starting my PhD. I was astonished to see the cultural diversity in Belgium and the UK. I, therefore, developed an interest in reading articles about migrant-origin groups living in high-income countries. The literature confirmed my personal observation of a high prevalence of obesity among African populations living in the UK. Surprisingly I found a plethora of articles describing the higher prevalence of obesity and diabetes of some ethnic minority groups especially South Asians living in Europe. There were a few articles on prevalence overweight/obesity and hypertension among Ghanaians living in the Netherlands. However, I could not locate a single article that explored diet as a determinant of obesity and dietary behaviours more generally amongst Ghanaian populations living in Europe, although Ghanaians form one of the largest African populations in the UK. My initial idea was to do an explorative study into the diets of Ghanaians living in the UK, to understand how that impacts on obesity. My focus on diet is because it is a known key determinant of obesity. A few months into my PhD I realised that there was an EU project (RODAM) that had just begun to explore Ghanaian diets and some factors that may be associated with lifestyle behaviours among Ghanaians living in three European countries, including the UK. After reading the protocol for the RODAM project and from consultations with my supervisors, I decided to focus my PhD on dietary practices and associated factors amongst Ghanaians living in Europe.

Final reflections: The research process has been both academically and socially fulfilling. It has allowed me to contribute to the current debate and understanding of the role of migration on dietary practices of migrant-origin groups from Ghana, which has provided insights for future interventions amongst this group. My own position as a Ghanaian migrant allowed me to appreciate the complexities of multiple influences on the dietary behaviour of migrants.

Organisation of the thesis

This thesis is organised into six chapters. Chapter 1 situates the research within the context of existing knowledge about migration, nutrition-related non-communicable diseases (NR-NCDs) and dietary behaviours. Known factors associated with dietary behaviours of migrant-origin groups such as socio-economic status, social networks, food insecurity and acculturation are discussed, and frameworks that explain dietary acculturation amongst migrant groups are also presented. This is followed by an overview of Ghanaians living in Ghana and Europe. The study rationale, research question and study objectives are outlined after the background literature.

Chapter 2 presents a systematic review (study 1). It presents the methodology, findings and discussion of a systematic mapping review conducted to answer the research question: what factors influence dietary behaviours among ethnic minority groups living in Europe? Given the limited body of literature relating to people of Ghanaian descent living in Europe specifically, this question was relevant to identify explanations that have been developed so far to explain dietary behaviours of ethnic minority groups living in Europe in a broad sense.

Chapter 3 describes the mixed method approach used in this PhD. A justification for the mixed method approach and the epistemological viewpoint underlying this method is provided. The research design for the qualitative and quantitative components of the study is described in this chapter, as well as the strengths and limitations of the methodological choices made. Chapter 4 presents the findings and discussion from the qualitative study of the PhD (study 2) that focused specifically on dietary practices of people of Ghanaian descent living in Greater Manchester. Chapter 5 presents the results of the quantitative component of the PhD (study 3) focused on secondary data analysis from a larger European study. The findings are also discussed and compared with existing literature. Chapter 6 presents the integration of the quantitative and qualitative findings of this PhD. This comprises an integrated discussion based on the findings of all three studies. The theoretical contributions, limitations and strengths of the study, implications for research, practice and policy are presented at the end of the chapter. Interview guides, supplementary results, ethics applications and other relevant documents are attached as appendices.

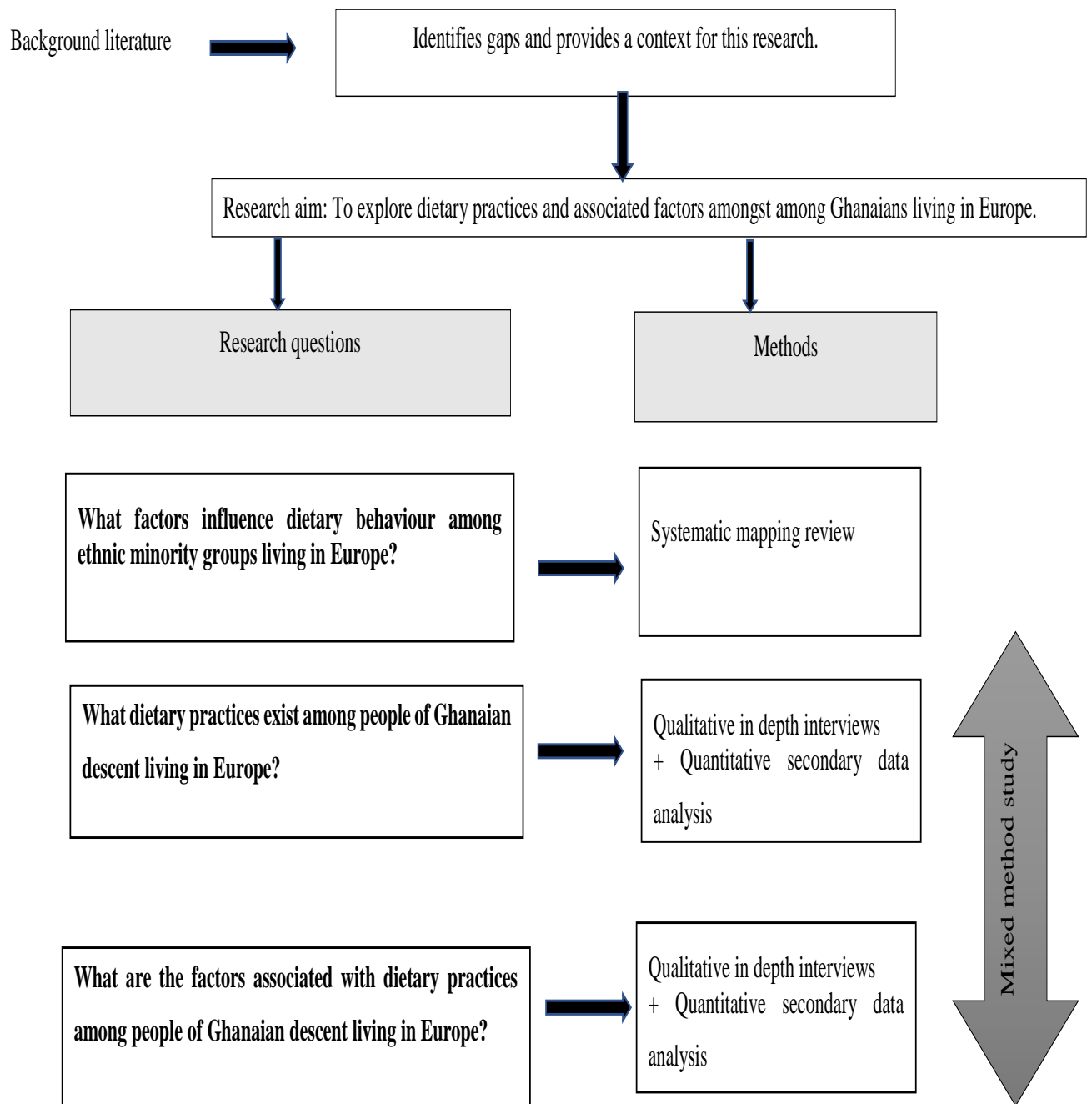


Figure 1: Framework of PhD

Clarifying terms used in this PhD

This section presents the conceptual definition of key terms and concepts related to diet and ethnicity used throughout this thesis. ‘Dietary behaviours’ as used in this PhD refers to the manner in which an individual act or performs in relation to diet (Stok et al., 2016). It encompasses all food related behaviours. This includes: 1. food choice which consists of outcomes preceding the actual consumption (e.g. produce purchase/shopping and intentions); 2. Eating behaviour, comprising outcomes to do with the actual act of eating (e.g. dieting and food neophobia); and 3. Dietary intake consisting of all outcomes related to what is consumed. In the systematic mapping review, the specific outcome of the study is dietary behaviour.

The term ‘dietary practices’ falls under dietary behaviours and refers here to characterisation of meals according: (1) format (e.g. types of food combinations); (2) structure and patterning (e.g. frequency of spacing, regularity and skipping); (3) context (e.g. eating with others or family, eating at/out of home) (Leech et al., 2015). This framework for characterising meals was based on a review of the literature on how adults’ meal patterns have been previously defined. Dietary practices as used in this PhD also considers not only what foods are consumed, where, how and with whom to eat food but also where to buy ingredients from and how to prepare and serve food (Tuomainen, 2006). In the qualitative study, the specific outcome is dietary practices.

‘Dietary intake’ consists of all outcomes related to what is consumed (e.g. fruits and vegetable intake and healthy versus unhealthy). In this PhD, dietary intake is synonymous with the meal format and diet. In the quantitative secondary data analysis, the specific outcome is dietary intake.

In the background chapter, the literature presented mainly referred to migrant origin-groups which consist of recent migrants and populations that might have settled for several generations in Europe while in chapter two, the focus is on ethnic minority groups broadly. Ethnic minority group as used in this PhD refers mainly to migrant-origin groups but also indigenous population

living in Europe. While the focus of this PhD is on change following migration, it was relevant to undertake a literature review which looked at broader groups.

In the mixed methods study, however, the research focused on a more recent homogenous migrant –origin group (first and second-generation migrants), i.e. Ghanaians living in Greater Manchester for the qualitative study and Ghanaians living three European cities (Amsterdam, Berlin and London) in the quantitative secondary data analysis. Migrant-origin groups from Ghana is used synonymously with people of Ghanaian descent in this PhD.

1 Background to the study

Introduction

The aim of this chapter is to provide the background and rationale for the PhD. The background provides a context for this research. The chapter begins by discussing the nature of the public health problem investigated in this study and explains why there is the need for more research on this problem, i.e. the importance of dietary behaviour as a determinant of health among migrants – particularly in relation to nutrition-related non-communicable diseases (NR-NCDs). The next section discusses dietary behaviours among migrant-origin groups in the UK, drawing on relevant frameworks that have been developed to account for observed patterns of dietary behaviour. This is followed by an overview of the Ghanaian dietary context - the country, culture, nutrition and dietary patterns and a summary of the social and economic context of Ghanaian migrants in the UK. The chapter concludes by presenting the study rationale, research questions and objectives.

1.1 Migration and nutrition- related non-communicable diseases (NR-NCDs)

Migrant groups who move from low to high-income countries experience higher levels of NR-NCDs than host populations. The prevalence varies among different migrant- groups and there are important differences by gender. For example, one study found that the prevalence of type II diabetes (T2D) in North West Europe was about three times higher in people of Moroccan and Turkish origin compared to indigenous populations (Uitewaal et al., 2004). In the UK, Black African women have been found to have higher rates of obesity compared with other ethnic minority groups, and the general UK population (Gatineau and Mathrani, 2011). The prevalence of NR-NCDs are not only higher compared to host country populations, but there is also an increased risk among migrants compared to their non-migrant compatriots living in their country of origin. For instance, findings from a study to assess differences between overweight and obesity among Ghanaians living in the Netherlands and Ghanaians living in Ghana, reported the prevalence of obesity and overweight was much higher (79.5%) in the

Netherlands as compared to urban Ghanaians (50%) and rural Ghanaians (19%) living in Ghana (Agyemang et al., 2009). More recent evidence also shows that there are high risks of obesity and type II diabetes (T2D) among migrants from Ghana living in Europe compared to their compatriots living in Ghana (Agyemang et al., 2016). While there is routine data on the health of the majority population in all European countries, routine data on migrants' health, particularly at a large scale, is limited (Jayaweera, 2011). The most recent data on adult obesity broken down by ethnic groups are available from the Health Survey for England, (HSE) 2004, a robust data set that includes a significant sample of individuals from migrant-origin backgrounds (Gatineau and Mathrani, 2011). According to the study, obesity prevalence in women appears to be higher among Black African (38%), Black Caribbean (32%) and Pakistani (28%) groups when compared to women in the general population (23%). Chinese women had the lowest prevalence of obesity (7.6%) (Gatineau and Mathrani, 2011). Among men, however, the picture was different as obesity was lower for men from Black African, Indian, Pakistani, Bangladeshi and Chinese communities when compared to the general population. **Figure 2** shows the prevalence of obesity by ethnic groups in the UK.

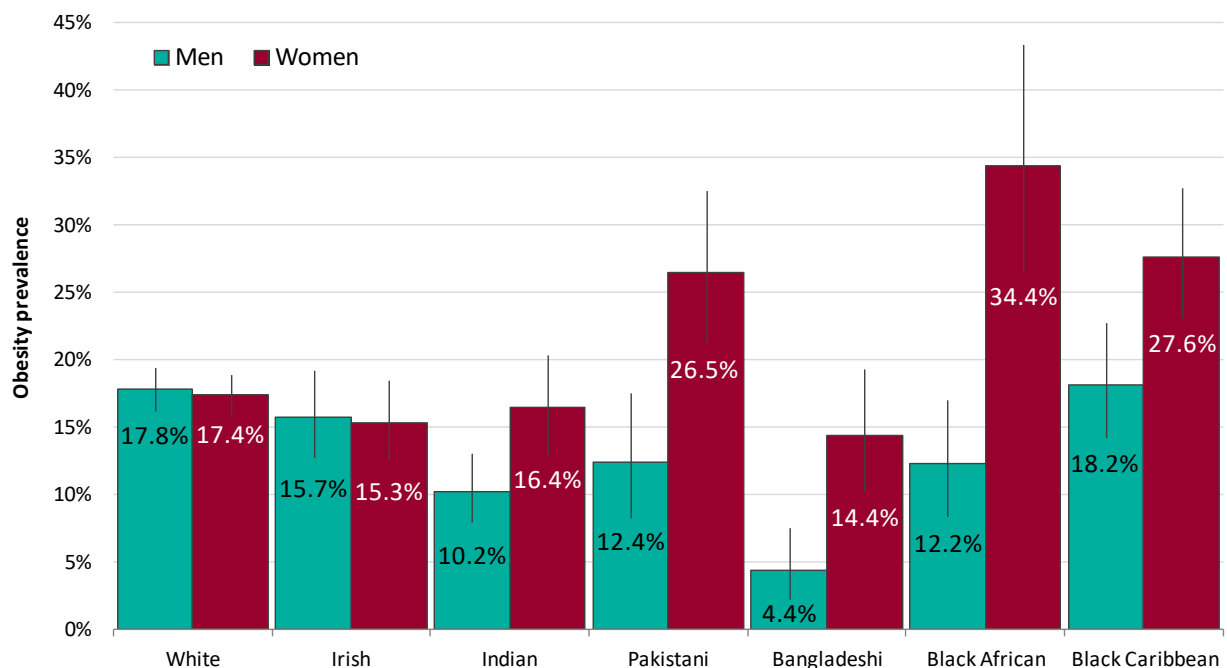


Figure 2: Adult obesity prevalence by ethnic group in the UK (HSE, 2004)

As with the obesity prevalence in adults, the trends appear to be similar among children. The National Child Measurement Programme (NCMP) is the most robust dataset on childhood obesity in the UK (Ridler et al., 2009). It measures weight and height of children (4-5 years) attending state primary schools and children in year 6 (10-11 years) and compares the measures to BMI centile charts developed for children and adolescents. Between 4-5 years old, obesity prevalence from the NCMP 2008/2009 showed that obesity was higher for both boys (18%) and girls (16%) from Black African and Black other ethnic groups and boys from the Bangladeshi ethnic group (15%) as compared to the White British population of boys (9.6%) and girls (8.6%) (Ridler et al., 2009). Two longitudinal studies on adolescents aged 10-16 years showed a similar prevalence to that of the NCMP study. These studies are the Health and Behaviour in Teenagers Study- HABITS (Wardle et al., 2006) and the MRC Determinants of Adolescent well-being and Health (DASH) (Harding et al. 2007). Overweight and obesity was more prevalent among Black girls (Black African and Black Caribbean); almost double that of white girls (Harding et al., 2008a). Although the prevalence of obesity varies between different population groups, the data presented above provide an indication that in the UK, the Netherlands and other European countries obesity is particularly a burden for some migrant-origin populations.

1.2 Role of dietary behaviours in NR-NCDs

As a response to the rising burden of NR- NCDs, the World Health Organisation (WHO) has responded with the “Global Strategy on Diet, Physical Activity and Health” (Samuelson, 2004) and the “Global Action Plan for the Prevention and Control of NCDs” (WHO, 2013). These strategies focus on prevention and target underlying modifiable behaviours like dietary behaviours and social determinants through the creation of healthier environments (Gissing et al., 2017). In addition, several studies have underlined the important role of dietary factors in the obesity epidemic and its prevention (Landman and Cruickshank, 2001, Palou and Bonet, 2013). Until more recently, the research focus was on the study of specific nutrients or foods in understanding the aetiology of obesity, but this has shifted towards how overall dietary behaviours (which is defined as the manner in which an individual act or performs in relation to diet) can lead to obesity (Thomas, 2001, Butland et al., 2007). Studies have shown that energy density and portion size of foods are two dietary risk factors for obesity (Thomas, 2001). Understanding the role of dietary factors in the development of obesity is crucial because it

helps inform strategies to reduce weight which includes encouraging less energy dense foods, increasing certain foods, as well as education on relevant portion sizes (Thomas, 2001). Recent studies into the drivers of dietary behaviours aims to identify the root causes of these behaviours in order to produce priority areas for policy (Kraak et al., 2014).

Migration from low to high-income countries is associated with environmental and lifestyle changes. These lifestyle changes include variations in diet (Satia-Abouta et al., 2002), some of which can be positive or negative. There is also the assumption that traditional diet (that is diets that are thought to be particular to a migrant's country of origin) is healthy and with migration it becomes unhealthy (Khunti et al., 2008, Raberg Kjollesdal et al., 2010) (see section on dietary acculturation). Research has established a range of factors associated with dietary behaviours among the general population (Leung and Stanner, 2011). These factors have been described as influencing behaviour at the individual, societal or national level (Webster-Gandy et al., 2011). However, factors influencing dietary behaviours of migrant-origin groups are not well understood.

Studies have shown that migration plays a role in dietary behaviours of migrants and this is usually assessed by investigating changes in traditional diets. This process of change from traditional to new patterns of diet is often referred to as dietary acculturation (Satia-Abouta et al., 2002). Like many other high-income populations, dietary behaviours among UK populations and other Western European populations have been studied extensively. However, because of the considerable variations in dietary behaviours across and within different migrant-origin groups (Gatineau and Mathrani, 2011) research tools that are used in high-income countries and usually developed for the host population may not be suitable for migrant-origin groups (Stronks, 2003) because of differences in for instance, diet and language use. This may partly account for the gap in knowledge related to the dietary behaviours of some migrant –origin groups including the Ghanaian population. In the UK, the Low-Income Diet and Nutrition Survey (LIDNS) investigated the diet and nutrient intake of low income populations (Nelson et al., 2007) and a small amount of data is available on ethnic minority populations. However, the sample size maybe insufficient to allow robust sub-group analysis (Leung and Stanner, 2011). The family Food Survey (Defra, 2008) also contains some data on ethnic minority populations to estimate consumption levels but uses a methodology based on household food purchases to estimate food consumption (Leung and Stanner, 2011). Household purchases may not account or usual and habitual dietary intake, like other diet

assessment methods would (e.g. 24-hour recall and food frequency questionnaires). Within the limited research conducted on migrant-origin groups in the UK and other countries in Europe, most studies have focused either on a selected number of migrant-origin groups (Sharma et al., 1999, Mennen et al., 2001, Sanghera et al., 2003) or are limited to specific European countries (Nicolaou et al., 2004, Earland et al., 2010). For instance, research in the UK has focused on South Asians (Kassam-Khamis et al., 2000, Ellahi, 2014) and African Caribbeans (Earland et al., 2010) and in the Netherlands the focus has been on Surinamese (Nicolaou et al., 2006, Kohinor et al., 2011). This focus is also reflected in reviews of dietary behaviours; a 2008 review focused specifically on dietary change among the largest migrant-origin groups in Europe (Gilbert and Khokhar, 2008), while two reviews focused only on migrant-groups in the UK (Leung and Stanner, 2011) and France (Darmon and Khlal, 2001). Findings from these studies have shown that the traditional diets of first-generation migrant populations are well balanced with high fibre and low saturated fats. However, these population groups tend to adopt other eating habits found in Europe, while maintaining some of their traditional foods (Thomas, 2001). It is also reported that dietary behaviours of migrant-origin populations over the years becomes unhealthy as healthy components of traditional diets are replaced by convenient processed foods and less healthy foods in the UK, which contributes to obesity risk (Gilbert, 2008, Gatineau and Mathrani, 2011a). Given the rising levels of NR-NCDs among migrants and the role that diet plays as one of its determinants, a clear understanding of the influence of migration on dietary behaviours of immigrants is needed to be able to design culturally sensitive preventive interventions. The next sections briefly discuss some issues relevant to understanding dietary behaviours amongst migrant-origin groups.

1.3 Factors influencing dietary behaviours

Differences in dietary behaviours between ethnic groups and/or between migrants and the host population are well documented (Mejean et al., 2007, Raza et al., 2016). The wide variations in dietary behaviours among and within different migrant groups compared to host populations (Leung and Stanner, 2011), is an indicator that factors influencing dietary behaviour are likely to differ among migrant-origin groups (Satia-Abouta et al., 2002) due to the differences in factors such as social networks, socio-economic status (SES) and acculturation level among migrant-origin groups (Jonsson et al., 2002a, Roberts et al., 2013). However, there is a lack of insight into the broad range of factors influencing dietary behaviour among migrant-origin in

Europe. In addition, there has been little attempt to study factors influencing dietary behaviour in a holistic way. In the obesity foresight map (Butland et al., 2007) for instance, the complexity of factors influencing dietary behaviours are illustrated, but this was not prepared through the lens of migrant-origin groups.

1.4 Migration and identity

Dietary behaviours together with other cultural and social traits like language reflect cultural and ethnic identity (Almerico, 2014.) The relationship between dietary intake and identity was first published in the 19th century, when Jean –Anthelme Brillat-Sarvarin (1825), wrote “*Tell me what you eat, and I will tell you who you are*” (Delormier et al., 2009). To survive we need to eat, but food is more than a source of nutrients required for growth and well-being (Panayi, 2008). The phrase: “*you are what you eat*” can refer to issues of ethnicity and also health (Panayi, 2008). For example, among certain religious groups diet might be an indicator of the extent to which people conform to religious prescriptions.

Studies have shown that dietary behaviours are one of the last cultural traits to change in the context of migration (Charon Cardona, 2004) indicating that amongst migrant-origin groups the diet might have extra significance because of the association with identity. Hence dietary behaviour can be a signifier of belonging or difference (Tuomainen, 2006). While research about the relationship between migration and dietary behaviours from low to high income countries is still in its infancy (Panayi, 2008), within the limited dietary research in the UK, the focus has been on the nutritional quality of the diet, which often uses quantitative dietary assessment methods (Tuomainen, 2006).

1.5 Socio-economic status (SES) and dietary behaviours

SES is a known driver of dietary behaviours (Roberts et al., 2013, Gilbert and Khokhar, 2008). Populations of lower SES based on educational level in particular and income tend to have less healthy eating habits compared with populations of higher SES (Roberts et al., 2013) in high income countries. There is some indication that adults from higher income quintiles are more likely to adhere to the recommendations of eating at least five portions of fruits and vegetables as compared to adults in low income quintile (Roberts et al., 2013). Lower income is shown to

restrict food choices, thus compelling the consumption of poorer quality of foods (Gilbert and Khokhar, 2008). Most migrant-origin groups tend to have higher levels of poverty than the majority population, (Platt, 2009) and tend to engage in lower paid jobs (Kassam-Khamis et al., 2000). The literature shows that Black Africans in the UK tend to engage in low paying jobs. Some of them have to engage in two jobs and work for many hours (Herbert et al., 2006). Income is shown to be a significant determinant on dietary behaviour and because unhealthy foods (high in fats and sugars) tend to be cheaper than healthy foods (Drewnowski and Specter, 2004.), migrant population may be susceptible to consuming unhealthy foods. The Living Costs and Food Survey showed that, when food prices rose in 2007, low income households were the hardest hit (Roberts et al., 2013), limiting their access to healthy foods. Access to healthy foods is one of the key dimensions that describes food security. From an economic point of view, access to food is influenced by purchasing power, and purchasing power is a function of household income and the food environment (Rose, 2010). The potential vulnerability of migrant-origin groups to food insecurity justifies the need for research exploring food insecurity amongst migrant-origin populations, thus the next section discusses food insecurity and its association with dietary behaviours.

1.6 Food insecurity and dietary behaviours

Research evidence indicates migrant –origin household have a high prevalence of food insecurity (Chilton et al., 2009, Hadley and Sellen, 2006). Food insecurity is an important concept because it may result in unhealthy dietary behaviours (Rose, 2010). Food insecurity is also associated with some poor health conditions, including hypertension, hyperlipidaemia (Seligman et al., 2010) and poor socio-emotional health status (Vozoris and Tarasuk, 2003). Food security is a concept that developed in low-income countries, but it is now recognised as an important concept in high-income countries as well (Pilgrim et al., 2012). According to the Food and Agriculture Organization (FAO), Food security at a minimum includes: the readily availability of nutritious, adequate and safe foods and the assured ability to acquire acceptable foods or preferred foods in a socially acceptable way (FAO, 1996). This definition emphasises multidimensionality and has established the four pillars of food security as availability, accessibility, utilisation and stability (Pangaribowo et al., 2013, Renzaho et al., 2010). The components are hierarchical, with availability necessary but not sufficient to ensure access, and

accessibility necessary but not sufficient for effective utilisation. If one of these conditions is not met, food insecurity is said to exist (Webb et al., 2006).

Most published work on food insecurity in high-income countries come from the United States (US), Canada and Australia (Carlson et al., 1999, Kirkpatrick and Tarasuk, 2008, Foley et al., 2010). Findings from the US shows that households at highest risk of food insecurity include migrant-origin groups, for instance Black people and Latinos (Dhokarh et al., 2011). Additionally, it has been reported that non-US born families have been found to be more prone to food insecurity than native-born families (Chilton et al., 2009, Hadley and Sellen, 2006). Though limited in number, studies on food insecurity situation of migrants from sub-Saharan Africa (SSA) have focused on specific migrant groups, for instance, refugees and asylum seekers from Liberia and Somalia living in the US, in which a high prevalence of food insecurity was reported (Dhokarh et al., 2011, Hadley and Sellen, 2006). In the United Kingdom (UK), the Low-Income Diet and Nutrition Survey (LIDNS) was the most comprehensive survey to investigate dietary behaviours and nutritional status of materially deprived of the UK population. It found almost a third of families were food insecure (Nelson et al., 2007). However, this survey did not specifically consider migrant –origin groups. Thus, there is a lack of insight into food insecurity situation amongst migrant-origin groups in the UK.

1.7 The role of social network on dietary behaviours

There is some evidence to suggest that social networks influence dietary behaviours among migrant-origin groups. One of the explanations for this observation is the social transmission of eating behaviours whereby a strong relationship exists between the social construct and amount or types of food eaten (Robinson et al., 2014). Individuals tend to eat according to the usual company they find themselves, either in terms of quantity or types of food eaten (Powell et al., 2015). Social psychology has shown that human beings tend to use other people's behaviours as a measure to guide their own behaviours (Deutsch and Gerard, 1955). Thus, it is possible that people use eating behaviours of others to guide their behaviours, such that if one feels that another person is eating healthy or unhealthy foods, this could influence one's decision of food choice (Robinson et al., 2014).

Patricia Crotty (1993) explains that nutrition as a scientific discipline often gives limited attention to the social nature of dietary intake (Crotty, 1993). Disciplines such as public health nutrition and dietetics tend to mainly focus on the impact of dietary behaviours on nutrition. Like the theories that underlie nutrition counselling, theories that underlie dietary change interventions such as the theory of reasoned action (Glanz and Bishop, 2010), social cognitive theory (Bandura, 1986) and the transtheoretical model (Prochaska and DiClemente, 1982) are used to explain individual food choices and dietary behaviours. The main challenge with studying dietary behaviours under the control of an individual, is that it tends to exaggerate the extent to which rational choice drives dietary behaviours and underestimate the extent to which eating is embedded in our daily lives (Delormier et al., 2009), cultural and social context.

Understanding the role of social networks in dietary behaviours as a modifiable determinant of obesity can be a great potential for nutrition intervention (Landman and Cruickshank, 2001).

1.8 Theories of dietary behaviour among ethnic minority groups

Some theories dominate explanations for dietary practices among migrants. The next sections briefly discuss these theories.

1.8.1 The socio-ecological model of health

The socio-ecological model of health emphasises and explores the role of social determinants in the emergence of NR-NCDs, and this has been used to explain a range of health behaviours among different migrant population groups, including dietary behaviours (Chastin et al., 2015). This approach to understanding health behaviour was developed in the social science discipline and adapted in public health (Tinker, 2005). The basic premise of the socio-ecological model of health is that behaviour is influenced by a complex web of factors at multiple social levels (e.g. individual, social, physical, or macro); therefore, we need to identify factors operating at a range of levels to understand behaviour (Crosby et al., 2011). The socio-ecological model of health involves looking beyond the individual level because the individual is embedded in the environment and the environment has a substantial influence on the individual's behaviour (Crosby et al., 2011). Furthermore, the socio-ecological model posits that health is influenced not only by an individual's actions and characteristics but also factors outside the individual and the interaction between these factors and the individual (Tinker, 2005). Some variations of

the socio-ecological model of health have been developed however all these models share similar elements that are described below:

Table 1: Common elements within socio- ecological models of health

Common elements shared by socio-ecological models	Description and examples
Intrapersonal factors- characteristics of a person that affect dietary behaviour. It also includes developmental history of a person (Crosby et al., 2011, Tinker, 2005)	Attitudes, skills, perception knowledge e.g. perceived barriers and benefits of dietary change, knowledge related to nutrition, intention to eat healthy foods, taste preference, skills for food preparation There are several theories to explain the effect of intrapersonal factors on dietary behaviour. They include the Health Belief Model, the Theory of planned Behaviour and the Social Cognitive Behaviour
Social and cultural environments – this refers to the interactions that people have with family, friends and institutions.	Social networks including family, friends and co-workers. Also, churches, schools, work environment.
Physical environment- this refers to the physical structures that influence what is eaten (Tinker, 2005).	Availability of foods that is an influence by climate, geography, restaurants and fast food outlets in the neighbourhood
Macro environment –this refers to the external and uncontrollable factors on a person	Norms and values: cultural beliefs, religion, food prices, food marketing & media, taxation, economic development

The main challenge with using this approach is that the socio-ecological model presents different layers of influence, but fails to show how the influences are interrelated, with an underlying assumption that some determinants are more proximal, and that that wider societal factors influence individual behaviours but not vice versa (Carey, 2015). Thus, community factors are presumed to influence the individual via the family, whereas certain community factors may directly influence dietary choices, bypassing the family. Also, the socio-ecological model depicts reality as artificially separating individual and social experiences. As, this PhD aims to explore the underlying mechanisms that shape dietary behaviours, a more holistic approach which involves clustering of factors according to how they are seen to relate to each other is used. Clustering of factors was perceived as a more adequate way to depict interrelationships between factors (see chapter 2). This is in line with recent work that seeks to understand dietary choice as a social practice (Blue et al., 2016).

1.8.2 Acculturation

Culture is defined as “a set of guidelines (both explicit and implicit) that individuals inherit as members of a particular society and that tells them how to view the world; how to experience it emotionally; and how to behave in it in relation to other people, to supernatural forces or gods, and to the natural environment” (Helman, 2007; p.117). This also provides them with a way of transmitting these guidelines to the next generation- using symbols, language, art and ritual (Helman, 2007).

Acculturation refers to cultural (e.g. beliefs, language, religion) changes that result when a group migrates to a new setting (Satia-Abouta et al., 2002). Acculturation is often operationalised/represented as cultural change (Hunt et al., 2004); thus, there are various measures used in the literature to depict acculturation. This is unsurprising given that culture is very broad and complex. Theories of acculturation have been deployed to explain changes in health behaviours among migrant-origin groups. Numerous social scientists have proposed acculturation theories to explain the process of change in traditional culture resulting in an evolution regarding thinking about acculturation. One of the common theories was proposed by Park (1928), in which he suggested a linear process where loss of traditional culture occurs over time as an immigrant settles/integrates into a new culture. This unidimensional perspective of acculturation is criticised for not capturing the bi-dimensional changes that occur when individuals from different cultural and social backgrounds interact (Hunt et al., 2004, Abraído-Lanza et al., 2006). Unidimensional proxies of acculturation however tend to be easy, quick and simple to use (Sturkenboom et al., 2016). The most common indexes of acculturation used in the health literature include generation status, residence duration in the host country and language proficiency (Thomson and Hoffman-Goetz 2009).

Recent theories posit orthogonal relations between the original and the new culture (Berry, 2003) which results in different orientations such as biculturalism-a situation where individuals adapt to the host culture without losing their attachment to the culture of origin (Berry, 2003).

Acculturation strategies from the bi-dimensional perspective have been grouped into four domains (**Figure 3**): integration, assimilation, separation and marginalisation. When a group has an interest in both maintaining their culture while trying to adopt some cultural aspects of a new society, it is described as integration. Integration is also known as biculturalism.

Assimilation is when a group or individuals adopt the culture of the new society without maintaining their cultural identity. When individuals neither want to maintain their traditional culture, or adopt that of the new society, it is described as marginalisation. Finally, unlike marginalisation, separation occurs when individuals hold onto their original culture, and avoid interaction with others (Berry, 1980).

Most discussions on acculturation have focused on its measurement, while the actual concept remains largely unexplored (Hunt et al., 2004). Most studies use ‘proxy’ measures of acculturation because acculturation is a process of change and given that most studies tend to be cross-sectional, proxy of acculturation is used rather than ‘measure’ of acculturation.

The process of acculturation presents several challenges and life changes that could have potentially positive or negative effects on the health of immigrants via changes in lifestyle, including diet. When migrant-origin groups adopt dietary behaviours of the majority population, often the host country (Satia-Abouta et al., 2001), it is referred to as dietary acculturation.

Several studies have explored the association between acculturation and dietary behaviours (Pan et al., 1999, Satia-Abouta et al., 2001, Raza et al., 2016, Sturkenboom et al., 2016), but the influence of acculturation on dietary behaviours is still not properly understood. For instance, a study on acculturation and diet amongst residents of Surinamese origin in the Netherlands showed that acculturation was not associated with dietary pattern (Sturkenboom et al., 2016). In contrast, earlier studies among East Asians living in the United States showed a positive relationship between acculturation and diet (Pan et al., 1999). The inconsistencies in study findings between the effect of acculturation on the diet of migrants is possibly an indication that the process of dietary acculturation is still not properly understood (Satia-Abouta et al., 2001, Raza et al., 2016).

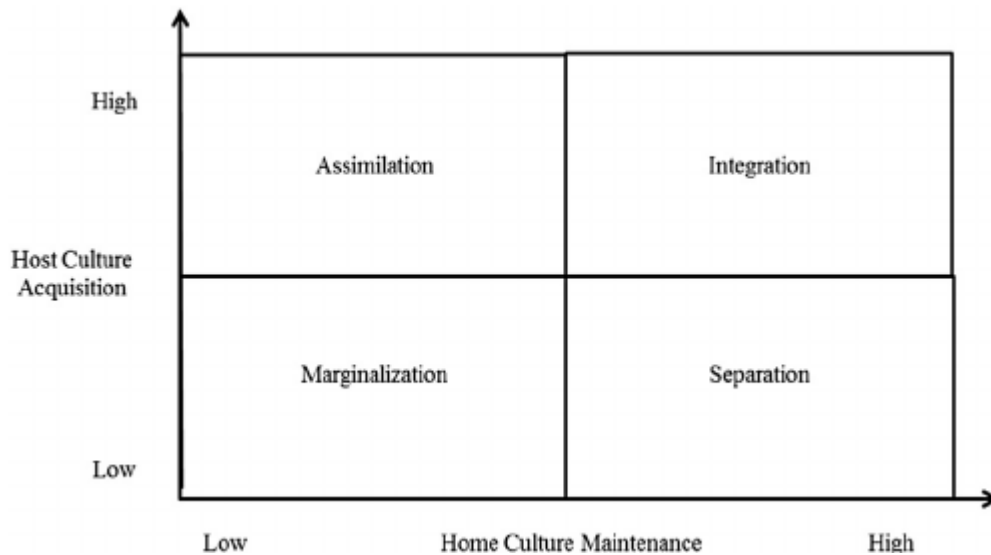


Figure 3: Acculturation Strategies (Berry, 1980)

The next section explains dietary acculturation and proposed models of dietary acculturation.

1.8.2.1 Dietary acculturation

Evidence from some diet studies among migrant-origin groups have shown that dietary acculturation includes the adoption of high fat diet and low intake of fruit and vegetables (Kim and Chan, 2004, Satia-Abouta et al., 2002). This example is of public health concern because dietary patterns characterised by high-fat and low fruit and vegetables are risk factors for NR-NCD's. The next section presents the theoretical framework that underpins the exploration of dietary practices amongst Ghanaian migrants living in Europe.

Dietary practice following migration have often been examined in the larger context of health, based on two models: the model of dietary acculturation (Satia-Abouta et al., 2002); the model that shows the changing process to a new dietary pattern following migration (Koçtürk-Runefors, 1999).

Satia-Abouta et al.'s (2002) model (**Figure 4**) depicts a process by which migrant-groups are understood to change their dietary behaviours following migration. The model of dietary acculturation shows the complexity and relationship that exists between cultural factors (e.g.

religion), socioeconomic factors (e.g. employment), demographic factors (e.g. sex) and migration, and how this relationship impacts on different patterns of dietary intake.

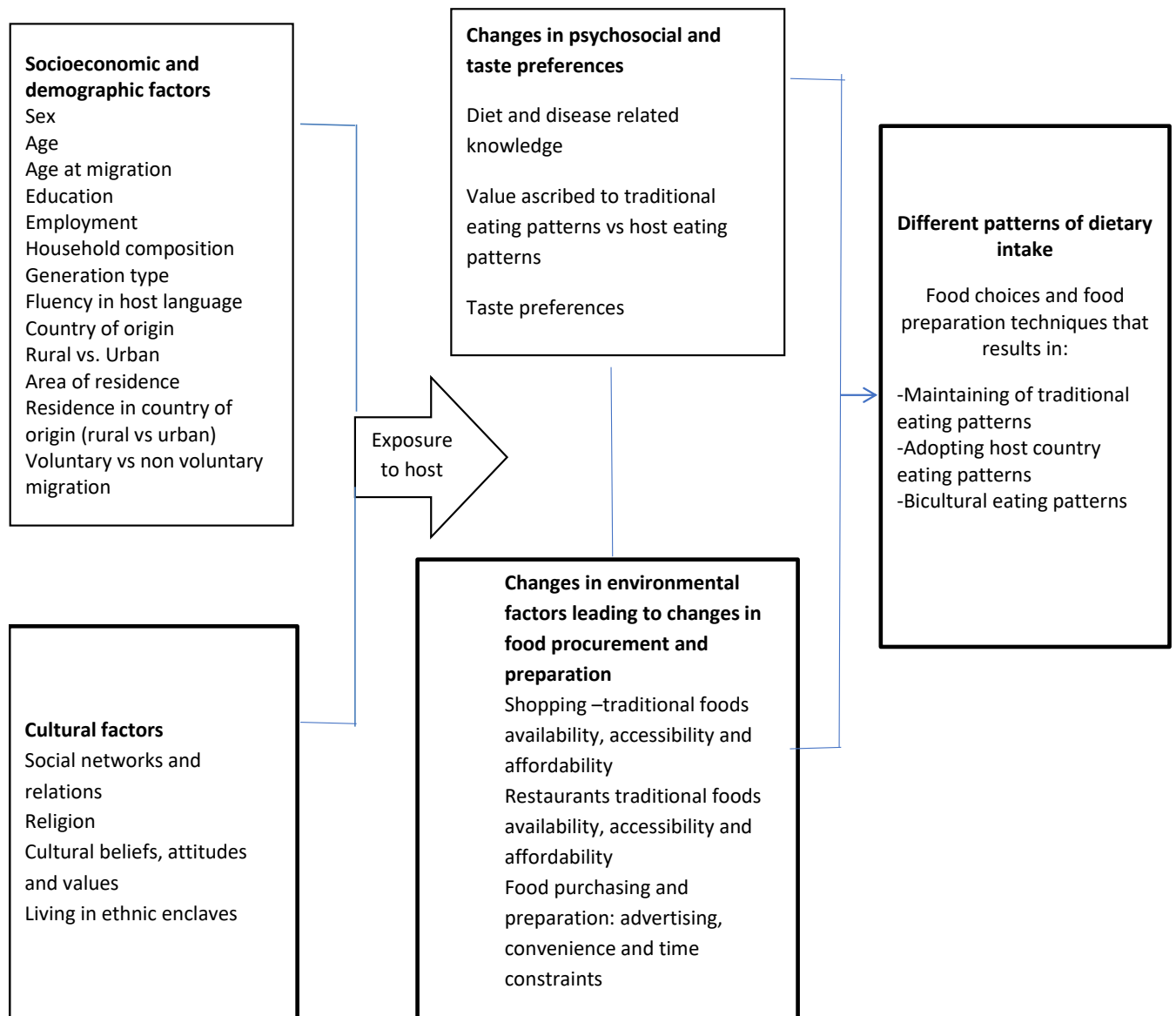


Figure 4: Model of dietary acculturation: adapted from (Satia-Abouta et al., 2002)

According to Satia-Abouta (2002), change in dietary intake due to migration is not a simple or linear process where migrants make a discrete shift from traditional foods to the host diet. Instead, change in dietary intake could take different patterns. It can be in the form of completely abandoning traditional diets or maintaining traditional diets to combining

traditional diets with the host diet due to various reasons (Satia-About a et al., 2002). These different outcomes of dietary acculturation are in line with Berry's view of acculturation strategies. For instance, maintaining some traditional dietary behaviours and adopting new ones from the host country could be described as integration. The departure from traditional diets has been reported in some studies in the UK and France especially among the younger generations of migrant-origin groups (Gilbert and Khokhar, 2008). Factors known to contribute to change in the diet following migration include income, generation type, gender, food availability and time available for shopping or cooking (Leung and Stanner, 2011). Contrary to some migrants changing their traditional diets as reported in some studies, a study in Manchester showed that African-Caribbeans usually maintained their traditional diet even after several years of living in the UK (Mennen et al., 2001). The authors speculate that the wide variety of African- Caribbean foods available in the UK could explain the little change observed among African-Caribbeans living in Manchester. In a systematic review of changing dietary behaviours of the major migrant-origin groups in Europe, the availability of food, the level of income, food beliefs, religion and culture were identified as factors associated with change in dietary behaviour following migration (Gilbert and Khokhar, 2008).

While the model of dietary acculturation discussed above is recommended to nutrition experts to understand dietary acculturation (Satia-About a et al., 2002), it is criticised

for being limited in its inclusiveness and for not accounting for the many other variables that could affect dietary practices following migration (Abraído-Lanza, 2006; Antin and Hunt, 2012). It is largely based on traditional migration models and considers dietary change from the perspective of relatively disadvantaged communities. Migration is often presumed to be from an underprivileged situation to a more prosperous country, and that the resultant dietary change is often from an implied healthy, traditional diet, to a more westernised. This limits its relevance to more recent voluntary migrant groups or migrants from a privileged background before migration (Thomas, 2016) and may not be relevant for future migrant generations i.e. second, third or fourth generations.

In addition, the separation of factors in Satia-Abouta's model into socioeconomic, demographic and cultural factors tend to present a simplistic view of the process of dietary change which may be more complex than the model suggests. Other factors that have been shown to influence

dietary practices such as contemporary migration patterns and those of the globalisation of the food system are not included (Thomas, 2016).

Furthermore, while the model of dietary acculturation by Satia provides useful insights into factors affecting the process of dietary acculturation, the model tends to be incomplete because it does not say what should be expected in the change process. It focuses on the possible factors that can result in dietary change following migration.

A complementary model that seeks to explain the process of adapting to a new dietary pattern following migration is the Koctürk model (Koctürk-Runefors, 1999) (Figure 5).



Figure 5: The changing process to a new dietary pattern after migration (Koctürk-Runefors, 1999)

Koctürk's model fills this gap by proposing a model to enhance the understanding of adaptation to new food patterns. Koctürk's model (1999) seeks to explain how food habits change depending on taste preferences and cultural identity. According to Koctürk-Runefors, accessory foods change most easily when new foods are incorporated in the diet and complementary foods may remain unchanged over a long period while staple foods may remain the same for several generations. Koctürk-Runefors also argues that if the staple diet remains the same following migration, changing accessories is still perceived by migrant-origin groups

to preserve the meal as the traditional diet. Additionally, she indicates that there is a similar trend (differential change) for intake of meals referring to breakfast, lunch, dinner and snacks. The initial changes are seen with snacking or grazing because snacks are not considered as real foods by migrant-groups. This is followed by changes in breakfast, then lunch. Supper, like the concept of the staple foods, usually remains unchanged for so long because family members are more likely to be around at the end of the day (Koçtürk-Runefors, 1999).

Although it was based on observations of food habits of Turkish migrants in Sweden, studies in Europe have tested its usefulness. An example is a study among Pakistani women in Norway (Mellin-Olsen and Wandel, 2005). In this model, foods are grouped into staple foods, complementary foods and accessory foods. According to the Food and Agriculture Organisation (FAO, 2014), staple foods are foods that form a dominant portion of the diet for any population, and it varies among different population groups. They usually are a source of carbohydrates and proteins (FAO, 2014). For Ghanaians, living in Ghana/or within Africa, a popular staple food is ‘fufu’ made from pounded cassava or yam and plantain (Offei-Ansah, 2012). Complementary foods are often protein-rich sources like meat, fish, legumes and milk and energy sources including fats and oils, sugars and mineral and vitamins sources like vegetables (FAO, 2014). In Ghana, a common complementary food is a soup that contains vegetables, meat or fish. Among Pakistanis, complementary foods include legumes, meat, vegetables or milk. Accessory foods are added to enhance the taste and presentation of the meal (Mellin-Olsen and Wandel, 2005).

Some studies have confirmed Koçtürk-Runefors’s hypothesis (Méjean et al., 2007, Nicolaou et al., 2012). For instance, a study of Moroccans in the Netherlands showed that Moroccan migrants tend to consume more sweets and snacks following migration (Nicolaou et al., 2012). A study among Pakistani women in Norway also showed that Pakistani women attach limited cultural importance to breakfast and lunch. The study, however, gave limited support to the hypothesis by the Koçtürk model that, changes occur mainly among accessory foods and least among the staples (Mellin-Olsen and Wandel, 2005).

Several studies have cited environmental factors among factors that result in change following immigration (Satia-Abouta et al., 2001, Bhopal et al., 1999). For instance, exposure to a new food supply which can result in changes in procuring and preparation of food and unavailability of traditional foods that can lead to increased intake of foods found in the host country (Satia-

Abouta et al., 2002). However, studies that explore the role of the social environment on dietary behaviours are limited and so are studies that compare migrants in the host environment with the country of origin, or a homogenous group of migrants in different countries. Most studies have been conducted among specific immigrant populations in just one host country (for example, South Asians in the US or the UK). There is a dearth of evidence from studies that compare a homogenous group of migrants in different settings or migrants with their compatriots in the country of origin. Studies on dietary acculturation after migration are valuable if compared with studies of food intake in the country of origin (Holmboe-Ottesen and Wandel, 2012). In addition, there is lack of evidence to show if the models explaining the process of dietary change are applicable to Ghanaians living in Europe.

In extending the traditional models of dietary acculturation, an exploratory approach was used in this PhD to explore dietary practices following migration to capture some of nuances of dietary practices and the complexity of the process of change beyond what the existing models present. To help with the interpretation of the findings of the empirical mixed method study in this PhD, Satia-Abouta's model was appraised for the first time amongst migrants from West Africa. Earlier studies that have explored dietary change using these models in Europe have focused on South Asian populations (Mellin-Olsen and Wandel, 2005). In the quantitative secondary analyses, dietary change amongst Ghanaian migrants living in Europe was explored as outlined in Koctürk's model. This PhD, therefore provides a unique opportunity to discuss the usefulness of Koctürk's model together with Satia-Abouta's model amongst people of Ghanaian descent living in Europe.

1.9 Context in Ghana prior to migration

The context (e.g. cultural, economic) prior to migration has an important relationship to behaviour. According to Berry (1997), the long-term outcome of acculturation varies, depending on personal variables, the society of settlement and phenomena that exist before and during the process of acculturation (Berry, 1997). Thus, a study investigating dietary change following migration should start with a description of the country of origin. The operant model of acculturation and ethnic minority health behaviour (Landrine and Klonoff, 2004) suggests the need to understand the context (e.g. dietary) before migration. The model suggests that the context from which migrants originate interacts with the context to which they migrate in shaping health behaviours. If for example, migrants originate from a context where fruit and

vegetables are less available/consumed into a context where fruit and vegetables are more available/consumed then, with acculturation, they will be more likely to increase their consumption of fruit and vegetables, thus implying a healthy change. However, if they originate from a context where there is greater availability/consumption of fruit and vegetables to a context where there is less availability/consumption, then migrants may tend to eat less fruit and vegetables, hence an unhealthy change. A plethora of studies have supported this hypothesis amongst migrant-origin groups in the US and Canada (Kim and Chan, 2004, Kaplan 2002).

The Ghanaian population is made up of about 25 million people, of which over 60% are reported to be Christians and 30% Muslims (GSS, 2014). There are about 60 different ethnic groups in Ghana; Akans form the largest ethnic group (49.1 %), followed by Mole –Dagbani’s (16.5%) and Ewes (12.7%). Figure 6 shows the map of Ghana highlighting some ethnic groups.



Figure 6: Map of Ghana showing some ethnic groups

The next section presents an overview of diet-related chronic diseases of Ghanaians and transition in food consumption patterns.

1.9.1 Epidemiological and nutrition transition

The epidemiological transition describes a shift in the highest burden of disease from infectious causes of morbidity and mortality to a pattern of chronic, degenerative, and delayed-degenerative diseases (Olshansky and Ault, 1986) as a result of urbanised lifestyle associated with economic, political and social development (Popkin, 201, Amuna and Zotor, 2008) The epidemiological transition is considered to be preceded by a nutrition transition as dietary patterns change from traditional foodstuffs rich in complex carbohydrates and fibre towards more saturated fat- and sugar-rich items (Drewnowski and Popkin, 1997). The nutrition transition is defined as a change in dietary patterns, nutrient intakes and physical activity in populations resulting from the adoption of ‘modern’ lifestyles associated with urbanisation, economic, political and social development and acculturation (Popkin, 2001, Vorster et al., 2011). The transitions in lifestyle and dietary behaviour at the latter stages of the epidemiological transition have led to a rise in the prevalence of obesity and NR-NCDs (Reddy, 2002).

According to Popkin (2002), there are five stages of the nutrition transition as shown in Figure 7. The first two stages: pattern 1 and pattern 2 are precursors for the actual nutrition transition (Popkin, 2002, Popkin, 2006).

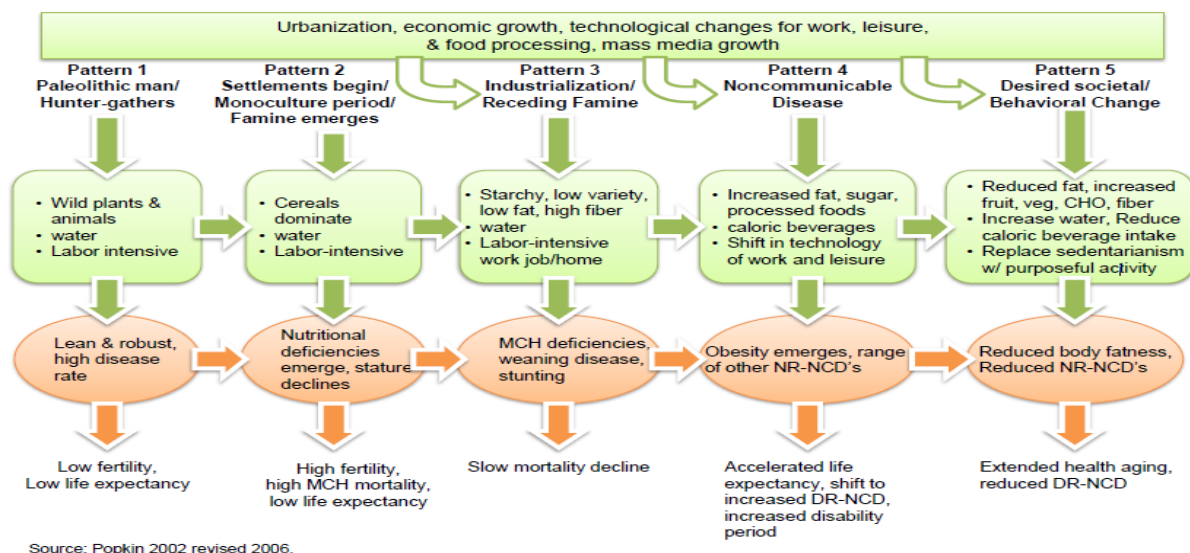


Figure 7: Stages in the Nutrition Transition (Popkin, 2002a)

The nutrition transition is taking place at a rapid pace in low and middle- income countries (LMICS) and this is reported to be occurring at a much faster rate in urban areas in these countries (Popkin, 2002, Popkin and Gordon-Larsen, 2004).

As a consequence of the nutrition transition with changing dietary patterns related to rapid urbanisation in Ghana and other African countries, obesity and other NR-NCDs are on the rise. In Ghana, The Ghana Demographic and Health Survey, (2014), showed that non-communicable diseases (NCDs) account for greater than 40% of total morbidity and are now recognised politically as a pressing health concern (GDHS, 2014). The GDHS collects data on the nutritional status of women and children every four years and shows that overweight and obesity is on the rise in Ghana. Overweight and obesity rates amongst adult women have increased from about 25% in 2003 to 30% in 2009, though there are great disparities between rural and urban areas in Ghana. There is a different social gradient in obesity compared to high income countries, with higher rates of overweight and obesity in the urban high-SES status residents compared with the low-SES residents and in urban than rural subjects (GDHS, 2014). People with a tertiary education have the highest prevalence of obesity (18.8%) compared with less literate and illiterate populations (12.5–13.8%) (Amoah, 2003).

1.9.2 Evidence for transition in dietary intake patterns in Ghana

Ghana like other low/middle -income countries is going through the nutrition transition associated with demographic and epidemiological changes and is experiencing receding famine and communicable diseases patterns (De-Graft Aikins,2007, Agyei-Mensah and de-Graft Aikins, 2010) as described in Popkin’s stages in nutrition transition in **Figure 7**.

Ghanaian diets are very diverse and are based mainly on staples such as maize, rice, millet and sorghum (Offei–Ansah, 2012). It includes a variety of stews and soups that are prepared with fish, meat, vegetables and poultry (Offei–Ansah, 2012). Examples of Ghanaian staple foods

that are commonly served in most Ghanaian homes include ‘fufu’¹, ‘omo tuo’² ‘banku’³ ‘kenkey’⁴ and fried fish and ‘tuu zaafi’⁵ (Offei-Ansah, 2012).

There is scarce data on dietary practices in general of Ghanaian adults; however, a few studies have shown that the nutrition transition has resulted in the higher intakes of high energy-dense foods and sugary drinks and also a diet characterised by meat and animal products which have implications on health (Haggblade et al., 2016). Food consumption patterns have changed from traditional diets prepared with coarse grains, such as millet and sorghum, to modern diets high in imported wheat and rice (De-Graft Aikins, 2007).

In urban areas in Ghana unprocessed plant-based traditional foods are gradually being replaced by foods which are more energy-dense and higher in sugar and salt but nutrient poor (De-Graft Aikins, 2007; Agyei-Mensah and de-Graft Aikins, 2010). There is increased availability of foods, for example, sugar- sweetened soft drinks, and fast foods have emerged and are popular in shopping malls found in cities in Ghana. In Accra, the capital city of Ghana, such Western food items are often regarded as desirable status symbols, rapidly accepted by local inhabitants, and widely consumed (Haggblade et al., 2016). Due to the paucity of published data on dietary practices in Ghana, this PhD will explore dietary intake of Ghanaians living in Ghana to get an insight into the dietary context of the country of origin of the study participants and to make comparisons with the current dietary intake of Ghanaians living in Europe.

¹ Made from boiled cassava, yam or plantain and prepared by pounding in a dough and served with soup

² Ground or mashed boiled rice

³ Cooked fermented maize dough and cassava dough

⁴ Fermented half cooked corn dough wrapped in leaves and boiled

⁵ Cooked from maize dough and eaten mostly in Northern Ghana

1.10 Ghanaians living in the UK: Social and economic context

The first wave of emigration of Ghanaians was in 1965 when Ghanaians experienced an economic crisis (Anarfi et al., 2003). A large number of Ghanaians arrived in the UK in the early 1980's to seek political asylum, while others also migrated due to the economic situation around the same time. Another wave of immigrants to Europe from Ghana arrived in the 1990's in London, Amsterdam and Hamburg when the government of Ghana moved from military rule to a multi-party democracy (Anarfi et al., 2003). According to the Home Office, between 1990 and 2001, 21,485 Ghanaians entered the UK and documents showed Ghanaians were among the top 10 national groups migrating to the UK (Anarfi et al., 2003). The Ghanaian High Commission (2014) reported that in 2012 about 1.5 million Ghanaians were registered to live in the UK. This section of the thesis describes what is known about the experiences of Ghanaians currently living and working in the UK, with a particular emphasis on economic conditions and reported discrimination. Discrimination may influence the level of acculturation of migrant-origin groups (e.g. result in marginalisation) which in turn may indirectly impact on an individual's behaviour (in this case diet).

A survey (Herbert et al., 2006) conducted in London focusing on Ghanaian and Nigerian migrants employed in low paid sectors to explore working condition showed that most respondents in the study engaged in cleaning jobs while others were employed as care workers. All participants in the survey complained about poor working conditions. The survey also reports that 94% of Ghanaians who participated in the survey earned less than the minimum wage (£6.70/hour) in 2008 (Herbert et al., 2008). Apart from earning less than the minimum wage, other complaints that were reported included: no annual pay rise, no sick pay and few or no paid holidays. Racism was a theme that kept emerging in the interviews conducted. Respondents reiterated their feeling about being excluded from professional jobs, although more than half of the respondents interviewed had some form of university qualification, awarded either before or after moving to the UK. The respondents complained that within the labour market being Black situated them as inferior to the Whites. Racial discrimination has also been argued to be very important in explaining ethnic health inequalities in the UK (Nazroo and Karlsen, 2001).

The survey also reports that many Ghanaians have tried to integrate into the UK system by educating themselves and applying for professional jobs but complained at failing at the

application or interview stage due to perceived racism and prejudice from employers (Herbert et al., 2006). Herbert's sample was not a random sample. The findings on Ghanaians was based on analysis of 65 questionnaires and 18 in-depth interviews drawn from a larger study of Black Africans in the UK. Therefore, could not be generalised to all Ghanaians living in the UK; however, it may give some insight into experiences of Ghanaians engaged in a low paid labour market which may shed light on dietary behaviours of Ghanaian migrants.

1.11 Study Rationale

Migration from low to high-income countries is associated with environmental and lifestyle changes that increase the risk for NR-NCDs (Smith et al., 2000, Meeks et al., 2016). Migrant-origin groups from these regions experience higher risks of NR-NCDs than host populations. The prevalence of NR-NCDs are not only higher compared to host country populations, there is generally also an increased risk among migrant-groups compared to their non-migrant compatriots living in their country of origin. Diet is a known modifiable determinant of obesity and dietary behaviours are associated with increased obesity risk. Previous studies have identified a process of dietary acculturation when migrant groups adopt the food patterns of the host country (Satia-Abouta et al., 2001, Mellin-Olsen and Wandel, 2005, Garnweidner et al., 2012). Evidence from such studies has shown that dietary behaviours of migrant populations may become unhealthier following migration, as healthy components of traditional diets are replaced by convenient, processed and less healthy foods in the host country, which contributes to obesity risk (Gilbert and Khokhar, 2008, Gattineau and Mathrani). Given the rising levels of NR-NCDs among migrants and the role that diet plays as one of its determinants, a clear understanding of the influence of migration and other factors associated with dietary practices of migrant-origin groups is needed to be able to design culturally sensitive preventive interventions. Furthermore, although migrant research and research into dietary behaviour has gained prominence in recent years, there is a paucity of data on Ghanaians and other migrants from SSA living in the UK. Existing research on migrant-groups and diet has focused mainly on South Asian people living in the UK. Very few studies have investigated the dietary behaviours of immigrants from Sub-Saharan Africa (SSA) who have an increased risk of NR-NCDs. The Ghanaian population is one of the largest African communities in the UK and Europe at large. In countries like Germany and the Netherlands (Agyemang et al., 2009), there

has been some research into this population, however only a few of these studies have focused on dietary behaviours.

1.12 Aim

The current PhD seeks to explore dietary practices and associated factors amongst among Ghanaians living in Europe.

1.13 Research questions

The following research questions have been developed to achieve the aim of this study:

- What factors influence dietary behaviour among ethnic minority groups living in Europe?
- What dietary practices exist among people of Ghanaian descent living in Europe?

What are the factors associated with dietary practices among people of Ghanaian descent living in Europe?

Table 2: Research questions and corresponding objectives and methods

Research questions	Objectives	Methods
What factors influence dietary behaviour among ethnic minority groups in Europe?	To systematically search and retrieve literature that identifies factors influencing diet and dietary behaviour among ethnic minority groups living in Europe. To develop a systematic map to illustrate the ways in which the factors affecting diet and dietary behaviour among ethnic minority groups might be interrelated.	Systematic mapping review (Study 1)
What dietary practices exist among people of Ghanaian descent living in Europe?	To explore perceptions regarding changes in dietary practices following migration among people of Ghanaian descent living in Greater Manchester To describe changes in dietary change among people of Ghanaian descent living in Europe.	Qualitative research (Study 2) Secondary data analysis (study 3)
What are the factors associated with dietary practices among people of Ghanaian descent living in Europe?	To explore the influence of migration (or parental migration) on dietary practices of Ghanaians living Greater Manchester	Qualitative research (Study 2)
	To explore the influence of social and economic factors in shaping dietary practices among people of Ghanaian descent living in Greater Manchester (the case of food insecurity)	Qualitative research (Study 2)
	To measure associations between acculturation and dietary intake among people of Ghanaian descent living in Europe	Secondary data analysis (study 3)

1.14 Framework of the study

Figure 1 shows the framework of the study.

In order to address the overarching research questions, aims and objectives, this PhD consisted of three studies: studies 1, 2 and 3.

The main aim of having the three different studies in this PhD was to increase the scope of inquiry by using appropriate methods for the different research questions. Study 1 was a

systematic mapping review of the factors associated with dietary behaviour among ethnic minority groups living in Europe. The mapping review sought to identify explanations that have been developed so far to understand dietary behaviours of ethnic minority groups living in Europe in a broad sense before then exploring dietary practices of the main population group of interest in this PhD. A mapping approach was considered useful for the review research question because the aim was to map out the factors to give ideas about the scope of research available on factors influencing dietary behaviours and then to identify neglected areas.

Findings of the mapping review helped to provide a background against which discussions of the findings in studies 2 and 3 were made. The mapping review was then followed by a mixed methods study: qualitative in-depth interviews and quantitative secondary data analysis. The mixed method design was employed to enhance the comprehensiveness of the research firstly by identifying, through qualitative methods, dietary practices of Ghanaians in the UK and potential explanations for these. This was followed by a quantitative secondary data analysis that examined the association between dietary intake and acculturation, which was identified as a potential determinant of dietary patterns in study 2. This study was focussed on a wider Ghanaian population living in Europe, i.e. Amsterdam, Berlin and London.

The next chapter constitutes study 1 of this PhD. It presents the methodology, findings and discussion of a systematic mapping review conducted to answer the research question: what factors influence dietary behaviours among ethnic minority groups living in Europe?

2 Systematic mapping review

Introduction

This chapter presents the first study of this PhD, i.e. the systematic mapping review (SMR). The question the review sought to answer was *What factors influence dietary behaviour among ethnic minority groups living in Europe across the life course?* The first part of the chapter begins with the background to the review and it is followed by the methodology, including details of search strategy, inclusion/exclusion criteria and quality assessment. The second part presents the findings and discussions of the review. The chapter then concludes with implications of the findings.

1.1. Background to the review

During the last few decades, migration in Europe has increased and many migrant-origin groups have been reported to have a higher prevalence of NR-NCDs and poorer dietary habits than the native born European populations (Faskunger et al., 2009, Patel et al., 2006). In addition, Europe has a number of indigenous minority groups such as the Sami and the Roma, who have historically suffered from discrimination and marginalization accompanied by diet-related NCDs (Sjölander, 2011). Given the rise in ethnic minority groups and the high prevalence of NR-NCDs among these populations (Gatineau and Mathrani, 2011), a clear understanding of factors influencing dietary behaviour is warranted in order to assess the needs of these populations and to develop effective public health interventions that also reach ethnic minority groups.

This review fills these gaps by systematically reviewing primary studies on a wide range of ethnic minority groups and by considering a variety of dietary behaviours over the whole life course, using a holistic and data driven approach, by clustering emerging factors across these groups. The aims of this review were to identify a broad range of factors influencing dietary behaviour among ethnic minority groups living in Europe in order to identify gaps in the literature to guide future research. The evidence from this review also fed into developing a framework for the study of factors influencing dietary behaviours in ethnic minority groups in

Europe (Holdsworth et al., 2015), as part of the work of the DEDIPAC-KH (DEterminants of Diet and Physical Activity Knowledge Hub) (Lakerveld et al., 2014) for European populations.

1.2. My role in the systematic mapping review

The SMR forms part of a larger European Union funded project on the Determinants of Diet and Physical Activity (DEDIPAC). The project reflects the creation of a knowledge hub on determinants of diet and physical activity in Europe. Networks of 56 research groups are involved in the project to provide a better understanding of how determinants influence diet and physical activity. The SMR described in this chapter also contributed to the deliverables of the work package that I was a part of. I worked as a research assistant on the DEDIPAC project and led the SMR and led the development of the protocol with inputs from all members of the work package responsible for the review. I conducted the electronic searches on all the databases with the help from an information specialist from School of Health and Related Research (ScHARR), University of Sheffield, and I was the main correspondent, who gave progress reports of the review to other members of the review team and drafted a manuscript for publication.

1.3. Why choose a systematic mapping review?

Mapping reviews were developed by the Evidence for Policy and Practice Information and Co-ordinating Centre Institute of London (EPPI centre, 2006). A mapping review was selected because it allows the mapping and categorisation of existing literature and identification of the gaps in research literature (Grant and Booth, 2009). This was considered useful for the current review research question because the aim was to map out the factors in a tabular form to give ideas about the scope of research available on factors influencing dietary behaviours and not to examine the dietary behaviours investigated. To avoid research bias during the review process, the review protocol was registered with PROSPERO (PROSPERO 2014: CRD42014013549) before commencing, as shown in **Appendix A.1**.

2.1 Review methodology

2.1.1 Search strategy

An initial scoping search was undertaken through PubMed PubRe Miner (Slater, 2014) with the aim of assessing the amount of available literature and identifying appropriate search terms to be used in the main searches. A search strategy was constructed in consultation with an information specialist from the University of Sheffield. The search strategy was based on search terms within three concepts: (i) dietary behaviours and its synonyms: diet, food habits, nutritional status, food preferences and nutrition; (ii) ethnic minority groups; all countries that are listed by the World Bank as low and middle-income countries. In addition, countries from the former Eastern European Bloc (Hirsch et al., 2002) from where groups commonly migrate to other parts of Europe, were included so that the review captured all ethnic minority groups living in Europe including indigenous populations. Other search terms that were used to capture potential studies were: emigrants, immigrants, cultural diversity, minority groups, migrants, ethnic groups, multiculturalism, ethnic minority, BME (Black and Minority Ethnic), black, minority ethnic, asylum seeker, refugee, non-white, coloured population or black; and (iii) Europe, all European countries by name. The search strategy contained free text and subject headings.

The following nine electronic databases were searched: MEDLINE, EMBASE, Web of Science, Cochrane Library, CINAHL, ProQuest, Psycinfo, ASSIA, and Campbell Collaboration Library of Systematic Reviews. The search strategy was modified where necessary for use in different electronic databases. The complete MEDLINE search strategy is shown in **Appendix A.2**. Databases were searched from 1999 to 2014 as it was expected that any factor identified before 1999 would also be referred to in more recent literature. Spot checks on results from the scoping review indicated that key papers emerged after 1999. Searches were conducted between May-July 2014. The citation follow-up technique and contacting of experts in the field was undertaken to identify additional relevant articles. In addition, the reference lists of all included articles were scanned for articles that met the inclusion criteria. All citations were downloaded into an Endnote web library and duplicates were removed.

Ethnic minority population is a concept used for very heterogeneous groups that may share minority status in their country of residence due to ethnicity, place of birth, language, religion,

citizenship as well as other cultural differences (Blais and Maïga, 1999). This definition may include groups from newly arrived immigrants to (minority) groups that have been part of a country's history, for instance the Sami people.

2.1.2 Inclusion criteria

- All studies that identify an association between a risk factor and the diet or dietary behaviour of minority ethnic groups living in Europe were included i.e. motivations, knowledge and perceptions.
- All studies that have objective or subjective measured dietary outcomes were included.
- Studies that investigate factors and determinants of diet or dietary behaviour, and not studies that merely present descriptive data on diet.
- All population groups (regardless of age, gender, health status, and whether or not they are institutionalised populations) were included.

2.1.3 Exclusion criteria

- All studies that analyse diet as a confounder in the relationship between ethnicity and disease
- All studies that explore whether ethnicity is a determinant of diet and do not attempt to explain why
- Non-human studies/ laboratory-based studies
- Studies examining beliefs and practices around breastfeeding and weaning
- Studies examining the nutrient status of particular ethnic groups without mention of actual food eaten.

2.1.4 Study selection

The title and abstracts of a total of 2965 articles identified references were imported into Endnote and 730 duplicates removed. The remaining 2235 articles were equally divided between five independent reviewers against the inclusion criteria. Of these abstracts, 1956 articles did not meet the inclusion criteria. The main reasons why studies were excluded were

because they contained no empirical data on ethnic minority groups, presented only descriptive information on diet or were outside the review time limit. Full text articles were retrieved by the five reviewers for the remaining 279 articles and the inclusion/exclusion criteria were applied. This yielded 68 potentially relevant papers for data extraction. Spot checks were conducted on a sample of 10% of the excluded papers to assess the extent of agreement between reviewers. During the spot checks, there was a good degree of concordance. There was disagreement between two reviewers on two papers therefore a third reviewer in the team was consulted. The outcome in both cases was to exclude the papers. The most common reason for excluding studies from this review during the data extraction stage was because they were focused on describing dietary differences between populations without examining the factors driving dietary behaviour.

During the data extraction process 37 studies met the inclusion criteria (**Figure 8**).

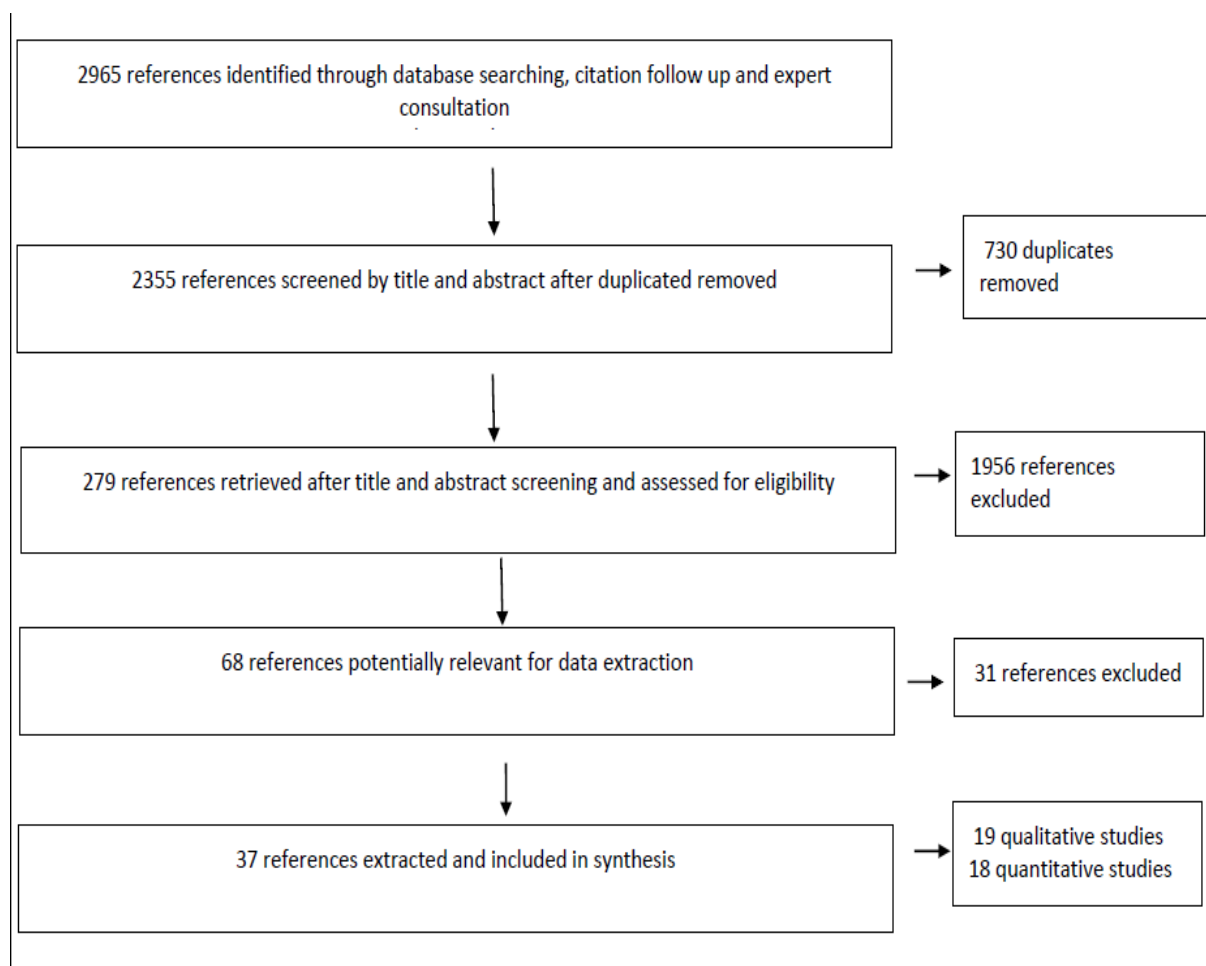


Figure 8: PRISMA diagram

2.1.5 Data extraction and synthesis

Data extraction was performed by the five reviewers according to the following study characteristics: study design, sampling population, sample characteristics, number of participants, country where the study was conducted, sampling method, dietary behaviour measured, factors reported to influence dietary behaviour. As the main aim of this mapping review was to gather a broad base of evidence to map the conceptual domain of factors potentially influencing dietary behaviours it was decided to include all factors reported by authors and not to restrict to those factors where a statistical relationship had been demonstrated. For quantitative studies, types of analysis were also extracted, while direct quotations were extracted from qualitative studies.

2.1.6 Quality assessment

Quality assessment of quantitative and qualitative studies was undertaken using the standard quality assessment criteria for evaluating primary research papers (**Appendix A.3 and A.4**) (Kmet et al., 2004). Each reviewer in the process of extracting data assessed the paper for quality as well. To ensure consistency in quality assessment, an independent reviewer cross-checked the quality assessment between the five reviewers. **Appendix A.5 and A.6** summarise the quality assessment scores given to the included studies.

2.2 Data analysis and emerging clusters

Two stages were used in the analysis. In the first stage, all factors influencing dietary behaviour identified in the selected papers were extracted and their association described with the different dietary behaviours observed.

The second stage involved sorting and structuring the factors into clusters, during which, the list of factors emerging from the review were clustered according to how they were seen to relate to each other, in a data driven approach (Trochim, 1989). This clustering step was part of a larger concept mapping process (Trochim, 1989) leading to the development of a systems-based framework of factors influencing dietary behaviour and physical activity/sedentary behaviour in ethnic minority groups living in Europe. The emerging factors from the systematic mapping review were grouped into clusters, according to how they were seen to

relate to each other. This resulted in 7 dietary behaviour clusters containing 63 factors. This process was undertaken in two ways. Firstly, during meetings of the DEDIPAC ethnic minority team, when the relationships between factors were collectively debated. And secondly during a confirmatory stage involving members of the DEDIPAC ethnic minority and general population teams (Holdsworth et al 2017). The map that emerged was discussed collectively, which led to some changes in wording of the clusters to enhance clarity and some factors were moved into different clusters.

The concept mapping approach is guided by systems thinking, which can simply be defined as “looking at things in terms of the bigger picture” (Midgley, 2006). This concept mapping approach included steps on generating a list of factors, and sorting and structuring these factors into clusters by consensus based on how they relate to each other (Blais and Maïga, 1999).

Within the DEDIPAC-KH, an inter-disciplinary group focused on the determinants of dietary and physical activity behaviours. This comprised a team specifically focussing on the factors influencing the behaviours of ethnic minority populations (‘DEDIPAC ethnic minority team’). Other parts of the DEDIPAC-KH focussed on the factors influencing dietary (Chastin et al., 2015, Stok et al., 2016, Condello et al., 2016) and physical activity behaviours of the general European population (‘DEDIPAC general population team’).

All sixty-three factors were grouped into seven clusters (**Table 3**) in two steps - firstly by a meeting of n=5 members of the DEDIPAC ethnic minority team, followed by a confirmatory workshop of n=21 members of DEDIPAC general population team. Experts representing a range of disciplines participated in the clustering process: nutrition, public health, epidemiology, anthropology, social demography, economics, sociology, dietetics, psychology, exercise physiology, health promotion and physical activity.

2.3 Results

2.3.1 Description of included studies

The characteristics of the 37 included studies are presented in Tables 2 and 3 (19 qualitative; 18 quantitative). Most of the studies were conducted in Northern Europe (UK n=9, Norway n=9, The Netherlands n=6 and Sweden n=5). The most commonly studied ethnic minority groups were of Pakistani or Bangladeshi origin. Most of the studies were conducted among adults (n=31), but studies on children/adolescents (n=5) and on older adults (n=1) were found. However, 11 of the studies conducted on adults included participants who were older adults and three other studies included children/adolescents. The number of participants ranged from 14-83 in the qualitative studies and 100-12,811 in the quantitative studies.

Table 3: Dietary map of the 63 factors and the 7 clusters that emerged from the systematic mapping review

	Migration context	Social and cultural environment	Food beliefs and perceptions	Accessibility of food	The body	Psychosocial	Social and material resources
Number of factors	7	16	11	10	5	9	5
Factors	Region of origin Urban or rural dweller Age at migration Country of birth Length of stay in host country Place of residence in host country Westernization	Cultural identity Ethnic identity Ethnicity Religious beliefs Equipping children in different social networks Perception of host culture Level of acculturation Religious prescriptions Socialization process in place of residence Conformity to tradition Traditional dietary values/beliefs Gender Age Social networks Social ties Social bonding	Status of traditional vs convenience foods/diets Familiarization of host foods before migration Familiarization with host country foods Husband's food preferences Children's food preferences Inter-generational influences on diet Parental dietary habits Perception of healthy foods Food beliefs Perception of cost Social role of food	Availability of traditional foods Accessibility of traditional foods Food prices Food-related life-style Neighbourhood level physical proximity Season Family's neighbourhood (ethnic enclave) Lack of time for cooking traditional foods Time for food preparation Change in lifestyle (work/school commitments)	Health consciousness Dieting tendency BMI Body image perception and preferences for larger body size Child's health	Taste preferences Attitudes Subjective norms Perceived behaviour control Perceived behavioural intention Perceived group norms Past behaviour Motivation Food neophobia	Competency in host language Educational attainment SES Personal income Nutrition knowledge

Table 4: Characteristics of quantitative studies on factors influencing dietary behaviour in ethnic minority groups

Author	Country	Study population	Design	Participants	Dietary behaviour measured
Koochek et al., 2011	Sweden/ Iran	Iranian-born residents of Stockholm/ Iranians living in Iran	Cross- sectional	Elderly ≥ 60 yrs Iranians in Sweden (N=121; F=66%) Iranians in Teheran (N=52; F=40%)	Dietary intake including fruit and vegetables
(Volken et al., 2013)	Switzerland	Portuguese, German, Italian, Turkish, Serbian, Kosovan residents of Switzerland.	Cross-sectional	Participants aged 17- 74 yrs. M=5390, F=6358	Fruit and vegetable intake
(Edwards et al., 2010)	UK	36 nationalities of international students	Cross-sectional	Participant aged 20-60 yrs. N=226 M=31%, F=69%	Food neophobia, changes in eating habit
(Ross et al., 2009)	Sweden	Sami involved in reindeer herding (traditional lifestyle) vs others	Cross-sectional	N=595 Sami (F=321, M=274)	Food and nutrient intake
(Skreblin and Sujoldzic, 2003).	Croatia	Three groups of adolescents: host; immigrant (Bosnia Herzegovina); permanently settled	Cross-sectional	N= 510 adolescents (14-19 yrs.)	Food intake, dieting practice
(Brustad et al., 2008a)	Norway	SAMI and Norwegian who grew up in areas with mixed Sami and Norwegian populations	Cross-sectional	Participant aged 36-79 yrs. N= 7614 both M & F	Dietary patterns in childhood based on clustering of 11 'traditional' Sami food items
(Brustad et al., 2008b)	Norway	SAMI and Norwegian	Cross-sectional	Participant aged 36-79 yrs. N= 12811 Age: both M & F	Dietary patterns based on traditional and modern dietary items.
(Kumar et al., 2004)	Norway	East Asians, Indians, sub-Saharan Africa, Middle East/North Africa-	Cross-sectional	Adolescents resident in Oslo. Mean age 15.6 yrs.; N= 1659 (M=48.9%, F=51.1%)	Fruit and vegetable intake, breakfast skipping.

Author	Country	Study population	Design	Participants	Dietary behaviour measured
(Kassam-Khamis et al., 2000)	UK	South Asian Muslims from Bangladesh, Pakistan East Africa (Ismailis)	Cross-sectional	Households include everyone >12 yrs. N=291 individuals in 92 households (n=100 Bangladeshis; n=108 Pakistanis; n= 83 Ismailis)	Food intake
(Harding et al., 2008b)	UK	Black Caribbean, Black African, Pakistani, Indian Bangladeshi	Cross-sectional	Children aged 11-13 yrs. Pupils in 51 schools N= 6599	Food intake including fizzy drinks, fruit and vegetables, breakfast
(Nicolaou et al., 2006)	Netherlands	Surinamese of South Asian and African origin, white Dutch	Cross-sectional	Adults aged 35-60 yrs. N=1518	“Diet Quality” based on the Intake of a number of key foods and breakfast
(Nielsen et al., 2014)	Denmark	Non-Western minorities; Turkish (35%) Pakistani/Indian background (20%), “other” covers >100 different countries	Cross-sectional	Parents with children 6 months to 3.5 yrs. Danish and non-western N=337	Dietary intake, dietary pattern (healthy eating)
(Carrus et al., 2009)	Italy	Indian females	Cross-sectional	Females 18-34 yrs. living in Rome for ≥ 10 yrs N=100	Purchase of ethnic food
(Perez-Cueto et al., 2009)	Belgium	International students from 60 nationalities	Cross-sectional	Students aged 19-48 yrs. N=235; M= 54%	Perceived changes in dietary habits, healthy intake
(Råberg et al., 2014)	Norway	Pakistani women with type 2 diabetes	RCT	Participant aged 25-62 yrs. N= 198	Change in food intake
(Raberg Kjollesdal et al., 2010)	Norway	Pakistani women living in Norway and born in Pakistan or born in Norway by two Pakistani parents.	RCT	Women aged 28-62 yrs. N= 82	Healthy dietary intake
(Khunti et al., 2008)	UK	Schools with a >60% South Asian population, mainly Indian origin.	Action research	Pupils aged 11-15yrs, N= 4763, (77% South Asian)	Dietary pattern (healthy and unhealthy intake)

Author	Country	Study population	Design	Participants	Dietary behaviour measured
(Johansen et al., 2010)	Norway	Women living in Norway and born in Pakistan or women born in Norway by two Pakistani parents.	RCT	Women aged 25-63 yrs. N=198	Dietary intake, portion size, intention to change diet

Table 5: Characteristics of qualitative studies on factors influencing dietary behaviour in ethnic minority groups

Author	Country	Study population	Design	Participants	Dietary behaviour measured
(Lawrence et al., 2007)	UK	African (Somalia, Zimbabwe) South Asian (Pakistani/Bangladeshi) females	6 Focus groups	Girls and young women aged 12-35yrs N=33	Food choice
(Lawton et al., 2008)	UK	Pakistanis, Indians with type 2 diabetes	In-depth interviews	Adults aged 33-71 yrs. M=15, F=17 N= 32	Food and eating practices, dietary change
(Fagerli et al., 2005)	Norway	Pakistani-born living in Oslo	In-depth interviews	Adults aged 38-66 yrs. M=4, F=11 N=15	Changes in food -habits while living in Norway after diabetes diagnosis
(Garnweidner et al., 2012)	Norway	Female immigrants from 11 African and Asian countries residing in Oslo	In-depth interviews	Participants aged 25-60 yrs. N=21	Food habits, meal preparation, perception of change in food habits
(Halkier and Jensen, 2011)	Denmark	Pakistani living in Denmark	Interviews, participant observation	N=19 Age= 15-65yrs.	Healthy eating practices
(Kohinor et al., 2011)	Netherlands	Dutch Surinamese	Semi-structured interviews	N=32 M=12, F=20	Healthy dietary intake
(Ahlqvist and Wirfalt, 2000)	Sweden	Iranian women living in Sweden	Interviews	Women aged 29-85 yrs. N=14	Food intake
(Grace et al., 2008)	UK	Bangladeshi adults	17 focus groups and 8 interviews	Bangladeshis without diabetes (M=37; F=43); religious leaders (M=14, F=15); health professionals (F=19; M=1)	Dietary intake in relation to the prevention of type 2 diabetes

Author	Country	Study population	Design	Participants	Dietary behaviour measured
(Terragni et al., 2014)	Norway	Somali, Pakistani, Sri Lanka, Iraq, Turkey, Iran, Egypt, Algeria, Lebanon, Morocco	Semi-structured interviews	Women aged 25-70 yrs. N=21	Shopping, preparation and eating habits, dietary acculturation
(Jonsson et al., 2002a)	Sweden	Somalians	Focus group interviews	19 women with children <18yrs.	Food choice, tradition, meanings attached to 'feeding the family'
(Hendriks et al., 2012)	Netherlands	Surinamese Indians	Semi-structured interviews and focus groups	Participants aged 29-83 yrs. F=24. M=3 N=27	Eating habits
(Rawlins et al., 2013)	UK	African; Caribbean; Indian, Pakistani, Bangladeshi	Focus groups and interviews	Children aged 8-13 yrs. and their parents N=43 parents, N=70 children	Perception of healthy eating and shopping practices
(Tuomainen, 2009)	UK	Ghanaians	In-depth-interview and participant observation	18 households (N=41 individuals), 24 key informants	Meal format, eating pattern, meal cycle, shopping practices, food preferences
(Nicolaou et al., 2009)	Netherlands	Turkish/ Moroccan	14 Focus groups	N=83 aged= 20-40 yrs.	Food intake
(Nicolaou et al., 2004)	Netherlands	South Asian Surinamese	Focus group discussions	N=5 (4-6 per group); adults	Food intake, healthy eating
(Nicolaou et al., 2012)	Netherlands Morocco	Moroccan	8 focus groups	N=53 aged = 16-59 yrs.	Changes in and diet
(Nielsen et al., 2013)	Denmark	Turkish and Pakistani mothers living in Denmark	Focus groups	Mothers aged= 25-35yrs with at least one child < 30 months N=20	Food choice, eating behaviour
(Jonsson et al., 2002b)	Sweden	Bosnian Muslim immigrants in Sweden.	Focus groups	N=20 Women with children <18yrs.	Food choice
(Mellin-Olsen and Wandel, 2005)	Norway	Pakistani immigrants in Norway	Focus groups	N= 25 women	Dietary change in meal pattern, meal

Author	Country	Study population	Design	Participants	Dietary behaviour measured
					preparation, intake of specific foods (Koctürk model)

The 12 dietary behaviours examined in the included studies (**Table 4 and 5**) were food intake, fruit and vegetable intake, changes in food habits, intention to change diet, product purchase, meal preparation, dietary acculturation, dietary intake (healthy/unhealthy intake), eating habits, food neophobia, dieting and diet quality. Dietary behaviour as used in this review encompasses all food related behaviours that are grouped into three main categories (Stok et al., 2016) 1. Food choice, consists of outcomes preceding the actual consumption (e.g. produce purchase and intentions); 2. Eating behaviour, comprising outcomes to do with the actual act of eating (e.g. dieting and food neophobia); and 3. Dietary intake consisting of all outcomes related to what is consumed (e.g. fruits and vegetable intake and healthy versus unhealthy).

2.3.2 Factors influencing dietary behaviours

There were some commonalities and differences in factors influencing dietary behaviour across different ethnic minority groups. For instance, lack of availability of traditional food, foods meeting religious prescriptions, and preferred foods were identified in all study populations irrespective of the region of origin or country of settlement. Religious beliefs and prescription was a common factor influencing dietary behaviour in all studies conducted among South Asians (Pakistanis, Bangladeshis, Indians), African, Middle Eastern and Eastern European immigrants. Taste preference was another frequently reported factor, irrespective of the population or setting of the study. Factors reported by specific populations included fluency in the host language identified in a study conducted among diabetic Pakistani born persons living in Oslo (Fagerli et al., 2005) and traditional lifestyle as deduced from occupation, e.g. reindeer herder reported in both papers addressing diet among the Sami and non-Sami groups in Norway (Garnweidner et al., 2012, Brustad et al., 2008b). Also a number of studies found differential associations between socioeconomic status (SES) and dietary behaviour (Kumar et al., 2004, Nicolaou et al., 2006, Koochek et al., Volken et al., 2013, Skreblin and Sujoldzic, Kassam-Khamis et al., 2000). For instance, SES was not associated with dietary behaviour

among populations from East Asia, Indians and African origin in Norway (Kumar et al., 2004), or in a Surinamese population in the Netherlands (Nicolaou et al., 2006), while in a study conducted in the UK, SES influenced dietary intake among South Asians from Bangladesh. All factors are shown in **Table 6**.

2.3.2.1 Emerging clusters

Sixty-three individual factors resulted from the first step of the analysis and seven clusters emerged from the brainstorming and structuring process: social and cultural environment (16 factors), food beliefs and perceptions (11 factors), psychosocial (9 factors), accessibility of food (10 factors), social and material resources (5 factors), migration context (7 factors), and the body (5 factors). As shown in **Table 3**, the ‘**social and cultural environment**’ cluster contained the highest number of factors influencing dietary behaviours. These factors include cultural identity and desire to maintain traditional food identity (Kassam-Khamis et al., 2000, Jonsson et al., 2002a, Nicolaou et al., 2009, Tuomainen, 2009, Kohinor et al., 2011, Hendriks et al., 2012) religious beliefs and prescriptions (Jonsson et al., 2002b, Fagerli et al., 2005, Lawton et al., 2008, Grace et al., 2008, Rawlins et al., 2013), social networks (Nicolaou et al., 2006), social bonding (Lawton et al., 2008), level of acculturation and socialization processes (Skreblin and Sujoldzic, 2003, Nicolaou et al., 2006, Nicolaou et al., 2009), social norms/social role of food (Grace et al., 2008) and gender (Perez-Cueto et al., 2009, Edwards et al., 2010, Volken et al., 2013). Another set of factors was grouped under the cluster ‘**accessibility of food**’. This cluster includes factors relating to: availability of food in new environments and workplaces and included specific foods, such as traditional, ‘halal’, healthy or preferred foods (Jonsson et al., 2002b, Fagerli et al., 2005, Lawton et al., 2008, Grace et al., 2008, Cueto et al., 2009, Garnweidner et al., 2012, Rawlins et al., 2013, Perez- Terragni et al., 2014), accessibility of food (e.g. physical access to traditional foods) (Lawrence et al., 2007, Grace et al., 2008, Tuomainen, 2009, Rawlins et al., 2013) and food price (Lawrence et al., 2007, Rawlins et al., 2013). Several factors were also grouped in the ‘**food beliefs and perceptions**’ cluster: beliefs regarding traditional foods and convenience foods (Kassam-Khamis et al., 2000, Jonsson et al., 2002a), family member preferences (husband/children) (Jonsson et al., 2002a, Nicolaou et al., 2012, Garnweidner et al., 2012, Helland-Kigen et al., 2013), parental dietary habits (Skreblin and Sujoldzic, 2003), familiarisation of host foods before migration (Tuomainen, 2009), familiarisation of food in new environments (Jonsson et al., 2002b) and new ways of shopping

(Terragni et al., 2014), beliefs and perceptions of healthy food (Lawrence et al., 2007, Kohinor et al., 2011, Rawlins et al., 2013), and perception of cost (Rawlins et al., 2013). The ‘**migration context**’ cluster consists of factors influencing dietary behaviour such as region of origin (Kumar et al., 2005, Tuomainen, 2009,) and country of origin (Skreblin and Sujoldzic, 2003, Brustad et al., 2008a,) length of stay (Skreblin and Sujoldzic, 2003, Edwards et al., 2010) and age (Nicolaou et al., 2006). The ‘**body**’ cluster includes factors such as health (Jonsson et al., 2002b, Grace et al., 2008, Nielsen et al., 2013), dieting (Kumar et al., 2004), BMI (Koochek et al., 2011) and body size preferences (Skreblin and Sujoldzic 2003). The ‘**psychosocial**’ cluster included factors such perceived behavioural control, perceived grouped norms (Carrus et al., 2009, Nielsen et al., 2014), taste preference (Garnweidner et al., 2012), motivation (Nielsen et al., 2014) and past behaviours (Carrus et al., 2009). This cluster of factors seems relevant to the South Asian population as shown in **Table 6**. The last set of factors was grouped under the ‘**social and material resources**’ cluster, which includes education (Koochek et al. 2011), SES (index of income and education) (Kassam-Khamis et al., 2000, Nicolaou et al., 2006, Carrus et al., 2009, Rawlins et al., 2013), competency in host language (Fagerli et al., 2005, Grace et al., 2008), nutritional knowledge (Jonsson et al., 2002b, Grace et al., 2008), change in lifestyle (lifestyle referring to work/school commitments) and time for food preparation (Garnweidner et al., 2012, Rawlins et al., 2013).

Table 6: Emerging factors and their association with dietary behaviours across different populations

Cluster	Factor	Dietary behaviour	Evidence	Study population
Migration context	Region of origin	Eating behaviour	(Tuomainen, 2009)	Ghanaians
	Urban or rural dweller	Food neophobia	(Edwards et al., 2010)	International students
		Fruit and vegetable intake	(Volken et al., 2013)	Portuguese, German, Italian, Turkish, Serbian, Kosovan residents of Switzerland
	Country of birth	Food neophobia	(Edwards et al., 2010)	International students
	Length of stay in host country	Food neophobia	(Edwards et al., 2010), (Skreblin and Sujoldzic, 2003)	International students; Immigrants from Bosnia and Herzegovina

Cluster	Factor	Dietary behaviour	Evidence	Study population
	Place of residence in host country	Food intake	(Skreblin and Sujoldzic, 2003)	Immigrants from Bosnia and Herzegovina
Social and cultural environment	Cultural identity	Food intake	(Kassam-Khamis et al., 2000), (Nicolaou et al., 2009)	South Asian, East Africa (Ismailis), Somalian
		Food choice	(Jonsson et al., 2002a)	Turkish/Moroccan
		Changes in diet	(Nicolaou et al., 2012)	Moroccan
		Healthy dietary intake	(Kohinor et al., 2011)	Dutch Surinamese
		Eating habits	(Hendriks et al., 2012)	Surinamese Indians
		Eating behaviour and food choice	(Tuomainen, 2009)	Ghanaians
	Religious beliefs	Food choice	(Jonsson et al., 2002b)	Bosnian Muslim immigrants in Sweden
		Eating behaviour and dietary change	(Lawton et al., 2008)	South Asians with type 2 diabetes
		Perception of healthy eating and shopping practices	(Rawlins et al., 2013)	African Caribbean and South Asian
		Dietary intake in relation to type 2 diabetes	(Grace, 2011)	South Asian
	Perception of host culture	Eating behaviour, meal preparation, perception of change in food habits	(Garnweidner et al., 2012)	African and Asian
	Level of acculturation	Food intake	(Nicolaou et al., 2009), (Skreblin and Sujoldzic, 2003)	Turkish/Moroccan; Immigrants from Bosnia and Herzegovina
	Religious prescriptions	Shopping, preparation and eating behaviour, dietary acculturation	(Terragni et al., 2014)	Somali, Pakistani, Sri Lanka, Iraq, Turkey, Iran, Egypt, Algeria, Lebanon, Morocco
	Socialization process in place of residence	Food intake	(Skreblin and Sujoldzic, 2003)	Immigrants from Bosnia and Herzegovina

Cluster	Factor	Dietary behaviour	Evidence	Study population
	Conformity to tradition	Food choice	(Jonsson et al., 2002a, (Tuomainen, 2009)	Somalians, Ghanaians
	Traditional dietary values/beliefs	Perception of healthy eating and shopping practices	(Rawlins et al., 2013)	African Caribbean and South Asian
	Gender	Fruit and vegetable intake	(Volken et al., 2013)	Portuguese, German, Italian, Turkish, Serbian, Kosovan residents of Switzerland.
		Food neophobia	(Edwards et al., 2010)	International students
		Dietary intake	(Brustad et al., 2008a)	Sami
	Social networks	Changes in diet	(Mellin-Olsen and Wandel, 2005)	South Asian
	Social ties	Food intake	(Nicolaou et al., 2009)	Turkish/ Moroccan
	Age	Dietary intake	(Koochek et al.)	Iranian
		Fruit and vegetable intake	(Volken et al., 2013)	Portuguese, German, Italian, Turkish, Serbian, Kosovan residents of Switzerland
	Social bonding	Eating behaviour and dietary change	(Lawton et al., 2008)	South Asians with type 2 diabetes
	Taste preferences	Healthy dietary intake	(Garnweidner et al., 2012),(Halkier and Jensen, 2011)	African and Asian; South Asian
		Food choice	(Kohinor et al., 2011)	Dutch Surinamese
		Dietary intake (healthy/ unhealthy intake)	(Jonsson et al., 2002a)	Somalian
		Food habits, meal preparation	(Khunti et al., 2008)	South Asian
Food beliefs and perceptions	Status of traditional vs convenience foods/diets	Healthy dietary intake	(Halkier and Jensen, 2011)	South Asian
	Familiarization of host foods before migration	Eating behaviour and food choice	(Tuomainen, 2009)	Ghanaians

Cluster	Factor	Dietary behaviour	Evidence	Study population
	Familiarization with host country foods	Food choice	(Jonsson et al., 2002b)	Bosnian Muslim immigrants in Sweden
	Husband's food preferences	Changes in diet	(Nicolaou et al., 2012)	Moroccan
	Children's food preferences	Changes in diet	(Nicolaou et al., 2012), (Mellin-Olsen and Wandel, 2005)	Moroccan; South Asian
	Inter-generational influences on diet	Food intake	(Ahlqvist and Wirfalt, 2000)	Iranian
	Parental dietary habits	Food intake	(Skreblin and Sujoldzic, 2003)	Immigrants from Bosnia and Herzegovina
	Perception of healthy foods	Healthy dietary intake	(Perez-Cueto et al., 2009)	International students
	Food beliefs	Healthy dietary intake	(Kohinor et al., 2011)	Dutch Surinamese
		Food intake	(Ahlqvist and Wirfalt, 2000)	Iranian
		Perception of healthy eating and shopping practices	(Rawlins et al., 2013)	African Caribbean and South Asian
	Perception of cost	Perception of healthy eating and shopping practices	(Rawlins et al., 2013)	African Caribbean and South Asian
		Dietary intake (healthy and unhealthy intake)	(Khunti et al., 2008)	South Asian
		Food choice	(Lawrence et al., 2007)	African, South Asian
	Social role of food	Healthy dietary intake	(Raberg Kjollesdal et al., 2010)	South Asian origin
Accessibility of food	Availability of traditional foods	Food intake; Food choice	(Kassam-Khamis et al., 2000), (Lawrence et al., 2007)	South Asian, East Africa (Ismailis); African south Asian
	Food prices	Perception of healthy eating and shopping practices	(Rawlins et al., 2013)	African Caribbean and South Asian
		Food choice	(Lawrence et al., 2007)	African, south Asian
	Neighbourhood level physical proximity	Perception of healthy eating and shopping practices	(Rawlins et al., 2013)	African Caribbean, South Asian

Cluster	Factor	Dietary behaviour	Evidence	Study population
	Accessibility	Dietary intake	(Grace et al., 2008)	South Asian
		Changes in diet	(Mellin-Olsen and Wandel, 2005)	South Asian
	Season	Food intake	(Kassam-Khamis et al., 2000)	South Asian, East Africa (Ismailis)
		Changes in diet	(Mellin-Olsen and Wandel, 2005)	South Asian
	Food-related life-style	Shopping, preparation and eating habits, dietary acculturation	(Terragni et al., 2014)	Somali, Pakistani, Sri Lanka, Iraq, Turkey, Iran, Egypt, Algeria, Lebanon, Morocco
	Lack of time for cooking traditional foods	Food habits, meal preparation	(Garnweidner et al., 2012)	African and Asian
		Healthy dietary intake	(Halkier and Jensen, 2011)	South Asian
	Time for food preparation	Dietary intake (healthy and unhealthy intake)	(Khunti et al., 2008)	South Asian
		Food choice	(Lawrence et al., 2007)	African, South Asian
	Change in lifestyle (work/school commitments)	Changes in diet	(Nicolaou et al., 2012)	Moroccan
		Food choice	(Jonsson et al., 2002a)	Somalian
		Food intake	(Nicolaou et al., 2009)	Turkish/Moroccan
		Changes in diet	(Nicolaou et al., 2012)	Moroccan
The body	Health consciousness	Food choice	(Lawrence et al., 2007)	African, south Asian
		Changes in diet	(Mellin-Olsen and Wandel, 2005)	South Asian
	Dieting Tendency	Breakfast skipping	(Kumar et al., 2004)	East Asians, Indians, sub-Saharan Africa, Middle East/North Africa
	Body image perception and preferences for larger body size	Dieting practice	(Skreblin and Sujoldzic, 2003)	immigrants from Bosnia and Herzegovina

Cluster	Factor	Dietary behaviour	Evidence	Study population
	Child's health	Food choice	(Nielsen et al., 2013)	Turkish and Pakistani mothers
Psychosocial	Taste preferences	Dietary intake (healthy and unhealthy intake)	(Khunti et al., 2008)	South Asian
		Food habits, meal preparation	(Garnweidner et al., 2012)	African and Asian
		Healthy dietary intake	(Halkier and Jensen, 2011) (Kohinor et al., 2011)	South Asian, Dutch Surinamese
		Food choice	(Jonsson et al., 2002a)	Somalian
	Attitudes	Purchase of ethnic food	(Carrus et al., 2009)	South Asian
	Subjective norms	Purchase of ethnic food	(Carrus et al., 2009)	South Asian
	Perceived behavioural intention	Purchase of ethnic food	(Carrus et al., 2009)	South Asian
	Perceived group norms	Purchase of ethnic food	(Carrus et al., 2009)	South Asian
	Past behaviour	Purchase of ethnic food	(Carrus et al., 2009)	South Asian
	Motivation	Dietary intake (healthy and unhealthy intake)	(Khunti et al., 2008)	South Asian
Social and material resources	Competency in host language	Changes in diet; Dietary intake	(Fagerli et al., 2005), (Grace et al., 2008)	South Asian
	Educational attainment	Dietary intake	(Brustad et al., 2008b)	Sami
	SES	Food intake	(Skreblin and Sujoldzic, 2003, Volken et al., 2013, Kassam-Khamis et al., 2000)	Immigrants from Bosnia Herzegovina; Portuguese, German, Italian, Turkish, Serbian, Kosovan residents of Switzerland; South Asian Muslims from Bangladesh, Pakistan East Africa (Ismailis)
	Personal income	Diet quality	(Nicolaou et al., 2006)	Surinamese of South Asian and African origin
	Nutrition knowledge	Dietary intake	(Grace et al., 2008)	South Asian

Cluster	Factor	Dietary behaviour	Evidence	Study population
		Changes in diet	(Kjøllestad et al., 2010)	South Asian

2.4 Discussion of the systematic review findings

Europe has a growing population of ethnic minority groups whose dietary behaviours are potentially of public health concern and the factors driving these behaviours need to be understood. This review identified a broad range of factors and clusters influencing dietary behaviour and identified gaps in the literature to guide future research. The evidence from this review will feed into developing a framework for the study of factors influencing dietary behaviours in ethnic minority populations in Europe.

This review extracted sixty-three individual factors that were grouped in seven clusters. Two clusters, '**social and cultural environment**' and '**food beliefs and perceptions**' had the highest number of factors shown to shape dietary behaviours of ethnic minority populations. These findings corroborate those of earlier reviews on ethnic minority populations (Gilbert and Khokhar, 2008, Leung and Stanner, 2011), in the sense that like other reviews, most factors identified are related to the socio-cultural environment and cultural beliefs and perceptions around food. In this review, factors are clustered in a way that cut across the more traditionally used socio-ecological levels (individual, family, community and society, see for example Whitehead and Dahlgren, 1991, Robinson, 2008). The socio-ecological model presents different layers of influence, with an underlying assumption that the layers operate in linearity. Thus, community factors are presumed to influence the individual via the family, whereas certain community factors may directly influence dietary choices, bypassing the family. In addition, the socio-ecological model depicts reality as artificially separating individual and social experiences. Clustering factors into systems may provide a more adequate means of depicting interrelationships between the factors. For example, in our analysis, social norm and identity were clustered together but would have been classified as 'community' and 'individual' factors using the socio-ecological model. By analysing data in this way, this study aimed to explore the underlying mechanisms that shape dietary behaviours, in a holistic, systems-based approach. This is in line with recent work that seeks to understand dietary choice as a social practice (Blue et al., 2016).

This review identified some factors that have also been shown to influence dietary behaviours of majority populations. These include food price, personal income (Roberts et al., 2013), social networks (Roberts et al., 2013), time constraints and food availability (Pollard et al., 2002), although these factors are often reported in low income groups (Roberts et al., 2013). However, many of the factors known to influence diet among majority populations were not identified in our review. For instance, a recent umbrella review among adults (Sleddens et al., 2015) which included studies conducted in Europe, Australia and North America, identified political environments, food advertising, late-shift work, behavioural regulation and sedentary behaviour as important correlates of dietary behaviour but these factors were absent in our review. This might be due to a bias in studies amongst ethnic minority groups, as there is a tendency by researchers to focus on socio-cultural factors. Factors that were identified as unique to immigrant origin groups include all factors within the ‘**migration context**’ cluster, and some factors from the other clusters such as level of acculturation, cultural identity, availability of traditional foods, familiarity with host country foods, competency in host language, perception of host culture and religious prescriptions. While the majority of the studies explored ‘differences’ across ethnic groups, this review found a need for research exploring ‘similarities’. This would be useful in adapting mainstream interventions for ethnic minority groups.

It is important to note that although dietary behaviour is generally considered to be associated with SES (Roberts et al., 2013), in our review SES was inconsistently related to dietary behaviour. For instance, a study conducted among adolescents in Oslo (Kumar et al., 2004) reported that SES using a composite measure of parental occupation, mother’s education, employment status and social security status was not associated with diet quality across the study sample of South Asians and African adolescents. In contrast, in other studies (Koochek et al., 2011, Volken et al., 2013, Skreblin and Sujoldzic, 2003), education was identified to be a determinant of selected food intakes including fruit and vegetables among elderly Iranian-born residents of Stockholm. The inconsistencies in the association between SES and diet corroborates previous studies that have observed differences in the association between SES and metabolic outcomes in different migrant populations (Agyemang et al., 2010). It has been hypothesised that these groups might be in another stage of epidemiological transition, where NR-NCDs (and risk factors) are still more prevalent (or equally so) in higher SES groups, as was the case among European populations in the 1950s and 60s (Agyemang et al., 2010).

Almost half the studies (44%) included in this review were focused on South Asians which is not surprising given that this group forms the largest ethnic minority group in some countries in northern Europe, where most of the studies were conducted (Gilbert and Khokhar, 2008). This ‘psychosocial’ cluster of factors seems relevant only to the South Asian population in our review; however, this is a reflection of only one study, therefore, there is insufficient evidence to be able to conclude that these factors are only important to South Asian populations. The findings should be interpreted with caution as not all factors may be applicable to all ethnic minority groups, as they are heterogeneous populations in terms of their acculturation level, ethnicity, socio-demographic status and religion.

Factors that were included in the ‘social and cultural environment’ and ‘food beliefs and perceptions’ clusters appeared to influence dietary behaviours amongst almost all minority groups. Among studies conducted with South Asians (Pakistani, Bangladeshi, Indians) and other migrants from predominantly Muslim countries religious beliefs and prescriptions were identified as important factors.

2.4.1 Strengths and limitations of the review

This is the first systematic mapping review that has mapped out factors influencing dietary behaviour among a diverse population of minority groups living in Europe. One difference between this review and others is in the method used in synthesizing the findings. Most reviews have used existing frameworks for this purpose (Robinson, 2008, Chastin et al., 2015). The approach used in this review has resulted in clustering of factors that transcends existing models, aiming to better capture the complexity of the system of factors influencing dietary behaviour. Another strength of this review was the inclusion of indigenous groups and Eastern Europe migrants to Western Europe in the search strategy, recognising that these groups are potentially disadvantaged and marginalized and may be more vulnerable to NCDs. However, only three studies were identified that reported factors influencing dietary behaviours among the Sami (Ross et al., 2009, Brustad et al., 2008a, Brustad et al., 2008b) and minority groups from the former Eastern Bloc European countries who commonly migrate to other parts of Europe (Volken et al., 2013). No studies on Roma populations were found.

Although migration is a phenomenon that is found in all European countries, most studies were conducted in Northern Europe, and predominantly among populations of South Asian origin.

Few studies were conducted among children and older adults. Findings need to be interpreted with caution as factors might differ across age groups. Many studies excluded in the reviewing process focused on describing dietary differences and did not present findings on the factors driving behaviour, which partly accounts for the limited number of relevant studies included in the review. The inclusion of mainly cross-sectional quantitative studies in this review reflects the types of studies available, which also means that causal relationships cannot be established between the factors identified and dietary behaviours

While there was no limitation for language during the search strategy, our review consists of articles published entirely in English. This could be due to the fact that other relevant articles may not have been indexed in the electronic databases used for this review.

2.4.2 Implications of the findings

Future research is needed to further deepen our understanding of the interrelationships between identified factors both within and between clusters. Studies into a broader range of more ‘mainstream’ factors (as with the majority population) are also recommended. There is also a need for more studies including longitudinal data of factors influencing dietary behaviours across the life course, particularly of young people and older adults among ethnic minority groups. Finally, a gap was identified for studies comparing the drivers of dietary behaviours across a wide range of ethnic minority groups including African migrants living in different contexts in Europe (including central and southern Europe) and including groups that are under-represented in national surveys such as the Roma, asylum seekers and refugees, which are increasingly relevant groups in Europe.

2.5 Conclusion

This review identified a broad range of factors and clusters of factors potentially influencing dietary behaviour among ethnic minority populations. Gaps in the literature included a need for researchers to explore the underlying mechanisms that shape dietary behaviours, which can be gleaned from more holistic, systems-based studies exploring relationships between factors and clusters. The dominance of studies exploring ‘differences’ between ethnic minority groups and the majority population in terms of the socio-cultural environment and food beliefs suggests a need for research exploring ‘similarities’, that is the relative importance of factors

influencing dietary behaviour in the general population in ethnic minority populations. This review shows that the range of factors that influence dietary behaviours among ethnic minority groups is limited.

This PhD sought to explore dietary practices and associated factors amongst among Ghanaians living in Europe. Study 1, identified a broad range of factors that influence dietary behaviours among ethnic minority groups more broadly but explanations of the ways in which such factors operate was limited in the literature. The findings point to a need to explore the mechanisms through which identified factors shape dietary behaviours. Consequently, study 2, in exploring dietary practices amongst people of Ghanaian descent focused on exploring the underlying mechanism through which identified factors shape dietary practices. In addition, the emerging factors identified in study 2 were categorised into clusters as identified in the mapping review to improve their explanatory value.

The next sections of this PhD describe the empirical study undertaken on a migrant population to explore dietary practices and explanations for these practices following migration to Europe. The next chapter presents the methodology used in the mixed methods study of this PhD; -a qualitative study (study 2) and quantitative secondary data analysis (study 3).

3 Methodology

Introduction

Chapter 3 describes the methodological approach of the mixed methods study. This is followed by an introduction to mixed methods research and the underlying epistemology, a description of the rationale for the choice of mixed methods in this PhD. The chapter continues with a description of the methods and design used for the qualitative component of the mixed methods and the methods and design for the quantitative component

3.1 Philosophical worldview / epistemology and application of mixed methods

I chose pragmatism as the philosophical paradigm for this research. My philosophical worldview is influenced by experience as a researcher in public health nutrition in Ghana, where nutrition research is often approached following the pragmatist paradigm. Pragmatism, unlike other philosophical viewpoints like postpositivism and interpretivism, is not committed to one reality. Rather, pragmatist researchers concentrate on the 'what' and 'how' of the research problem (Creswell, 2009; p. 11). As the intent was to explore dietary practices and understand factors associated with dietary practices among people of Ghanaian descent living in Greater Manchester, this is what was placed at the centre and then all possible methods that best addresses the problem were considered (Creswell, 2009). Pragmatism is seen as an underlying philosophical underpinning for mixed methods research (Plano Clark and Creswell, 2008).

Mixed methods research is a relatively new approach for conducting research, and it has gained popularity in public health research in recent years. It involves collecting and integrating both quantitative and qualitative data in a study (Tashakkori and Teddlie, 1998). A mixed methods approach is also known as integrating, quantitative and qualitative methods, synthesis or multi-methods, however the term "mixed method" is used more often in recent writings (Creswell, 2009; p. 217). The basic assumption underlying the use of mixed methods in research, as proposed by pragmatists in research is that the combination of both quantitative and qualitative research methods provides a more complete understanding of some research questions than either quantitative or qualitative research alone. Mixed methods research originated in the late 1980's from work of researchers in various disciplines including education, sociology and health sciences. Although it has gained popularity over the years, there are controversies about

its usefulness in different disciplines such as the natural and physical sciences (Creswell, 2009, Tashakkori and Teddlie, 1998). That notwithstanding a mixed method approach was used in the current research because the different research questions were best approached using a combination of quantitative and qualitative tools.

Creswell (2009) has identified some reasons for conducting mixed methods research. Firstly, at a general level, mixed methods approach is used because of its strengths of using both quantitative and qualitative research thereby minimising the limitations of either approach used alone. Thus, it is the best method to have a better understanding of some research problems (Creswell, 2009), by providing a bigger or richer picture than would have been observed using either quantitative or qualitative methods. Secondly at the practical level, this approach can be very useful if a researcher has access to both quantitative and qualitative data (Creswell, 2009).

The argument about using a single method against mixed method approach stems from the paradigm argument which contends that qualitative and quantitative research are two contrasting paradigms, hence combining methods is only superficial (Tashakkori and Teddlie, 1998). It is worth mentioning that the mixed methods approach can be mixed within qualitative or quantitative research (e.g. FGDs and individual interviews, or using secondary and collecting primary data) (Creswell, 2009).

Despite criticisms about the use of mixed methods in research, proponents of pragmatism have argued the importance of using mixed methods to understand some research problems such as the one being addressed in this PhD.

Five main purposes for using mixed methods in research have been outlined through theoretical reviews. These are triangulation, complementarity, development, initiation and expansion (Plano Clark and Creswell, 2008). In this study, the main rationale was for expansion. Expansion seeks to increase the scope of and range of inquiry by employing the most appropriate methods for different research questions (Plano Clark and Creswell, 2008; Tashakkori and Teddlie, 1998). The secondary aim of employing mixed methods design in this study was for complementarity.

Researchers have argued that the greatest value in combining types of data lies in the ability of one type to compensate for the weaknesses of the other (Small 2011, O’Cathain, 2007). The underlying assumption is that any given type of data can produce only a given kind of

knowledge; each method addressed a different aspect of the research question. Thus, exploring dietary practices and associated factors amongst people of Ghanaian descent living in Europe required looking at the phenomenon of Ghanaian dietary practices from different perspectives. This way the use of both qualitative and quantitative methods allows one method to complement the weakness of the other (Morse, 2003; Creswell & Plano Clark, 2007). Therefore, to complement the qualitative and quantitative nature of research objectives respectively, a mixed methods research design was employed in this PhD. This was necessary to fully explore dietary practices among Ghanaians living in Europe. By addressing these objectives, this study sought to build a more comprehensive understanding and obtain a broader picture of how and why dietary practices change following migration. A comprehensive approach was seen as necessary due to the complexity of the issues being investigated, i.e. migration and dietary practices.

. Despite these advantages of using a mixed method design, the challenge involved is having to collect and analyse both quantitative and qualitative data, for example, the length of time to do data collection in the two separate phases of the study (Plano Clark and Creswell, 2008).

3.1.1 Types of mixed methods

Several typologies for classifying mixed method strategies have been described in the literature. These include these include sequential, concurrent and nested approaches (Small, 2011). However, there has been a consensus on three basic mixed methods designs: convergent parallel mixed methods design, exploratory sequential mixed methods design and explanatory sequential mixed method design (Creswell, 2009; Plano Clark and Creswell, 2008).

When the two or more types of data are collected more or less simultaneously, it is referred to as concurrent designs, whilst when one is preceded by the other for methodological reasons it is described as sequential designs. Concurrent designs have been useful when the ordering of data collection was irrelevant. Nested designs refer to the extent to which multiple data types are collected from the same actors, organizations, or entities (Lieberman, 2005).

In a sequential mixed method study, the advantage is the ability to understand the mechanisms behind newly found associations or to test hypothesis. There have been many sequential studies

in recent years (Small et al. 2008; Johnston and Baumann, 2007). In all these studies, the conclusion is derived from a process in which prior data collection informed the nature and form of the subsequent alternative type of data.

In this research, exploratory sequential mixed method design was employed to identify important variables that were tested quantitatively. The first phase involved the collection and analyses of qualitative data, which was followed by the analyses of quantitative secondary data. Integration of the two methods occurred at the interpretation phase.

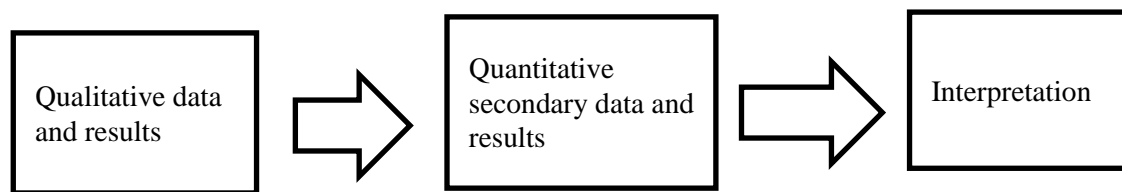


Figure 9: Exploratory sequential mixed methods design

3.1.2 Rationale for choosing exploratory sequential mixed methods design

The decision to use a sequential mixed method design was influenced by a number of reasons.

Firstly, the initial qualitative study was needed to explore perceptions of change in dietary practices following migration and secondly, to identify important variables of interest to the research that were tested in the quantitative study, for instance, social networks and ethnic identity (which emerged as common factors that influenced dietary practices). In addition, the second phase (study 3) focused on what people eat (dietary intake), which can be most appropriately addressed by using quantitative secondary data analysis. The use of qualitative methods was chosen first because little is known about the dietary practices of Ghanaians, and therefore an exploratory study was important to find out these practices. These were also useful to gather insight into whether dietary practices have changed or remained following migration, before deciding to focus on changes in dietary intake in the second phase of the research. By using quantitative and qualitative methods in combination, the study sought to provide a more comprehensive understanding of dietary practices than could be achieved having used either method alone (Morse, 2003; Creswell & Plano Clark, 2007).

Although the design was sequential, in this study, the quantitative and qualitative components had equal weighting. This implies that an equal priority was given to the design and data collection, as well as the interpretation stage of this research. Most studies conducted in the past to assess changes in dietary behaviour among migrant-origin groups, particularly in the US have relied on only quantitative data, using food lists (Yang and Fox, 1979, Lee et al., 1999, Satia-Abouta et al., 2002, Nicolaou et al., 2006). Using quantitative methods only has been criticised on the basis that they assess the outcome of dietary acculturation alone, and do not explore explanations for the dietary change. In this study, the qualitative data provided a deeper understanding as to why dietary behaviour might have changed or not, and factors influencing the degree of variations in dietary practices following migration. It also explored perceptions among Ghanaians of the influence of social and economic factors, perceptions of food insecurity and ways of mitigating food insecurity that may not have been appropriate to explore with quantitative tools. Exploratory sequential mixed methods provided a way to investigate associations that emerged in the qualitative study in the quantitative study, thus providing more comprehensive understanding of dietary practices than would have been observed using either a concurrent or nested designs. Thus, the decision was made to use exploratory sequential mixed methods design for this PhD.

Summary

The first part of the methodology chapter provides an overview of the research design employed in this PhD. The research adopted a sequential exploratory design for the qualitative research to inform the quantitative research and to complement the qualitative and quantitative objectives of this PhD. The next sections of this chapter present the methods for the qualitative and quantitative phase of the mixed methods study.

3.2 Qualitative Research

Introduction

This section describes the aim of the qualitative component of the study, study design, the data collection methods, analysis and ethical considerations. The main aim of the qualitative chapter was to describe and account for the dietary practices described by participants in this study in order to better understand a number of important determinants of dietary practices among Ghanaians living in the UK.

The following objectives were addressed in the qualitative study:

- To explore perceptions regarding changes in dietary practices following migration among people of Ghanaian descent living in Greater Manchester.
- To explore the influence of migration (or parental migration) on dietary practices among people of Ghanaian descent living Greater Manchester
- To explore the influence of social and economic factors in shaping dietary practices among people of Ghanaian descent living in Greater Manchester (i.e. the case of food insecurity)

The data collection process and analysis is clearly presented to ensure that the data is rigorously interpreted in the next sections.

3.1.3 Sampling

A purposive sampling technique was used to recruit participants as this approach allows selecting participants in terms of people's ability to discuss the topic (Patton, 2002), which was informed by their cultural background (Ghanaians). Sampling also sought for diversity in terms of characteristics known to influence dietary practices such as generation type, age, and SES. Unlike in quantitative research where sample size is calculated on the basis of the total population size and margin of error (Campbell et al., 2010), the sample size in qualitative research is not statistically estimated, rather it depends on the design being used. The researcher

purposively sampled for people with these varied characteristics, i.e. SES, age and generation type because earlier studies have shown associations between these variables and different dietary practices among migrant groups. Interviews were conducted until data saturation was achieved (Creswell, 2009). This method involves collecting data until new data does not reveal new themes or insights. Morgan (1996), stresses that data saturation should remain the underlying factor that influences the number of participants in qualitative research.

3.1.4 Setting

According to the Office for National Statistics, there were 93,000 Ghanaians living in the UK in 2009 (ONS, 2014). Most of these Ghanaians reside in London, Greater Manchester, Birmingham and Liverpool. Greater Manchester is one of the largest metropolitan areas in the UK and has ten metropolitan boroughs as shown in **Figure 10**. It is a county situated in North West England. Greater Manchester has high levels of poverty as compared to other parts of England (GMPC, 2012). Study participants were from across the 10 boroughs but the majority were resident in Manchester.

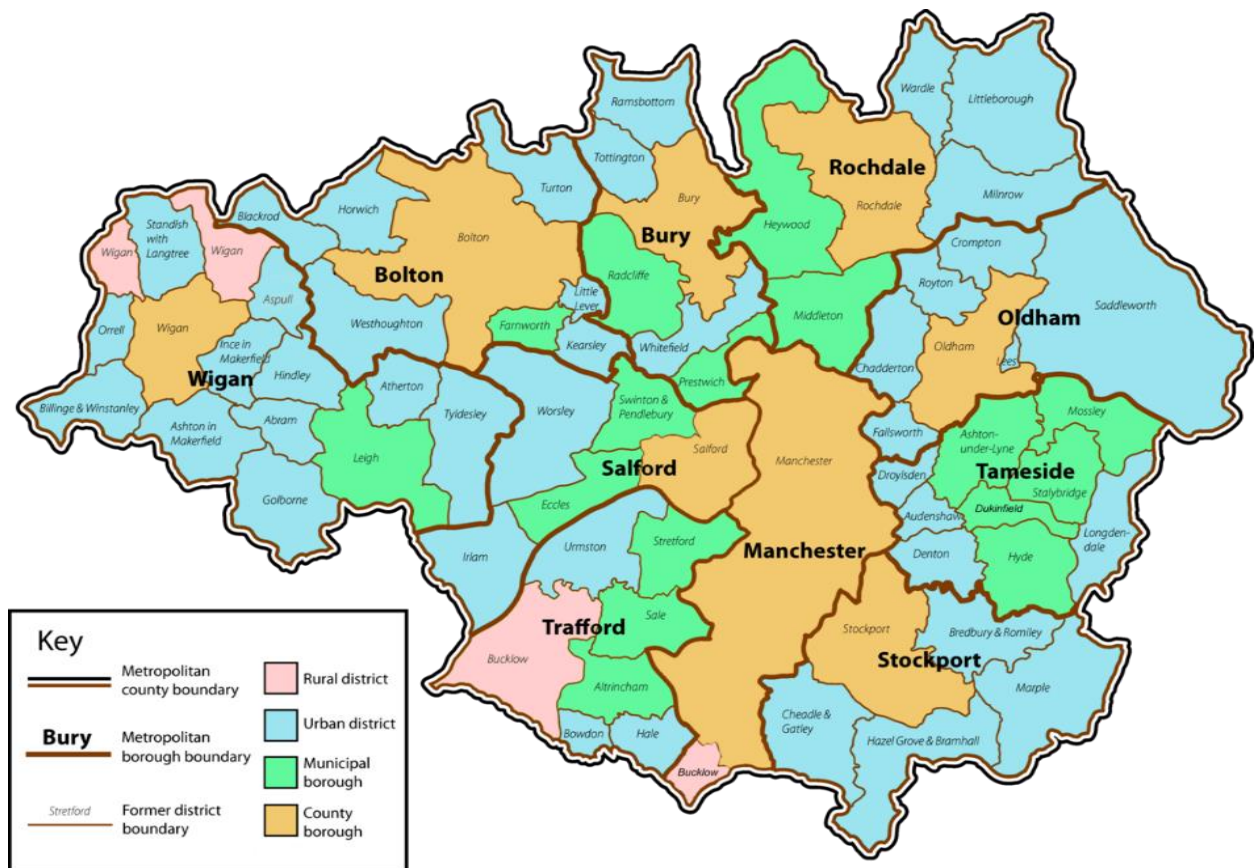


Figure 10: Map of Greater Manchester

Method selection

As individual accounts were required to understand dietary practices and reasons for change or maintenance of traditional dietary practices over time, the most appropriate data collection method that was chosen for this study was in-depth interviews. Qualitative interviews are particularly useful for exploratory studies (Bryman, 2012). Moreover, as this study sought to collect accounts of their migration stories, and the potential sensitive nature of issues such as the influence of economic factors on dietary practices (i.e. issues of food insecurity) further supported the decision to conduct one-to-one in-depth interviews. In-depth interviews using a semi-structured interview guide have an advantage over other qualitative designs, because the researcher is able to guide the participant so that particular topics of interest can be discussed (Bryman, 2012). They also allow the researcher to cover all topics thought to be of interest by the researcher and informed by the literature review by guiding the participants to discuss specific issues. An in-depth interview was used so that the topics that were of relevance in addressing the research objectives could be explored at length and in detail. A narrative

approach (Fryer, 2001, Hollway and Jefferson, 2000) was encouraged to the interviews so that people could tell their story thus, enabling them to identify changes that had happened over time. This approach also allowed for further probing by the interviewer.

3.1.5 In-depth interviews

The qualitative data were collected from 31 Ghanaians aged 25 years and above living in Greater Manchester between March and May 2015. The interviews were conducted face to face with participants in their homes. The interviews were mostly conducted in English. English is widely spoken among Ghanaians, so it was anticipated that there would be no language barriers to participation for these participants. However, some participants preferred to be interviewed in a Ghanaian language, “Twi” and therefore the questions were translated into the Ghanaian language verbally during interviewing as the researcher speaks and understand “Twi” fluently. All the audios of the interviews conducted in “Twi” were translated into English during transcription. There have been debates on the implication of translation in research. While this is an acceptable process, it is known to potentially introduce bias through for instance, incorrect interpretations (Temple and Young, 2004). Researchers have suggested that techniques such as back translation and the use of professional translators can be used to check whether a translation is 'correct'. The problem with this is the wealth of research that shows that there are many words that the translator can choose to select from and the 'same' words may have different connotations across languages (Edwards 1998). Increasingly, researchers are debating representation within their translations using a variety of means, for example, foreignization, situating translators within texts and providing text with the original language alongside (temple 2005). Sometimes people from language communities are employed as interpreters to transmit words across languages or as researchers to do the interviews themselves, translate them and then pass the English version to the researchers (temple and Young, 2004). In this research, however, the researcher also served as the translator which has an advantage over using others as the translation process served as a check to the validity of interpretations (Temple and Young, 2004). Additionally, translating to English prepares the data into a form that suits the management tools available for handling it such as NVIVO. Interviews lasted between 40 and 90 minutes. During each interview, the researcher sought to establish good rapport with the participant by maintaining eye contact, using participants' names, and listening attentively to participants and making them feel that she was really engaged in their stories

which helped to eliminate fear and distrust. Generic questions were asked from the start; for instance, “can you tell me about yourself?” and responses to these questions gave an insight into participants’ socioeconomic (education or occupation) and demographic status (age, ethnicity). The semi-structured questions then followed after a good rapport was built to explore the main topics for the interview (Longhurst, 2003). The depth with which participants gave accounts of their stories and the way they spoke at length were all indications of how comfortable they were with the researcher. Some participants insisted the researcher joined them to eat after the interview. In addition, some participants suggested other Ghanaians to the researcher for interviews; this positive response also facilitated the recruitment process.

There were three main sections during the interviews: 1. personal history and social networks; 2. perceptions of change in dietary behaviours following migration and food insecurity; 3. beliefs and perception of food. The interview guide was used by the researcher to ensure that important sub-topics were explored and also to ensure consistency in topics across participants, however, the questions were not followed in the same order for all participants. This is because sometimes participants may have touched on a topic earlier on in the interview that needed further probing and as result may end up discussing other topics. The interview guide is outlined in **Appendix B.4**.

During interviews, first generation migrant participants were asked to make comparisons between dietary practices before and after migration while amongst second generation migrants the change was captured by recalling dietary practices when participants lived at home with parents as compared with their current practices. The interview guide was piloted with one participant to make sure that the questions were clear before it was then used in all other interviews. This participant was known to the interviewer, met the inclusion criteria and was recruited based on convenience. The participant was asked whether he found any of the questions unclear or whether he had suggestions on improving the interviews. The main feedback from the interviewee at this stage was regarding how questions about personal history were asked. His concern was that not everyone would like to talk about the educational level or type of occupation. The researcher reflected on this and changed the approach used to solicit for personal information, by not asking directly about participants’ education or employment but rather asking them to talk about themselves. Given that there were no major changes to the interview guide as all questions were clear to the pilot participant, data from this interview was included in the main analysis.

3.1.6 The researcher's role

Reflexivity in research requires the researcher to examine her prior assumptions and experience to consider how these might shape the research process (Pope and Mays, 2008). Due to these reasons, it is required that the researcher explicitly identifies reflexively their biases, personal background and characteristics such as age, gender, SES and occupation, as this may have an effect on the data collected (Pope and Mays, 2008). In this regard, a reflexive approach that acknowledges the researcher's position, preconceptions, value systems and relation to the setting, which is critical at all stages of the research process (Robson 2002, Snape and Spencer 2003), is presented. My decision to conduct research into dietary practices was influenced by my professional background. As a Public Health Nutritionist, I have always been interested in people's dietary behaviours, however my interest in dietary practices of migrant developed after my two years stay in Belgium for my Master's programme and also the few times I visited the UK prior to starting my PhD. I observed that most of the Africans appeared to be overweight/obese as compared to other population groups. I therefore developed an interest in reading articles about ethnic minority groups living in high-income countries. The literature confirmed my personal observation of a high prevalence of obesity among African populations living in the UK. Surprisingly I found a plethora of articles on obesity and diabetes of some minority ethnic groups especially South Asians living in Europe. There were a few articles on overweight/ obesity and hypertension among Ghanaians living in the Netherlands. However, I could not locate a single article on dietary behaviours for Ghanaian populations living in the UK, although Ghanaians form one of the largest African populations in the UK. My focus on diet is because diet is a known key determinant of obesity.

I was fully aware and conscious of my educational privilege and the possible perception by participants that I may be of a higher SES class and this was visible during the interviews by some comments passed by participants. For instance, one participant used the phrase, "You know I am not a 'dada ba' like you are [a phrase in "Twi" that literally means daddy's girl and suggests a pampered rich child]. The achieved sample however, consisted of a mixture of high/middle SES and low SES participants including a university lecturer with a PhD degree and two PhD students. Nonetheless, my cultural background as a Ghanaian influenced participants to view me as an insider, as evidenced by statements that seemed to suggest that participants expected me to understand a point they were making because I was Ghanaian. For

instance: “You know the way we Ghanaians are”. As such I was an insider, but also an outsider, both and neither (Gilbert 1994; Mullings 1999). The challenge I encountered was the assumption that I would know exactly what was being alluded to (as an insider), therefore sometimes participants would not give details of an experience. However, I always probed and tried to encourage them to explain further. Even so, being an insider whilst conducting research has several advantages; it enables rapport to be established, and permits the researcher to interact naturally with participants because of a greater understanding of the group’s culture, greater acceptance by participants because of shared commonality (Dwyer and Buckle, 2009; Mullings 1999). A relative lack of objectivity, particularly in terms of assumed knowledge, can be seen to be a possible disadvantage of being an insider. However, being aware of this and being open and interested in participants and the ability to represent participants’ experiences adequately is considered more important than whether one is an insider or outsider (Dwyer and Buckle, 2009).

I realized that being a PhD student, among a community that may have very few PhD holders could result in a distance between me and the participants and also a power imbalance which could discourage potential participants from part taking in the research. In addition, I felt doing the research as part of my PhD could lead to the notion that I may be seeking for responses from participants for personal interest (to enhance my academic pursuit). However, other commonalities such as nationality, ethnicity and ability to speak some Ghanaian languages very fluently helped to bridge the gap. To become more accepted, I registered as a paying member of the Ghana Union and attended Union meetings in Manchester. The rapport that was built as demonstrated by how willing people were to parttake in the interviews and how generally friendly everyone was in making me feel like an ‘insider. Some participants, perceiving me as an insider invited me to partake in a Ghanaian meal after the interview was over. However, Mays (1993) argues that being an insider is not something that can be achieved as it is something you either are or not (Long and Johnson, 2000), a view point that I disagree with, because in this study, my personality and the good rapport built helped in making me feel like an insider. I believe my sociable nature and the way I interacted with people helped in forming the trust and rapport which resulted in an overwhelming interest by many Ghanaians. Participants showed trust in me as evidenced by their stories they shared in depth during the interviews. I still attend meetings and have become an active member of the Ghana Union of Greater Manchester even after my data collection and analysis.

Another concern that I had when starting fieldwork was my religious affiliation and the fact that I wore a head scarf. When living in Ghana and recently in the UK, some Ghanaian Christians have expressed surprise about my faith as a Muslim, because of the fact that I use a Ghanaian name 'Araba' which clearly shows which ethnic group I belong to, i.e. Fante. For such participants, I was an outsider by not being a part the Christian community of which almost all my participants were a part. During the study, some participants asked me, “why are you a Fante (from the south) and also a Muslim?” “Did you convert to Islam because of marriage?” But because I anticipated these questions before the interviews, I politely explained to them that the impression that all Muslims from Ghana are from Northern Ghana was a misconception; there are Muslims and Christians from the northern part of Ghana, and some Muslims and Christians from the southern part of Ghana as well. However, being a part of the Ghana Union and being able to speak some of the Ghanaian languages did not make this issue of difference in faith a challenge.

Being a researcher prior to commencing my PhD studies, there was a possibility that my previous knowledge and experience could bias the study findings. However, having previous experience of a topic being studied is argued to be an asset (Strauss and Cobin, 1990). To manage my own potential biases, I listened carefully and made sure that my background in the subject area did not unduly influence the interviews. In addition, to avert my concerns on how participants’ perception of my background could influence their responses during the interviews, I reassured them through interviews that, no answer was right or wrong, and I probed where necessary to understand issues being discussed.

I found that my origin as a Ghanaian and socialization into Ghanaian cultural practices also influenced the way in which I interacted with participants. This was particularly the case when I interviewed older women and participants I perceived as lower SES. For instance, I found it difficult to probe into details for participants’ personal details when I realized from their narration that they did not want to disclose enough details such as type of occupation and their level of education. So realizing this, I did not push so I could protect the rapport. This was the case with two participants. One of these participants however mentioned at the end of the interview having completed a university degree in Ghana before moving to the UK, which gave an idea of where to classify her. Another example was with exploring experiences of food insecurity and if participants perceived themselves as food insecure. Given the lack of a simple understanding of food insecurity, participants were asked about their food situation, by probing

for availability and accessibility of food (including participants' food preferences, traditional foods and healthy food), after which this was explained to them as representing food security. Due to the sensitive nature of the topic and my knowledge about the private nature of Ghanaians, I could not ask participants directly of their personal experience of food insecurity; rather I generalized the question and asked, "do you know anyone in the Ghanaian community who might be food insecure" and "have you been in a situation where you helped anyone who might be food insecure". This was a very useful way of getting information about the community, however, only a few people shared their personal experience of food insecurity.

Another observation I made amongst a few participants, was that when I gave them the option to choose what language they wanted us to use, it was always English. In the process of the interview, however, I realized sometimes it was a struggle for some to express themselves, so I had to politely switch to "Twi". This is an example of a power relation where I am placed in a certain position, with the assumption that I may not be able to speak the Ghanaian language or perhaps a way to prove to me that such participants were fluent in English as well or to prevent me from viewing them as less educated because they could not speak English.

Finally, some interviews were conducted in one of the Ghanaian languages "Twi". Being from the Akan tribe myself, I am very fluent in speaking "Twi" but I am not literate in writing "Twi", so I listened to the "Twi" audios and transcribed by translating into English. While translation is acceptable in research, it is known to potentially introduce bias through incorrect interpretations. Each audio was listened to more than twice to check the validity of interpretations. During analysis and write-up of the data, I have therefore ensured that analysis was systematically undertaken and the data is interpreted and presented in a way that reflects the depth of the issues discussed in the interviews.

3.1.7 Role of Gatekeepers

During the formative stage; a lay summary of the proposal was sent to the Ghana Union executive committee for their feedback on the research approach. Following a face-to-face meeting with the chairman, the researcher was introduced at one of the general meetings of Ghanaian Union in Greater Manchester where a brief summary of the objectives of the research were presented orally. The researcher sought feedback on how to recruit participants and more generally on the research objectives from the executives. The feedback was generally positive;

that is, the executives were pleased with the research and pledged support with the recruitment process, which they did by providing some contact numbers and introducing the researcher to potential participants. (Please see **Appendix B.5** for support letter from Ghana Union)

3.1.8 Ethical considerations

Ethical approval was sought from the School of Health and Related Research (ScHARR) ethical review committee at the University of Sheffield in March 2015 and data collection commenced immediately after approval. The confirmation letter from the ethics review committee is shown in **Appendix B**.

3.1.9 Issues of distress and harm

The in-depth interviews covered potentially sensitive issues that could cause some people to feel uncomfortable, for instance, questions around food insecurity. To ensure participants were comfortable during the interviews, I informed participants at the start of the interview that some of the topics may be sensitive. During interviews, I looked out for any signs of distress such as a change in attitude, tone or body language. Most participants showed no signs of distress, except for the husband of one participant who came in from work during the interview and showed his displeasure with a frown on his face. I quickly assured the participant that she could choose to discontinue the interview if her husband was not happy with me being around. The participant quickly introduced me to her husband, and mentioned my ethnicity ('Fante') and added that her husband was also a 'Fante'. The participant's husband immediately warmed up to me and started asking for more details about my background. After this, he left us (researcher and participant), and the interview continued. Before commencing interviews, two participants also showed concerns regarding the signing of the consent forms. They asked me why they had to sign if the interviews were going to be anonymised. I explained to them why they needed to complete and sign the consent form and again reminded them that they did not have to go ahead with it if they were not comfortable. After the further clarification on the need to complete the consent forms, these participants were happy to be interviewed.

3.1.10 Safety issues

Most interviews were conducted in the homes of participants, but two were conducted in a café and one in a park. The safety of the researcher was managed by ensuring that: 1) a mobile phone was carried at all times 2) I travelled during daylight hours and 3) I was in contact with my supervisors before and after each interview so that my whereabouts were known. 4) Additionally, participants were identified through a third party (leaders through whom recruitment were done) which reduced the risk to the researcher as there was a social connection. 5) I ensured that I used a reputable taxi company for most of my travels within Manchester and a bus for interviews conducted in other suburbs of Greater Manchester and again let a designated contact person (primary supervisor) know when I arrived and left an interview location. 6) Before each interview, I informed my contact person (supervisor) of the name and address of the participant, I informed her when I arrived at the address and called her as soon as the interview was over. There were two occasions that I forgot to call when I started the interviews, so during the interview, I asked for permission from the participant and sent a text to my contact person. For the few interviews that went beyond the stipulated time, due to interruptions to attend to family and to receive phone calls by the participants, I also asked for permission from the participant and sent a text to my contact person to inform her of the delay. Due to the above measures that were put to ensure the safety of the researcher, I had no issues regarding my safety during the data collection.

3.1.11 Recruiting participants

The chairman of the Ghana Union gave the researcher the opportunity during one of the group's meetings to speak briefly to the audience about the research. Participants who showed interest to participate in the study gave their contact number to the researcher after the meeting and they were also provided with information sheets (**Appendix B.3**). The researcher phoned potential participants after a week to address any questions on their research and their involvement, see if they were still willing to participate and to arrange a date to meet them for the interview. The researcher assured them that their contact information was going to be shared with my supervisor only.

To make sure that participation was not limited to members of the Ghana Union, as there are many other Ghanaians who do not identify themselves as part of the Union, the researcher left information sheets with potential participants from the Union, who passed the information sheet onto other potential participants. The information sheet had a summary of the research in English, contact details of the researcher so that interested people could telephone the researcher and information about the £20-pound gift voucher for participating in the study. When participants telephoned, and they needed further clarification regarding the research, their concerns were addressed after which the researcher arranged to meet with them. Participants were offered a £20-pound gift voucher to thank them for participating in the study. While paying participants has been argued to have implications in terms of the ethical obligation for consent and may have consequences on recruitment and data collected, this practice has become increasingly common (Head, 2009). Making a reasonable payment for involvement in a study is often viewed by participants as an acceptable thank you gift (Kirby, 2004) to compensate participants for their time.

Recruitment ceased when preliminary analysis revealed that significant issues were recurring. Moreover, as with all research, there were practical limits on the number of interviews and data that the researcher could manage.

3.1.12 Informed consent

Written informed consent was obtained from each participant before the start of each interview (**Appendix B.2**). Informed consent explained the purpose of the study, what was required of participants and how the data will be used, and the option to leave the study at any time should they want to.

3.1.13 Data recording procedures

All the interviews were audio-recorded with permission from participants. Audio recording has gained prominence in qualitative research in recent years and has an advantage over writing notes (Pope and Mays, 2008) because in writing, there is risk of the interviewer forgetting some important things while an audio recording is able to capture everything said by the participants. In addition, writing can disrupt the effectiveness of communication between the interviewer and the participants (Mulhall, 2003). However, taking field notes during interviews is also

recommended in addition to audio recording. The researcher kept a field diary to record all events; including interruptions and body language of participants during the interview. Other things that were recorded in the field diary included thoughts, questions and concerns after each interview as well as date, time for the interview and also other information about participants.

3.1.14 Privacy and confidentiality

Audio recordings of interviews were transferred from recorder to personal computer (PC) as quickly as possible after interviews and deleted from the recorder once stored on the researcher's personal computer which was encrypted and password protected. Transcripts were transcribed onto a computer and were anonymised (participants were assigned with ID numbers). As a back-up, audio recordings and transcripts were stored on the hard drive of the University of Sheffield's network drive. This information was only accessible to the researcher and the supervisory team. Consent forms and information sheets were stored securely in a locked drawer at the SchARR PGR office to prevent other people from having access.

On completion of the PhD, by October 2017, all documents enabling the future identification of participants in this study will be destroyed. Audio recordings and anonymised transcripts will be destroyed after all planned publications resulting from this research are published.

3.1.15 Quality criteria

To ensure quality in qualitative research implies paying attention to quality at all stages of the research. In qualitative studies, validity relates to whether the study has been undertaken in ways that ensure credibility (Bryman, 2012). To assess credibility, the findings should reflect the phenomenon being investigated in a qualitative study. Demonstrating credibility is not easy; however, there are various ways that have been recommended to improve credibility, each of which requires judgement by the researcher and the reader of the findings. These methods include triangulation, respondent validation, clear description of data collection and analysis, reflexivity, fair dealing and attention to negative cases (Pope and Mays, 2008, Long and Johnson, 2000). To make this research credible, a clear description of data collection and analysis, with details of how themes evolved into more sophisticated categories are presented. Additionally, quotations have been included to allow the reader to judge whether the

interpretation suggested is supported by the data. Another method used to improve credibility was to incorporate a wide range of different perspectives so that findings presented here do not only represent views of one group, a technique known as fair dealing (Long and Johnson, 2000). During the analysis process, attention was also paid to elements in the data that seemed to contrast to the emerging explanations of patterns observed in the data which helped in the revision of the patterns. Finally, the monthly supervision with academic supervisors where there was discussion on emerging themes and preliminary findings in the analysis process also contributed towards the credibility of the study. This was a way to check whether the interpretations made sense to others who were less involved in the analysis process.

3.1.16 Data management

There are a number of new software packages that have been specifically designed to aid qualitative data analysis (QRIHC). They include ATLAS/Ti and Nvivo. These software packages all have code and retrieval functions. They also provide counts of the frequency of codes and indicators of how many of the transcript documents may contain specific codes. While computer-aided analysis software package may be seen as helpful, it is important to note that these are only initial stages in the analysis. It does not make analysis less time-consuming, rather it makes the process more systematic (Bryman, 2012). Nvivo is the commonest software used for data management, thus the decision was taken to use Nvivo to facilitate data management.

Transcripts were anonymised with a unique ID and participants' names and study codes were stored safely on an encrypted password protected PC. All transcripts (n=29) were imported into 'NVivo 10 - Qualitative Data Analysis Software' for analysis. After transcription, each transcript document was read at least twice for familiarisation with the data before it was imported into Nvivo.

3.1.17 Data analysis

Preliminary analysis of data began during data collection, as this helps to shape the ongoing data collection, a process referred to as sequential analysis (Pope and Mays, 2008). This type of analysis according to Pope and Mayes (2001), is inevitable in qualitative research as it is impossible for the researcher collecting the data in the field not to start reflecting on what is

being heard and seen. This involved summarising participants' accounts after each interview. Summaries provided the researcher an overview of the interview providing insights into for instance, surprising findings. Additionally, because sample size was determined by data saturation, there was the need to begin analysis soon after interviewing so that point of saturation was identified.

The framework analytical approach to analysis (Ritchie et al., 2013) was employed for the study. This method is a type of thematic analysis that identifies commonalities and similarities in the data after which relationships in the different parts of the data can be identified in order to draw conclusion around themes (Gale et al., 2013, Ritchie et al., 2013). Thematic analysis is considered a method in its own right (Braun and Clark, 2006), although Boyatzis (1998) characterises it not as a specific method but as a tool to use across different methods. Generally, methods for qualitative analysis can be divided into two (Braun and Clark, 2006). The first methods are those tied to a particular theoretical or epistemological position for instance discourse analysis; phenomenology; narrative methods and Grounded Theory (Braun and Clark, 2006). The second methods are independent of theory and epistemology and can be applied across a range of theoretical and epistemological approaches, for instance, the framework method. This approach is a flexible tool that can be adapted for use with many qualitative approaches that aim to generate themes (Gale et al., 2013). The framework method sits within a broad family of thematic analysis (Gale et al., 2013).

The framework method is most commonly used for the thematic analysis of semi-structured interview transcripts. Unlike Grounded Theory, this method is not necessarily concerned with the generation of theory. A framework may be shaped by existing ideas and is less focused on producing a new theory (Ward et al., 2013). The framework tool also has no allegiance to either inductive or deductive thematic analysis, it can be adapted for use with deductive, inductive and in many cases, both. A combined approach was appropriate for this research as it allowed for new insights or unexpected aspects of the participants' experience and also the use of existing ideas. As this study aimed at addressing questions related to dietary practices following migration the framework approach was deemed the most appropriate.

Framework analysis offers a systematic and transparent approach to the analysis and allows inclusion of apriori and emergent concepts. The main defining feature of this approach is the

matrix output which makes use of rows as cases, columns as codes and cells of summarized data (Ritchie et al., 2013). This matrix provides a structure of reduced data to allow for analysis by case (in this study cases were ‘participants’) and code. This framework approach is suitable for the thematic analysis of semi-structured interview transcripts addressing specific questions (Ward et al., 2013). As the researcher was interested in exploring specific issues such as changes in dietary practices following migration the framework analytical approach was the most appropriate because it is best suited to research asking specific questions.

Framework analysis took place within 5 distinct stages.

Familiarization 2. identifying a thematic framework 3. indexing 4. charting 5. mapping and interpretation

Familiarization

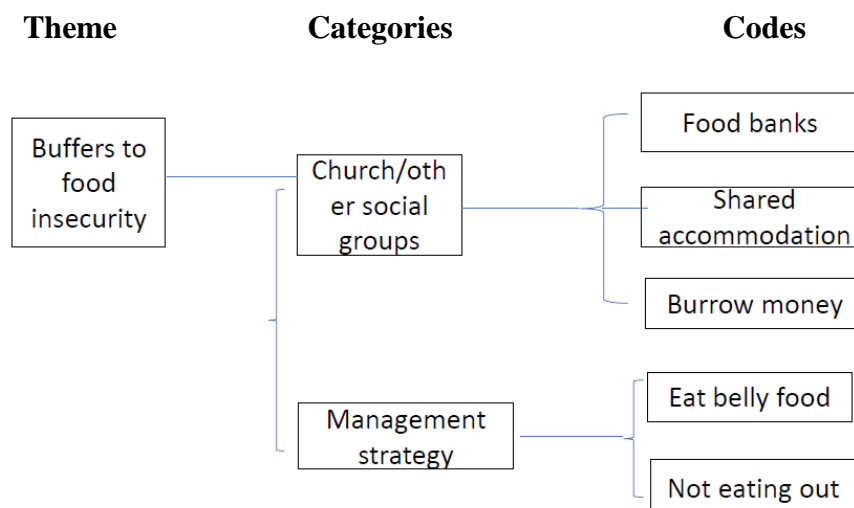
This involved immersion in the raw data by listening to audios, reading transcripts and studying field notes to be able list key ideas which included words/phrases that were frequently used by participants. All interviews were conducted by the student researcher and therefore, there was good understanding and familiarity of issues from the onset of the study. After each interview, reflections on the interviews were written. All recordings were clear and there were no problems in producing an accurate account of participants’ interviews. At the end of this stage the researcher had ideas of concepts to be used to label the data.

Transcription was conducted verbatim and all words and utterances such as ‘hmmm, ahh’ were noted which helped in the coding process as it added meaning to certain words and phrases depending on the context in which they were used. For instance, “hmmm it was not easy”, showed recall of something unpleasant or sadness. Each audio recording was listened to at least twice, while checking for the accuracy of the transcripts. All transcripts were printed out and notes, thoughts and impressions were recorded (Ritchie, Lewis et al. 2013) on one margin of the printed transcripts which helped in developing emergent themes. An example of an impression noted was: “the frequent reference to social support” which was common across all transcripts, hence emerged as a key theme in the analysis process.

Identifying a thematic framework

A priori themes informed by the literature and concepts that emerged from the interview transcripts were used to guide the development of the framework. Transcripts were each read, and line by line coding was used by the researcher at the initial stage to code the first few transcripts. Although line by line coding is criticized to break up the meaning of sentences, it allowed for the generation of new ideas and allowed anything that might be useful from different perspective to be coded (Ritchie et al., 2013) which could later be built into the framework. This approach generated lots of initial ideas comprising a mixture of values, emotions like sadness and other elements. Examples of codes identified were: ‘identifying as a busy person’; ‘bulk cooking’; ‘expressed sadness’. Codes were then grouped into clusters around similar and related concepts to create a hierarchy of categories and sub categories which were subsequently used to develop themes. For instance, ‘help from church members’, ‘borrowing money from close friends’, ‘eating belly foods’ (which refers to foods eaten just to get a feeling of fullness and the suppression of hunger; just for satiety) were all related to strategies to mitigate food insecurity, so they were put together with an overarching theme known as buffers to food insecurity (**Figure 11**).

Figure 11: Example of a hierarchy of codes



Indexing

The working analytical framework was then applied to the rest of the data in Nvivo by using codes to identify pieces of data which correspond to differing themes. This involved reading each phrase or sentence into detail and deciding what it is about, in order to determine which part of the framework to apply (Ritchie et al., 2013). This process of finalising the thematic framework was an iterative process that involved discussions with supervisory team, applying the framework to the data and refining the analytical framework until no additional codes were identified.

The example below shows how codes were broken into sub-components in the final analytical framework.

Table 6: Example of analytical framework

Theme: Description of dietary practices

Code	Description
Meal format	Typical foods consumed
Meal context	Eating with others, eating occasion, eating out, eating from a communal bowl
Structure and pattern of meal	Frequency of meal, regularity, timing
Food preparation	Frequency of cooking: daily, weekly
Shopping for food	Where food items are bought from, how often, what kinds of foods are bought
Other	Any example that deviates from the above

Charting data into the framework matrix

At this stage, the data was summarized in a matrix by themes for each case (transcript) using an excel spreadsheet. A separate spread sheet was used for each theme. Each cell in the matrix contained a summary of data by the researcher, which retained participants meaning and language, a quotation from transcripts and researcher notes that contained the meaning of the data as perceived by the researcher (Ritchie et al., 2013).

Mapping and interpretation

In the final stage of the framework analysis, the researcher in making sense of the data compared data within and between participants and themes in the matrix in order to identify typologies of dietary practices. This was done by studying notes under categories for each participant. This was an iterative process, which involved creating typologies and interrogation of cases in the matrix to see if typologies were the best fit for all and revising the typologies. This process was influenced by the research objectives of this study.

To be able to explain the typologies that emerged from the interviews, the researcher used emergent explanations from the data and explanations for particular factors influencing dietary behaviours from the systematic mapping review (study 1) of this PhD.

3.2 Quantitative secondary data analysis – study 3

Introduction

This section describes the design and methods used for the second phase of the mixed methods study, i.e. the quantitative part of this PhD. The quantitative study in this PhD consisted of secondary data analysis of the RODAM dataset, which was collected by a multidisciplinary team of researchers from Europe and Africa. The first part of this section describes the aim of the quantitative study, introduces the RODAM study, and presents details of the quantitative design- data collection procedures, sampling and recruitment. The final section describes the statistical analysis strategy employed, including how missing data were handled, descriptive statistics and linear regression analysis.

3.2.1 Rationale

The primary objectives of the quantitative part of this PhD were to explore changes in dietary intake and the association with acculturation amongst people of Ghanaian descent living in Europe. For West-African migrants in Europe, the degree of dietary acculturation has not been described so far, and the contribution of socio-cultural and migration-related factors remains to be investigated. In this study, the researcher assumed that differences in dietary intake between the RODAM study sites, i.e. rural and urban Ghana versus Europe (UK, the Netherlands and Germany) implied that there has been some dietary acculturation of Ghanaians overall living in Europe. Dietary acculturation was identified by Ghanaians living in Europe eating less traditional foods and more foods associated with westernisation/adaptation to the host country.

Therefore, the objectives of study 3 were to:

- To describe dietary change among people of Ghanaian descent living in Europe Ghanaians (by comparing dietary intake with Ghanaians living in rural and urban Ghana)
- To measure associations between acculturation and dietary intake among people of Ghanaian descent living in Europe

3.2.2 Design evolution

The initial plan was to conduct a quantitative survey in Greater Manchester as a follow up study to the qualitative study (study 2). However, after considering a number of factors, including the possibility of a high non-response rate, problems with identifying and recruiting participants, the relatively small sampling frame in Greater Manchester of Ghanaians (n=1400), the capacity of the researcher and time limitation within the PhD, the use of recent secondary data was seen as the best approach to address the quantitative objectives of this PhD. The overall aim of the PhD was to explore factors associated with dietary practices of people of Ghanaian descent living Europe, therefore analysing available secondary data on the dietary intake of Ghanaians in Europe was appropriate given that this method is complementary to the qualitative approach. Through professional links with Dr Mary Nicolaou (a co-supervisor of this PhD), that was first developed by working together on the DEDIPAC project which formed part of this PhD as study 1, the researcher was introduced to the core team of the RODAM project at the Academic Medical Centre, University of Amsterdam, Amsterdam, the Netherlands. The researcher was offered the opportunity to have access to data from the RODAM study. The RODAM study was identified as the only survey in Europe on Ghanaians that contained data on dietary intake and possible determinants of interest to this study. A publication proposal was submitted to the RODAM team for their input. The researcher then travelled to DIfE, German Institute of Human Nutrition, Potsdam, Germany to meet the RODAM team leading dietary data collection and analysis to further discuss the publication proposal in May 2016. The publication proposal was approved in July 2016 following revisions in the analysis plan. After approval of the publication proposal (**Appendix C.1**), there was a data exchange agreement that was negotiated between the University of Sheffield and the Academic Medical Centre, University of Amsterdam, Amsterdam, the Netherlands (**AppendixC.2**).

3.2.3 Research on obesity and type 2 diabetes among African migrants (RODAM)

RODAM is a multi-centre study that aimed to recruit 6,250 Ghanaians in four countries: rural and urban Ghana, UK, Germany and the Netherlands. The study used standardised protocols in all study sites. Each study site aimed to recruit 1250 individuals. A multidisciplinary team of researchers from Europe and Africa have collaborated to work together on RODAM to

achieve the goals of the study. RODAM consists of both quantitative and qualitative data collection methods. Variables measured in the RODAM study include demographic and socioeconomic status, migration related factors and health behaviour. Study sites of the RODAM study are London, Berlin, Amsterdam, rural and urban Ghana. The overall aim of the RODAM project was to understand the reasons for high prevalence of obesity and T2D among migrants from SSA in Europe. The aim of the nutrition component of the RODAM project was to assess dietary behaviour that may increase the risk of obesity and diabetes (Agyemang et al., 2014).

3.2.4 Secondary data analysis

Secondary data analysis as a research technique involves the analysis of data by a researcher who may not have engaged in the data collection process (Bryman, 2012). Using secondary data for research is encouraged so much that in the UK, some funding organisations will require applicants for a research grant for the collection of new data to demonstrate that there is no existing data that can be used to answer the research questions. After considering the potential challenges that might be faced in the field to conduct a large new survey to answer all the research questions in this PhD, and the advantages of using secondary data, the researcher decided that using secondary data was more beneficial; thus, the decision to use the RODAM data set to answer some of the research questions in this PhD. The advantages and limitations of using secondary data analysis are summarized in the table below:

Table 7: Advantages and disadvantages of using data (adapted from Bryman, 2012)

Advantages	Disadvantages (challenges)	Managing challenges
High-quality data –most large studies employ rigorous sampling methods and have laid down strategies for non-response rate that results in good quality data	Lack of familiarity with data-when you do a primary study, you are familiar with data but with secondary data you need some time to get familiar with the data	The researcher took some time to understand the data. Whenever there were uncertainties, an email was sent to the RODAM team to ask for clarification
It saves time and cost that will have been used to plan a new survey altogether	The data could be very complex	Only variables of interest to this PhD was requested from the RODAM team, thus the data the researcher used for analysis were less complex.
Opportunity to do more analysis and interpretation	No control over data	There were several suggestions to change and

		revise the objectives and analysis plan. However, after discussion with supervisors, the best options for this PhD was agreed upon with the RODAM team.
An opportunity to do various subgroup analysis	Absence of some key variables	Other variables that were of interest to the researcher from the study 2 were absent in the RODAM data i.e., data on availability and accessibility of foods. Therefore, these could not be explored in this study.

3.2.5 Ethical considerations

Prior to commencing the quantitative secondary data analysis, ethical issues surrounding the use of the RODAM data were considered. First the ethical approval granted from the respective ethics committees in Ghana (School of Medical Sciences/Komfo Anokye Teaching Hospital Committee on Human Research, Publication & Ethical Review Board), the Netherlands (Institutional Review Board of the AMC, University of Amsterdam), Germany (Ethics Committee of Charite-Universitätsmedizin Berlin) and the UK (London School of Hygiene and Tropical Medicine Research Ethics Committee) was shared with the researcher. Ethical approval was also sought from the ScHARR ethical review committee at the University of Sheffield in December 2016. Ethical issues considered by ScHARR included whether participants consented to their data being used for future research and if participants could be identified because of the analysis performed.

3.2.6 Sampling methods

The RODAM study focused on Ghanaian migrants living in different locations to enable comparisons of the prevalence of obesity and T2D between Ghanaian migrants living in different European cities, rural and urban Ghana. Adults Ghanaians aged 25 years and above were recruited in rural and urban Ghana, London, Berlin and Amsterdam. The RODAM project involved the Ghanaian community leaders including religious leaders and local key figures in all study sites. In Ghana, participants were recruited from two cities (Kumasi and Obuasi) and

15 villages in the Ashanti region. In the Netherlands, participants were recruited from the Amsterdam Municipal Health register, a register that contains information on country of birth of citizens which allowed for sampling using the Dutch standard indicator for ethnicity. The UK has no population register for migrant groups, hence Ghanaian organisations were used as the sampling frame. A list of these organisations was obtained from the Ghanaian embassy and the association of Ghanaian churches in the UK. In Berlin, a list of Ghanaians was provided by the registration office and members of Ghanaian organisations and churches in Berlin. Written invitations and information sheets regarding the study were sent to all potential participants aged 25 years and above in all three study sites. Participants were then phoned or visited after two weeks if they did not respond. For participants who showed interest in the study, an appointment was made for physical examination and a confirmation letter of the appointment was sent to their home/email address. Informed written consent was obtained from each participant before enrolment in the study (Agyemang et al., 2014). The participation rate was 76% and 74% in rural and urban Ghana respectively. In Amsterdam, the study received a 67% response rate of those invited; 68% in Berlin and 75% in London (Agyemang et al., 2016).

3.2.7 Data collection

Data collection consisted of interviews, physical examination and biological samples. Questionnaires were adapted to the local circumstance at each study site. Interviews lasted for about 60-120 minutes, and participants had a range of options: paper or digital version of the questionnaire. Interviews were conducted in the preferred language of the participants either Ghanaian language, English, German or Dutch in participants' homes. Interviews were based on a structured health questionnaire and contained questions on demographic and socioeconomic status, migration related factors and health behaviour. Interviewers were recruited from Ghanaian language speakers living in Europe and trained on the use of questionnaires, to take anthropometric measurements and physical examination. (Agyemang et al., 2014).

3.2.8 Data management

A sound understanding of the RODAM methods and datasets was required before starting analysis because the researcher was not involved in the design of the study and collection of the data. The data were screened for familiarisation of the variables in the RODAM data set. Inclusion/exclusion criteria showed that the age criterion of ≥ 25 years was only used for Amsterdam. All other study sites included some participants younger than 25 years, i.e. 18-24 years. The data were also examined for missing values. Missing data are considered important because they may reduce the information obtained from respondents leading to loss of data. In addition, missing data may indicate bias in the data especially when they are non-random. This may decrease the accuracy of measuring the desired outcomes (Roth, 1994). Missing data may be random or non-random (Schafer & Olsen 1998). The codes that were used for missing values were shared with the researcher. There were two types of missing figures -1111/-2222 and -9999.

1. -1111 or -2222 - missing because the question was not filled in.
2. -9999 is 'Routing Missing': For example, when a male participant did not answer questions on pregnancy is it coded as a -9999.

How missing data are handled may vary depending on the purpose of the analysis and the variables included. For missing cases completely at random (MCAR) and missing cases at random (MAR), several missing data methods have been developed in the last two decades (Schafer & Olsen 1998). Single imputation is possible in SPSS and is an easy way to handle missing data when just a few cases are missing (less than 5%). However, imputation may result in an underestimation of the standard errors, i.e. smaller confidence intervals. This increases the chance of a type 1 error. Therefore, this method is less adequate when 5% of the data is missing. When missing data exceed 5 % multiple imputations is recommended (Ward et al., 2013). For missing data not random (MNAR), imputation may not be sufficient, because the missing data are different from the available data, i.e. the complete data has become a selective group of persons (Cheema, 2014).

Missing data analysis for this study was run using SPSS. First, missing data were identified by obtaining the frequencies of the main study variables. **Table 9** shows that the percentage of missing values ranged from 6.2% to 8.9 %.

Table 8: Frequencies of missing data of main variables

	Missing		Valid N
	N	Percent	
City or village in Ghana	178	8.9	1833
Age of migration	169	8.4	1842
Feeling English/German/Dutch	147	7.3	1864
Spending free time with English/German/Dutch people - n.b. higher score means less time	141	7.0	1870
Spending free time with Ghanaian people - n.b. higher score means less time	140	7.0	1871
Feeling proud to be part of English/German/Dutch culture	137	6.8	1874
Having Ghanaian friends	136	6.8	1875
Having English/German/Dutch people understand me	135	6.7	1876
A lot in common with English/German/Dutch people	134	6.7	1877
Having English/German/Dutch friends	134	6.7	1877
Feeling Ghanaian	132	6.6	1879
In English/German/Dutch culture, I know what's expected of a person in various situations	131	6.5	1880
Understanding English/German/Dutch people	131	6.5	1880
I know how things are done in English/German/Dutch culture and I feel I can do them easily	131	6.5	1880

In Ghanaian culture, I know what's expected of a person in various situations	130	6.5	1881
I understand Ghanaian people	130	6.5	1881
Feeling comfortable with English/German/Dutch people	130	6.5	1881
Sharing most of beliefs and values with English/German/Dutch people	129	6.4	1882
I feel proud to be part of Ghanaian culture	128	6.4	1883
I feel comfortable with Ghanaian people	127	6.3	1884
Knowing a lot about English/German/Dutch culture	127	6.3	1884
I know a lot about Ghanaian culture	126	6.3	1885
Ghanaian people understand me	126	6.3	1885
I feel confident I know how to act in Ghanaian culture	125	6.2	1886

As missing data in this study were considered small and non-random, case mean substitution was used for individual cases that had one item missing. Case mean substitution assigns the subject's mean score based upon the related items that are present to the missing score. This strategy assumes that for any given case, the score on any data point is closely related to the scores on the remaining related data (Fox-Wasylyshyn and El-Masri, 2005). Participants with two or more missing values data on the items used in the assessment of the proxies of acculturation variables were excluded from the analyses (n=250). For other variables, such as age and gender, there were no missings in the data set used for the analysis. SPSS syntax was used in all analysis so that they could easily be repeated where necessary. **Figure 12** below shows the overall summary of missing values.

Overall Summary of Missing Values

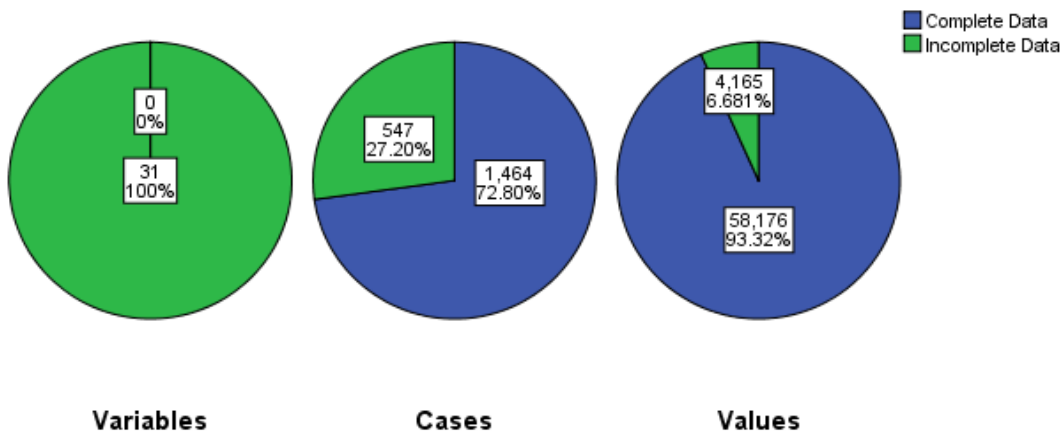


Figure 12: Summary of missing values

The overall summary of missing values displays three different aspects of missing values in the data as pie charts. The acculturation variables chart shows that each of the 31 analysis variables had at least one missing value on a case. The cases chart shows that 547 of the 2011 cases (Europe) had at least one missing value on a variable. The values chart shows that 4165 of the 62,341,000 values (cases \times variables) were missing.

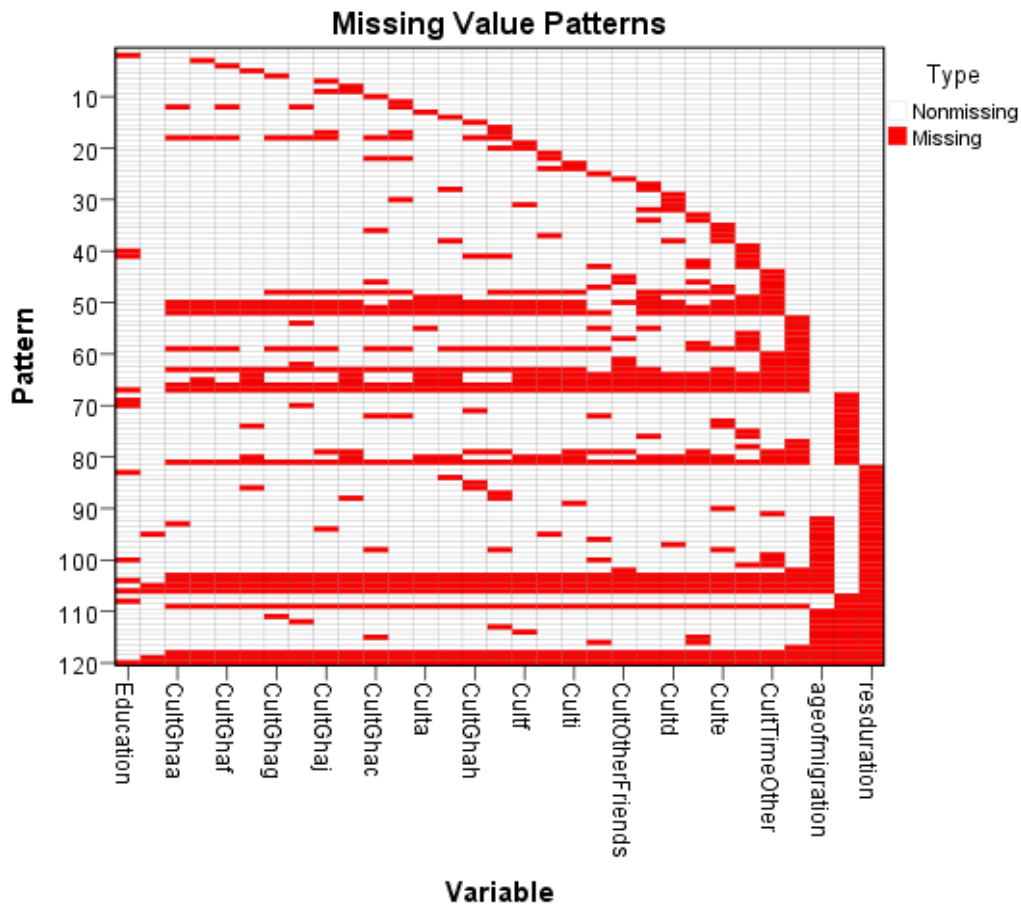


Figure 13: Missing value patterns

The patterns chart shows missing value patterns for the variables needed for analysis. Each pattern is associated with a group of cases with the same pattern of incomplete and complete data. For instance, pattern 120 represents cases which have missing values on all variables while pattern 30 cases with missing values on a few variables such as ‘culta’ and ‘cultGhah’. The chart orders variables and patterns to reveal monotonicity where it exists (Ho, 2013). This chart showed that the dataset is monotone and there are values that would need to be imputed in order to achieve monotonicity. **Figure 14** below shows a flow chart of excluded participants due to missing data.

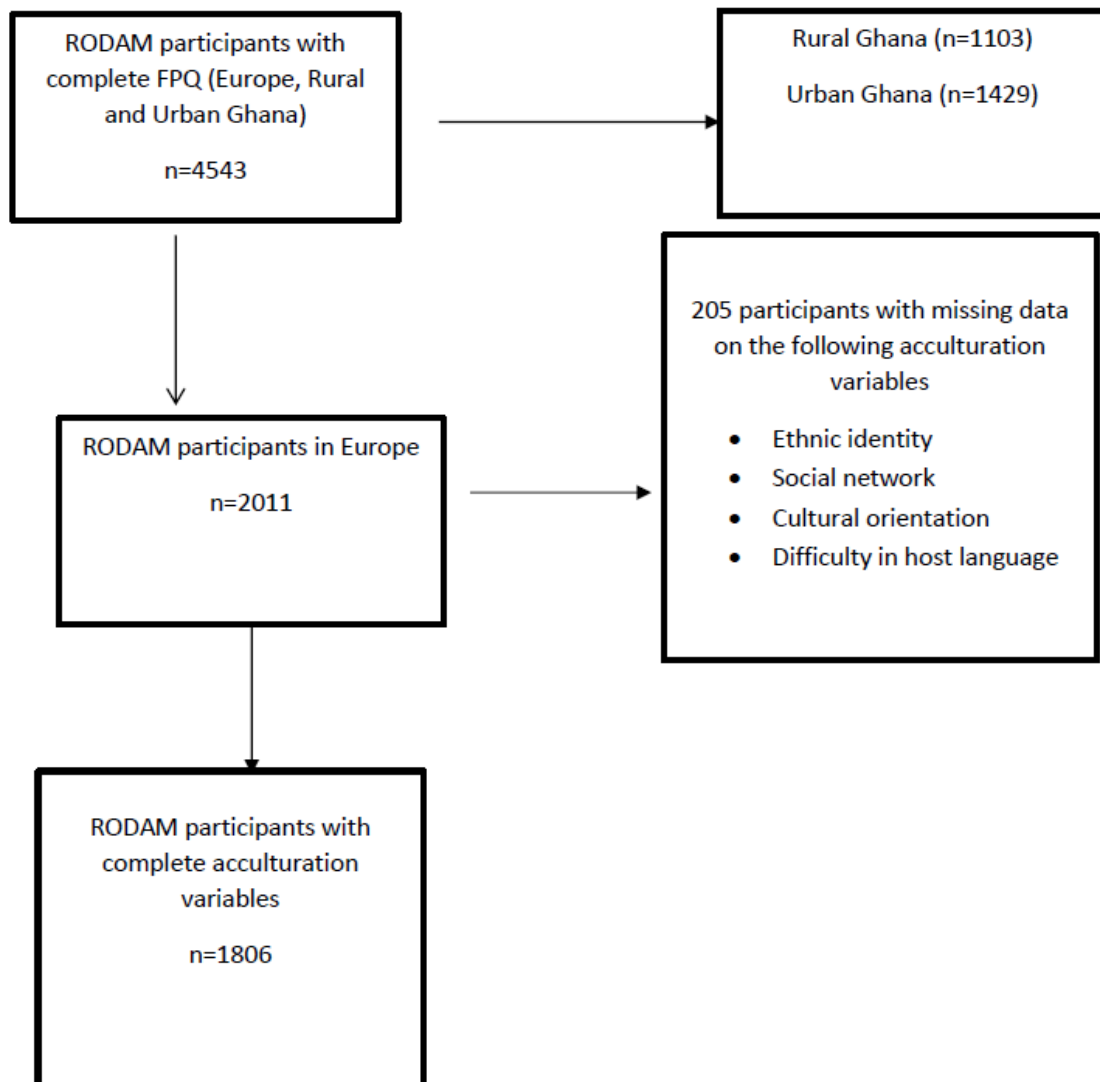


Figure 14: Flow chart of excluded RODAM study participants due to missing data

3.2.9 Measurement of food intake (Dietary assessment)

Several methods are available to assess individual’s dietary intake (e.g. 24h recalls, food frequency questionnaires [FFQ], diet history, food records). For dietary assessment, a

standardised, semi-quantitative Ghana-specific Food Propensity Questionnaire (Ghana-FPQ) documented the usual food intake of all RODAM participants (Agyemang et al., 2014). This questionnaire comprised frequencies of intakes of 134 food items in predefined portion sizes during the past 12 months. Additionally, 24-hours dietary recalls (24HDRs) were administered to a random sub-sample (n = 251) for the identification of representative foods, information on recipes, and portion sizes of traditional foods. In this PhD, only data from the FPQ was used. Food items were collapsed into 14 food categories, which were subsequently grouped as staples, complementary and accessory foods based on the Koctürk model (Kockturk-Runefors, 1991). To gain insights into biculturalism, i.e. having both Ghanaian and host country dietary intake patterns, traditional indicator foods, for instance, plantains, roots and tubers, and foods associated with westernisation/adaptation to the host country like pasta and potatoes were included in the categorisation of foods (Satia-Abouta et al., 2001). **Table 10** describes the grouping and categorisation of Ghana-FPQ food items for the present study.

3.2.10 Operationalisation of food intake (weighted food intake)

In food frequency questionnaires, a long list of food items generally can lead to an overestimation of the true intake of foods and nutrients (Cade et al., 2002). At the same time, measurement error can occur when certain food groups in the list comprise more items than others, such as fruits or vegetables (Michels et al., 2005). Thus, the regression correction method (Rosner and Gore, 2001) was applied to assign weights to food groups corresponding to the relative contribution of these groups to the explained variance in food category consumption. In linear regression, β -coefficients were calculated for the intake frequency of food groups (frequency per week) contributing to a food category. Subsequently, the regression coefficient of a food group was used as the weighting factor for the intake frequency of this food group. To estimate the weighted frequency of intake, linear regressions were first run with outcomes of frequency/week of food groups and exposures of summed frequency of food categories. The beta coefficients from the models represented the extent to which each food categories contributed to the food groups (staples, complementary and accessory foods). Weighted intake of each food category equals summed intake of the food category multiplied by the beta coefficient of the food category.

Table 9: Foods used in analysis

<i>Food group</i>	
Food categories	Food items included
<i>Staples</i>	
Plantain, roots and tubers	Plantain, cassava, yam, fufu, banku, kenkey
Rice and other grains	Rice and other grains (millet, couscous, polenta, spelt, barley)
Bread and cereals	Bread rolls buns, rye multigrain, whole grain bread buns, white wheat bread buns, Crispbread, muesli cereals, hot cereal porridge.
Potatoes and pasta	Sweet potatoes, potatoes, pan fried potatoes, pasta, noodles, macaroni
<i>Complementary foods</i>	
Vegetable soups and stews	Groundnut soup, palm nut soup, lentil pea bean soup, vegetable soup, nkontomire stew, okro stew, tomato sauce stew.
Red and Processed meat	Beef, goat, pork, bush meat, liver, giblets, meatballs, fried sausage, boiled sausage, dry cured meat, salami, liverwurst
Poultry	Chicken, turkey, duck
Egg	Egg
Fish and fish preparations	Fatty fish, lean fish, shell fish and fish preparations
Other protein sources	Milk, cheese and yoghurt and legumes, beans, seeds
<i>Accessory foods</i>	
Fruits	Apple, pear, orange, banana, watermelon, mango, pawpaw, plum, strawberries, cherries, berries, grapes, stewed fruit, dried fruit
Sugar-sweetened beverages	Sodas or minerals, light soft drinks
Alcoholic beverages	Regular beer, wine, liquor spirits
Cakes, sweets and spreads	Tart pie, yeast cake pastry, cake with cream, whipped cream, cookies/biscuits, chocolate, sweets candy, marmalade, jam, jelly, honey, butter, margarine

3.2.11 Operationalisation of proxies of acculturation

Assessment of acculturation was operationalised using two methods. The RODAM study had pre-defined unidimensional proxies (e.g. residence duration) which are considered to reflect exposure to the host culture. For residence duration, it was assumed that higher number of years of residence indicated greater exposure to the host country and this was classified into categories (≤ 10 years, 11-20 years, > 20 years). These cut-offs were guided by prior research (Mejean et al., 2007) that found a higher overall balance score on healthy diets among long-

term migrants (≥ 10 years residence) compared with recent migrants (< 10 years residence) in France.

The second operationalisation of acculturation adopted Berry's bi-dimensional perspective of acculturation (Berry, 1997). Acculturation was measured using 26 items based on ethnic identity (2 items), social contacts (4 items) and cultural orientation (20 items) as shown in **Table 11** (Matsudaira, 2006, Sayegh and Lasry, 1993). These three proxies (ethnic identity, social network, and cultural orientation) included questions regarding how participants felt about their identity, having friends from the host country and spending time within a social network of the host country or commonalities with the host culture. Examples of questions were: 'I feel Ghanaian', or 'I feel Dutch/German/British', and 'I feel comfortable with Ghanaian people', or 'I feel comfortable with Dutch people'. Mean individual scores were calculated, that ranged from 1 to 5 based on existing literature on assessment of acculturation. Based on the combination of the mean scores, participants were categorised into Berry's four strategies for classification of acculturation groups referred to as; assimilated, integrated, separated and marginalised (Berry, 1997).

Assimilation is described as when a group or individuals adopt the culture of the new society without maintaining their cultural identity (Berry, 1997). On the other hand, when there is an interest in the maintenance of the original culture and trying to adopt some cultural aspects of the new society, it is described as integration (Berry, 1997). When individuals neither want to maintain their traditional culture, or adopt that of the new society, it is described as marginalisation. Separation occurs when there is a rejection of host culture and orientation towards original culture (Berry, 1997). As each of these perspectives of acculturation could differ within participants each proxy of acculturation was analysed separately, i.e. it is possible for someone to be integrated regarding cultural orientation but still be separated when using ethnic identity.

Table 10: RODAM questionnaire items on acculturation

Ethnic identity

		Totally disagree	Disagree	Neutral	Agree	Totally agree
23.1	a. I feel Dutch.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*NB: this was English
in the UK, German
in Germany for all
questions alike*

b. I feel Ghanaian.

Cultural orientation

d. Dutch people understand me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. I feel proud to be part of Dutch culture.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. I know how things are done in Dutch culture and I feel I can do them easily.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. I feel confident I know how to act in Dutch culture.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. I understand Dutch people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. In Dutch culture, I know what's expected of a person in various situations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. I know a lot about Dutch culture (for example, its history, traditions, and customs).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Totally disagree	Disagree	Neutral	Agree	Totally agree
23.5 a. I share most of my beliefs and values with Ghanaian people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. I have a lot in common with Ghanaian people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. I feel comfortable with Ghanaian people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Ghanaian people understand me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. I feel proud to be part of Ghanaian culture.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. I know how things are done in Ghanaian culture and I feel I can do them easily.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. I feel confident I know how to act in Ghanaian culture.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. I understand Ghanaian people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. In Ghanaian culture, I know what's expected of a person in various situations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. I know a lot about Ghanaian culture (for example, its history, traditions, and customs).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Social network

None A few Quite a few Many
--

		Always	Often	Sometimes	Hardly ever	Never
23.2	a. I have Dutch friends.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b. I have Ghanaian friends.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23.3	a. I spend my free time with Dutch people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b. I spend my free time with Ghanaian people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.2.12 Socioeconomic, demographic and anthropometric variables

Socio-economic and demographic variables are known possible confounders of acculturation (Satia-Abouta et al., 2001), therefore completed education, age and sex variables assessed by a questionnaire were included in this study. Participants were categorised into four categories: ‘never been to school or elementary schooling only’; ‘lower vocational schooling or lower secondary schooling’; ‘intermediate vocational schooling or intermediate/higher secondary schooling (general)’ and ‘higher vocational schooling or university’. To assess body mass index (BMI), height was measured with a stadiometer. Weight was measured with a digital scale and BMI was calculated as weight/height² (kg/m²). BMI were categorised per WHO standards; not specified to ethnicity and were grouped into three categories (<25, 25-30-, >30 kg/m²) or four (< 18.5, 18.5-25, 25-30-, >30 kg/m²) (Agyemang et al., 2014).

3.2.13 Statistical analysis

Data analyses were conducted with the statistical software package IBM SPSS Statistics version 23. Socio-demographic, anthropometric and acculturation variables were presented as counts, means (\pm standard deviation, SD) for continuous variables while categorical variables were presented as percentages. Dietary intake for Europe and Ghana was presented as weighted frequency intake/week and presented in Chapter 5. Descriptive comparisons between sexes were performed using the Chi-square test.

To describe dietary acculturation amongst Ghanaians living in Europe, the weighted intake frequency/ week of staples, complementary and accessory foods amongst Ghanaian adults

living in rural and urban Ghana were compared with their compatriots living in Europe first as a baseline comparison by correcting for age and sex.

To measure associations between acculturation and dietary intake, dummy variables were made for acculturation strategy, separated, integrated and marginalised, with the assimilated group as the reference group because this group was assumed to be the ‘most acculturated’ given that assimilated represent a group or individuals who adopt the culture of the new society without maintaining their cultural identity. For residence duration, the ≤ 10 years in Europe was chosen as the reference because earlier studies have shown changes in dietary intake after 10 years. Multiple regression models were used to determine the independent effects of the different acculturation strategies on weighted food intakes of individual food categories within each food group (staples, complementary and accessory foods), in the baseline model. In the second model, age, educational level, site, BMI and sex and interactions (site*acculturation) were added. **Figure 15** below shows a conceptual framework that was used in this study.

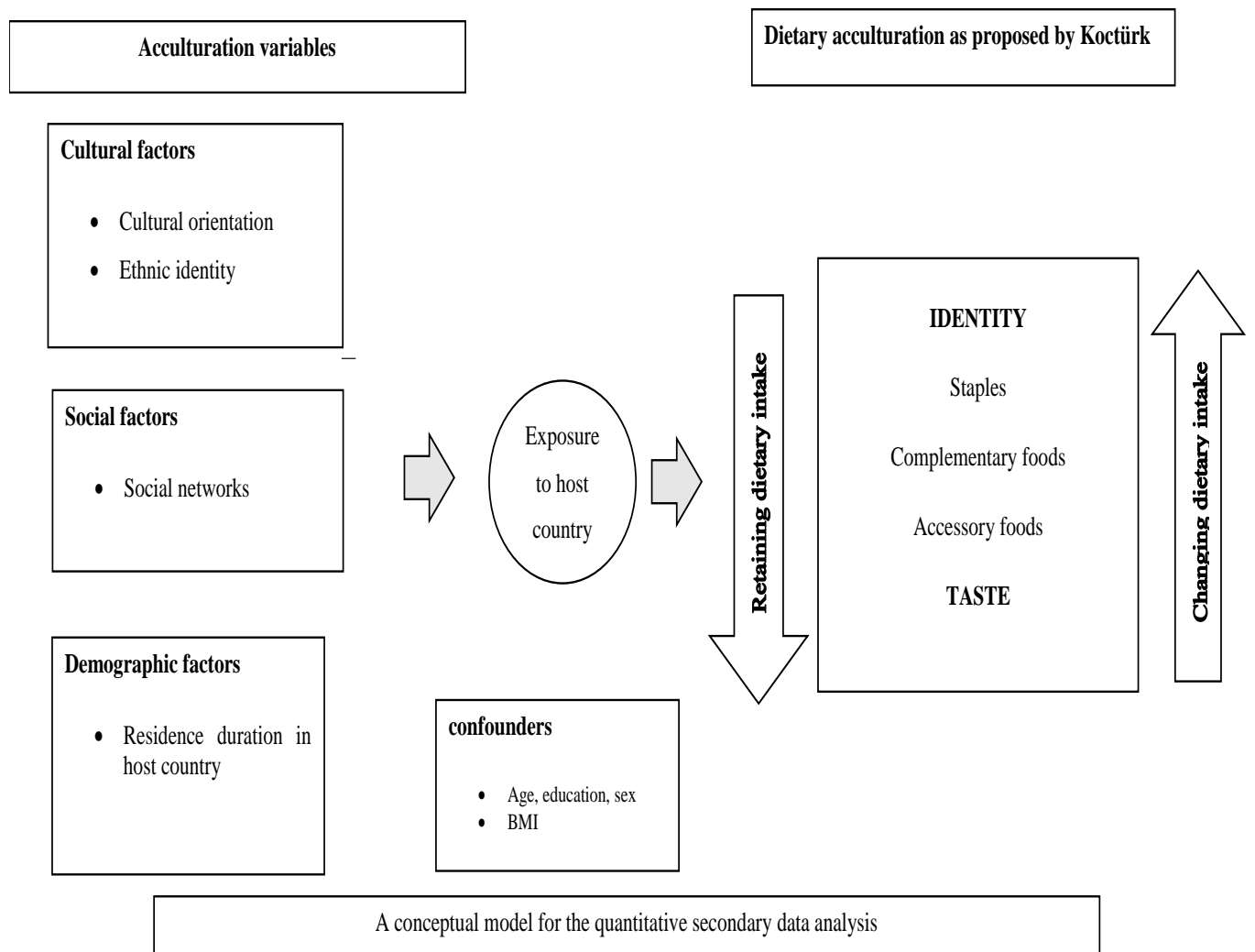


Figure 15: A conceptual model for the quantitative secondary data analysis

Summary

This chapter presented the mixed methods design of this PhD. It highlighted the types of mixed methods designs and presented a rationale for the choice of sequential explanatory design employed in this research. It went on further to describe the qualitative and quantitative methodology. The next chapter presents the findings and discussion of qualitative study (study 2).

4 Results and discussions of qualitative research

Introduction

This chapter presents the findings from the qualitative component of the study. The main aim of the chapter is to describe and account for the dietary practices depicted by participants in this study in order to better understand a number of important factors that influence dietary practices among Ghanaians living in the UK.

The following objectives were addressed in the qualitative study:

- To explore perceptions regarding changes in dietary practices following migration among people of Ghanaian descent living in Greater Manchester.
- To explore the influence of migration (or parental migration) on dietary practices among people of Ghanaian descent living Greater Manchester
- To explore the influence of social and economic factors in shaping dietary practices among people of Ghanaian descent living in Greater Manchester (i.e. the case of food insecurity)

The chapter starts with a description of the participants' characteristics before moving on to present an overview of the different dietary practices described by participants. The second sections of the chapter present explanations for the different practices observed, drawing on the findings from Chapter 2 (the clusters of factors). The final sections present findings of the influence of social and economic factors on dietary practices, focusing on one of its outcomes, food insecurity.

4.1 Participants' characteristics

The sample was made up of 19 women and 12 men. Most participants (n=26) were first generation migrants; the sample contained only five second generation migrants. All participants were adults aged between 25 and 68 years; the majority (n=18) were within the

25-44 age range, ten participants were 45- 64 years and three participants were over 65 years. All second-generation migrants were between 25-44 years.

Most first-generation migrants (n=19) had arrived in the UK between 1990 and 2005; some participants had migrated in the 1980s (n=4), and in the 1970s (n=2) with the majority of first generation migrants (n=15) migrating from urban areas in Ghana (mainly Accra and Kumasi), while others were from smaller towns and villages. Classification of participants' place of residence before migration was classified into 'urban or rural' based on area size ratio; localities of 5,000 persons and above are classified as urban in Ghana (La Verle Berry,1994). Some participants had lived in other parts of Europe before moving to the UK; two participants had migrated to Greater Manchester from Holland, one from Germany and another from Italy. Before settling in Greater Manchester (n=6) lived in London. The majority of participants were married (n=23) and some were single (n=5). Twenty of the participants had children, ranging from 1 to 7 in number.

Insights into participants' socioeconomic status were derived from participants' accounts of their educational level or occupation at the time of the interview. Half of the sample described work and education levels that can be classified as low SES and the remaining half of middle/ high SES across the age range as shown in **Table 12**. Classification of participant occupation as shown in **Table 13** was guided by the International standard classification of occupations (Van Leeuwen et al., 2002). Two-thirds of the participants were employed, with those classified as middle/high SES occupations including a medical doctor (n=1), nurse (n=1), health advisor (n=1), project manager (n=1), university professor (n=1), teacher (n=1), pastor (n=1), childminder (n=2), accountant (n=1) and PhD students (n=2). Participants classified as low SES participants included cleaners (n=5) and people who were unemployed. Most participants described themselves as belonging to the biggest ethnic group in Ghana, the Akan (Ashanti and Fante). Other participants were Ewe (n=3), Ga (n=3), Enzema (n=1) and Wala (n=1). Participants were mostly Christian (n=27) and a few were Muslim (n=4).

Table 11: Summary of participants' characteristics (n=31)

	Males (12)	Females (19)	Total
Age (years)			
25-44	8	10	18
45-64	2	8	10
65+	2	1	3

SES			
Low	4	10	14
Middle/high	8	9	17
Migration status			
First-generation migration	10	16	26
Second-generation migration	2	3	5
Duration of stay in the UK (years)			
≤20	5	15	20
≥21	5	1	6

Table 12: Participants' characteristics

Study ID	Age (years)	Age at migration (years)	No of children	Year of arrival in the UK (years)	Participant occupation /employment status	Rural/urban dweller before migration
P1	58	45	5	2002	Professional (but unable to work due to ill health)	Urban
P2	62	46	1	1999	Retired	Rural
P3	33	28	1	2010	Not specified	Urban
P4	36	10	0	1988	Professional	Urban
P5	36		1		Service and sales worker	Urban
P6	30	18	4	2003	Service and sales worker	Urban
P7	52	48	4	2001	Service and sales worker	Urban

P8	33		N/A		Professional	N/A
P9	33	23	N/A	2005	Professional	Urban
P10	25		N/A		Retired (elementary occupation)	N/A
P11	39	28	3	2005	Unemployed	Urban
P12	50	46	4	2011	Elementary occupation	Urban
P13	39	38	3		Elementary occupation	Not specified
P14	27	25	N/A	2013	Phd student	Urban
P15	45	33	3	2003	Not specified	-Not specified
P16	30		-		Phd student	N/A
P17	33	23	N/A	2005	Elementary occupation	Urban
P18	28	20	2	2006	Unemployed	Rural
P19	48	39	2	2006	Unemployed	Urban
P20	66	54	3	2003	Retired (elementary occupation)	Urban
P21	65	22	3	1972	Retired (professional)	Rural
P22	65	26	3	1976	Professional	Rural
P23	38	28	3	2004	Professional	Urban
P24	48	33	2	2000	Service and sales worker	Urban
P25	64	34	4	1985	Professional	Rural
P26	39	25	3	2001	Not specified	Rural
P27	28		0		Elementary occupation	N/A
P28	40	30	2	2006	Manager	Urban
P29	43	34	2	2006	Professional	Urban
P30	56	24	7	1981	Professional (pastor)	Rural
P31	48	22	7	1989	Service and sale worker	Urban

4.2 Dietary practices of Ghanaians living in Greater Manchester

This section describes participants' dietary practices; three sets of practices were discernible across the data set which are presented here as dietary practice typologies. These three typologies were discernible through differences in (1) the format of practices (which represents the type of food combinations); (2) the context of dietary practices (which includes practices such as, eating with family or others and meal location- eating at/out of home); (3) structure and patterning of meals (which refers to dietary practices such as regularity of meals, meal timing and meal skipping); and (4) food preparation and purchasing behaviours.

Based on participants' accounts three possible typologies of dietary practices following migration were conceptualized:

- 1) Mainly continuity of Ghanaian dietary practices and limited adoption of UK dietary practices (continuity practices)
- 2) Flexible use of Ghanaian or UK dietary practices (flexible practices)
- 3) Limited continuity of Ghanaian dietary practices and greater adoption of UK dietary practices (changed practices)

4.2.1 Mainly continuity of Ghanaian dietary practices and limited adoption of UK dietary practices (continuity practices)

Over a third (n=13) of participants described dietary practices in the UK as mostly consistent with those they perceived to be prevalent in Ghana. These practices were visible only among relatively older first-generation migrants, mainly people who were rural dwellers before migration and a small number of people who were urban dwellers before migration. These included both low SES and high/middle SES participants. A lot of participants in this group were either unemployed or retired. Within this group, there were two participants who perceived their meal format to be strictly consistent with what prevailed before migration, as this quotation illustrates:

“It’s hard for us to have tea, tea stuff, as for us who were village people back in Ghana, we ate the very traditional local Ghanaian foods before moving here. Fufu, ampesi etc. So we continued that tradition here” (P1, 1st generation, 44-64 yrs).

People with continuity practices described themselves as eating a lot of Ghanaian foods and only consumed UK foods as an exception or a way to get away from the usual. A broad range of Ghanaian foods that they reported consuming include: fufu, banku, tuo zaafi, akple, kenkey and jollof rice. Foods that they reported to have adopted since living in the UK include potatoes, fast foods like KFC, and fruit and vegetables not typically grown in Ghana.

Another participant emphasised in the quotation below that he mainly continued with Ghanaian foods and mentioned the new foods he had adopted.

“I totally eat traditional foods but having said that occasionally I will eat jacket potatoes etc. I like rice, mashed yam meal with red oil. I used potatoes here and it turns out very tasty” (P22, 1st generation, 65+ yrs.)

In addition to what was described as foods commonly eaten, participants with this typology also described their preference for Ghanaian foods and mentioned a few foods that they have adopted since living in the UK as these quotations illustrate:

“I just don’t like western foods but I like salads. I can eat salad, and drink water or juice, only juice and I am full. I was eating salads in Ghana as well but here I add broccoli. You know you cannot get broccoli in Ghana” (P20, 1st generation, 45-64yrs).

“Me I like foods from my country, but you know the saying that goes when you go to Rome you do what the Romans do, so though I don’t like food from here I eat it. My favourite food is kenkey and pepper and fish. I also like fried yam and potatoes” (P2, 1st generation, 45-64yrs).

The structure and patterning of meals among participants in this group also reflected what they perceived as continuity with what prevailed in Ghana; Ghanaian foods were reported to be consumed at most meal times either for breakfast, lunch or supper. For instance:

“I can just wake up in the morning and make banku and fried fish or I can make kooko, I am not fond of English breakfast” (P29, 1st generation, 25-44yrs).

The structure in terms of regularity and skipping of meals amongst some participants also reflected what was perceived as continuity of Ghanaian practice; either two meals in a day or one meal in a day as this participant explains:

“When I lived with my parents [in Ghana] we had two meals, no breakfast. [In the UK] I don’t usually eat early in the morning. If I have anything at all it would be tea or coffee..... And once we eat [lunch] I don’t have anything to eat again” (P25, 1st generation, 65 +yrs.).

Participants who could be categorised as having this typology described a wider context in which they ate Ghanaian and fewer contexts in which they ate UK foods. According to these participants, Ghanaian foods could be consumed at any time of the day and were also common at family meals, during weekends when all family members were around while UK foods were consumed away from the home and on rare occasions. Although most participants reported eating Ghanaian foods at home, one participant explained that leftovers from the previous night were sometimes packaged and eaten as lunch out of home, as this quotation illustrates:

“And sometimes we cook certain [Ghanaian] foods to keep it or when am going to work. I can send some to work for instance jollof rice” (P28, 1st generation, 25-44yrs).

Participants also described a range of social events where they were more likely to eat Ghanaian foods. These include weekly church meetings and church functions such as christening as this quotation illustrates:

“Fridays, we have a church group, we prepare jollof rice, people like our jollof rice” (P28, 1st generation, 25-44yrs).

Others occasion where participants were likely to consume Ghanaian foods include birthday parties and family visits.

For participants with continuity practices who had families, eating together with the family was usually during dinner. However, because members of the family had different routines for the day, not all families were able to gather for dinner. So, the weekends, especially Sunday was a day that most families gathered to eat together. UK foods on the contrary were consumed outside of the family meal contexts. While discussing cultural identity participants with continuity practices, described eating from a communal bowl as being the traditional practice

of eating which they perceived desirable, although they mentioned this practice had faded over the years, even in Ghana before they migrated.

With regards to food preparation and purchasing, most participants who can be described as having continuity practices described a change from their original food purchasing and preparation practices following migration to the UK. This group said that they shopped and cooked in bulk; that is, cooking and shopping to last for weeks or even months. For most participants, this was a change from the practice in Ghana where cooking and shopping were undertaken daily as this quotation illustrates:

“In Ghana, I couldn't cook and store it in the fridge because immediately you cook the entire meal is shared amongst everyone” (P13, 1st generation, 25-44 yrs.).

Participants described shopping more often from the Ghanaian shops, the Asian shops and market and less from supermarkets and local shops whereas in Ghana they mentioned that shopping was done in open markets.

4.2.2 Flexible use of Ghanaian and UK dietary practices

A smaller number of participants (n=11) described dietary practices that could be characterized as flexible with regards to Ghanaian and UK dietary practices. These practices were mostly visible among more recent migrants, participants who migrated as children, a few older participants who had a relatively longer duration of stay in the UK (i.e. >20 years), participants with young children and participants who were mainly employed outside of the home. These participants described their dietary practices in the UK to less strictly (compared with those who had continuity practices) match those they perceived to be prevalent in Ghana, while simultaneously adopting some dietary practices they perceived as prevalent in the UK.

Participants in this group described a broad range of foods they perceived as prevalent in the UK as typical of their diet including cereal, Weetabix, cornflakes and toast for breakfast, sandwiches for lunch, lasagne, potato pie and fish and chips for dinner. Participants also mentioned eating a broad range of Ghanaian foods such as corn dough porridge, fufu, soup and rice.

For instance:

“I am a Ghanaian so I normally eat fufu, rice, and Banku, also we eat some of the English foods, sometimes we eat some salad and sometimes we get some salads, sandwich like cheese and ham sandwich” (P18, 1st generation, 25-44yrs.)

Participants with flexible practices tend to have UK foods mainly for breakfast and lunch but dinner varied between Ghanaian and UK foods.

“My children like the English breakfast; fried eggs with onions and baked beans with bread and tea. Every Saturday morning, they prepare English breakfast” (P24, 1st generation, 45-64 yrs.).

Participants having flexible practices also described different contexts for having UK foods or Ghanaian foods. For instance, one participant explained that on days that she is working she eats a mixture of Ghanaian and UK foods, but when she has off days she and her family are more likely to have Ghanaian foods throughout the day.

“For those days I don’t work, we eat our own local foods three times a day, either we have cereal in the morning or porridge, then in the afternoon it could be fufu, yam, rice or anything since we are home. On my working days, I have breakfast then take packed lunch, I do the same with my children, I prepare packed lunch for them and when we get home we have cereals” (P23 1st generation, 25-44 yrs.).

Unlike participants with continuity practices who tended to buy prepared UK foods like KFC, participants in this group mentioned they bought frozen UK foods that needed to be cooked before consuming and interchanged UK foods with Ghanaian foods.

“I cook pasta and foods like lasagne, potato pie and chips” (P15, 1st generation, 45-64 yrs.)

Participants with flexible practices seemed to cook in bulk for Ghanaian foods such as soups and stews, and interchanged UK foods which were prepared and eaten daily with Ghanaian foods. One participant in this group said:

“I cook maybe every 2 weeks [referring to Ghanaian foods] for the family and we put some in the freezer and then some in the fridge (P24, 1st generation, 45-64 yrs.).

Another participant described cooking UK foods on specific days; implying that such foods are not cooked in bulk.

“Every Thursday the children want something from the oven. So I prepare lasagne or cottage pie” (P15, 1st generation, 45-64 yrs.)”

Participants with flexible practices described shopping more from supermarkets such as Tesco, ALDI and Asda as compared to participants with continuity practices as this quotation illustrates:

“I shop every Friday from ALDI or ASDA and from the African shops it is sometimes every two weeks” (P15, 1st generation, 45-64 yrs.)

4.2.3 Limited continuity of Ghanaian dietary practices

A small number (n=7) of participants described dietary practices that could be characterized as showing mainly adoption of host food dietary practices and a limited continuity of Ghanaian dietary practices. These practices were mostly visible among second generation migrants who tended to be of middle/high SES. In addition to the second-generation migrants, there was a couple of first generation migrants who had been living in the UK for a very long time whose dietary practices can be described as conforming to this group.

Participants with changed practices described themselves as eating a broad range of UK foods. Examples of foods mentioned include: cereals like pasta, couscous, sandwiches, toast and crumpet and fruits like blueberries and grapes.

“For this house, it’s a mixture of both. But due to the kids, the foreign foods we eat in this house are more” (P13, 1st generation, 25-44 yrs.).

These participants also described the contexts in which foods were eaten to mostly match what they perceived to be common in the UK which includes eating out of the home with friends and eating individually (not desiring to eat from a communal bowl). For these participants eating out was a common occurrence. Breakfast and lunch among these participants were often bought from work canteens.

Some participants recalled memories of being made to eat together from the same bowl as children by their parents; however, this practice was not seen as desirable by the bulk of people within this group unlike participants in typology 1.

“I didn’t like to eat together from the same bowl, because I am like very hygienic, so am like why would you wanna do that” (P10, 2nd generation, 25-44 yrs.)

According to participants with changed practices, Ghanaian foods were consumed occasionally during family visits, church functions and hardly prepared at home as this quotation illustrates:

“I eat jollof rice, but only my mom’s jollof rice [only when he visits his mom in London]” (P27, 2nd generation, 25-44yrs).

These participants described the structure and patterning of their meals as mostly matching those they perceived to be prevalent in the UK. For instance, most participants reported having a regular pattern of breakfast, lunch and supper at specific times as this quotation illustrates:

“So I always have breakfast. Most of the time, it will be between 8 and 8.30 and lunch it really depends on how busy the ward is, but varying from about 12.30 to 3 pm. If am working on a normal day and closing at 5pm, I will probably eat dinner around 7 ish” (P10, 2nd generation, 25-44 yrs.)

Participants with changed practices described cooking for meals usually one at a time, but where cooking was mentioned, it was only to last for a day or two. For instance:

“You know what, am always looking for something I can prepare quickly. I try and cook a couple of times in a week in the evenings. I hardly touch stews [Ghanaian]. So I will have meat, rice, a portion of salad. I like cherry tomatoes, so rocket salads, peppers...and sometimes I will have shito as a substitute for stew” (P5, 2nd generation, 25-44 yrs.)

This group of participants mainly shopped from supermarkets such as ASDA and Tesco. They rarely shopped from speciality ethnic shops.

Summary of findings of description of dietary practices

The above descriptions of participants’ dietary practices showed that participants retained, to a varying degree, some aspects of Ghanaian dietary practices while adopting different aspects of

the UK food culture. Across the three typologies, there were more variations in terms of meal format (as compared to the other elements of food practices), specifically the types of foods commonly consumed and the context for eating Ghanaian foods. Participants who could be described as having mainly Ghanaian dietary practices seemed to consume more Ghanaian foods at all eating events, at any day of the week and on special occasion, whereas participants with flexible dietary practices adhered less strictly to what they perceived as their Ghanaian dietary practice, while simultaneously adopting UK foods. Participants with changed practices described having adopted the host country's dietary practices. Such participants mainly consumed UK foods and only consumed Ghanaian foods on special occasions. Food preparation and shopping seemed to be done in bulk by participants with mainly continuity practices and flexible practices, while participants with limited Ghanaian dietary practices seemed not to cook in bulk.

The next section describes the different factors that emerged in explaining dietary practices among participants.

4.3 Explanations for dietary practices

This section presents explanations for the different practices observed, drawing on the findings from Chapter 2 (the clusters of factors). Participants' accounts revealed several interrelated factors influencing dietary practices following migration some of which reflected intentional actions and others which were unintentional. These factors were categorized into four key clusters as identified in Chapter 2 (as detailed below) in order to improve their explanatory value:

- 1) **Social and cultural environment** refers to beliefs or practices such as cultural identity, religious beliefs, and social networks that influenced participants' dietary practices.
- 2) **Accessibility of food** refers to factors relating to availability, physical accessibility of traditional and cost of traditional foods in host environment
- 3) **Migration context** refers to characteristics or the context of a participant before migration such as whether they were rural or urban dweller and region of origin. It also refers to country of birth; that is whether a participant was born in home country (Ghana) or in the UK.

4) **Food beliefs and perceptions** refers to things that participants believe to be true about food and perceptions. Examples include status of convenience foods, children’s preference and perception of healthy foods.

Table 14 shows all factors that emerged as explaining dietary practices from the interviews. The most important ones are described in the next section.

Table 13: Cluster of factors that influence dietary practices of Ghanaians living in Greater Manchester

Social and Cultural environment	Accessibility of food	Migration context	Food beliefs and perceptions
Cultural identity/ Ethnic identity	Lack of time for cooking traditional foods	Country of birth	Perception of host country food/traditional food
Perception of host country	Availability of traditional foods	Year of migration	Familiarization of host foods before migration
Socialization process in place of residence	Accessibility of traditional foods	Urban/rural dweller	Parental dietary habits
Conformity to tradition		Place of residence in host country	Perception of healthy foods
Social network		Age at migration	Perception of cost

4.3.1 Social and cultural environment

Amongst all factors that emerged (**Table 14**) cultural identity and social network were identified by all participants in explaining dietary practices.

Cultural identity

All participants emphasised the importance of maintaining cultural identity on dietary practices while describing why they retained traditional dietary practices in the UK. Participants used terms like “our foods” or “Ghanaian foods” or “African foods” or “we eat” or “our local foods” in describing what they perceived as Ghanaian foods. The importance of maintaining cultural identity was expressed particularly amongst participants with continuity practices. Within the Ghanaian population, there are several different sub-ethnic groups, and food was also used as

a marker of a participant's ethnic group among participants with continuity practices as this quotation illustrates:

"I am a traditional Ashanti man; [participant asks his daughter who was in the room] - what is my favourite food? [She answers fufu.]- yes! Fufu, what the Ashanti man calls fufuo. You know what, until the day I die that will be my favourite food" (P30, 1st generation, 45-64yrs).

The importance of cultural identity in continuing Ghanaian dietary practices was also echoed by some second-generation migrants with changed practices, although they did not seem to attach the same level of importance to eating Ghanaian foods as most first-generation participants. For such participants with changed dietary practices, eating Ghanaian foods as a way of maintaining cultural identity was only practised in particular contexts, such as during family visits. For instance:

"I eat it [referring to fufu] because that's our culture, that's our identity. So, I may not like to sit down to eat the food but I like it when I go home and I see my mom eating the food, so it's because it's my culture, my tradition" (P27, 2nd generation, 25-44yrs).

Other participants with changed practices (and one with flexible practices) described themselves as having hybrid British-Ghanaian identities and perceived that this had naturally shaped their dietary practice towards greater adoption of UK dietary practices.

While discussing cultural identity participants with continuity practices described eating from a communal bowl as being the traditional practice of eating which they perceived desirable, although they mentioned this practice had faded over the years, even in Ghana before they migrated. In contrast, a participant with changed practices did not seem to like the communal eating practice as shown in the quote below:

"I didn't like to eat together from the same bowl, because I am like very hygienic" (P10, 2nd generation, 25-44 yrs.).

Social network

The social networks of participants unsurprisingly influenced their dietary practices. Participants with continuity practices reported having close relationships and frequent contacts with Ghanaians including family, Ghanaian friends and church members. Some participants were a part of church congregations that were a mixture of British, other Africans and Ghanaian

members; however, they mentioned that during church gatherings, Ghanaian foods were served and all church members enjoyed eating these foods. Similarly, participants with changed practices emphasized the influence of their close relationships with non-Ghanaians on their heavy adoption of UK foods as this quotation illustrates:

“Especially growing up in this culture and visiting friends and being invited to a dinner, that’s when I started getting exposed to other dishes” (P8, 2nd generation, 25-44 yrs.).

Participants who migrated as children were also likely to adopt a lot of UK dietary practices through social networks. For instance, one participant talked about how his preference for the ‘Ghanaian taste’ changed over time and suggested it could be an influence from his non-Ghanaian social network.

"I have different social network groups, maybe because of my identity, and it's not like I have made a conscious effort to separate them. For instance, this weekend we have a group of people from church, it's really an African contingency and I have an entirely separate western group of friends that I hang out with at work. You know every so often we go out for food and beer. Very different experience, totally different. One thing I will say interestingly is that I found out the hard way that my taste in Ghanaian cuisine changed, I don't know exactly when, but I know that there are certain foods that I loved as a young boy that I can't bring myself to even try it" (P4, 1st generation, 25-44 yrs.).

4.3.2 Accessibility of food

Accessibility, availability of traditional foods and time for cooking traditional foods emerged as important factors from the accessibility of food cluster

Accessibility and availability of traditional foods were discussed as important drivers of dietary practices amongst participants with continuity practices. In explaining the importance of availability, participants who migrated in the early years of migration (1970-1980’s), revealed that they were forced to adopt certain foods found in the UK because Ghanaian foods were unavailable then, for example:

“When I came in 72 we didn’t have all these Ghana shops so we had to eat their potatoes and all the foods local to this place but now we get Ghanaian foods from the Ghana shops” (P2, 1st generation, 45-64yrs).

The interviews also indicated that, because Ghanaian foods were perceived to be readily available at present, participants tended to eat more Ghanaian foods now than they did when they first migrated. In contrast, participants with changed practices mainly relied on large supermarkets but they also thought that supermarkets sold more speciality ethnic foods currently than they had done in the past, especially in areas with large migrant populations. However, these participants rarely bought these Ghanaian foods.

Participants who had migrated to the UK in the last decade did not describe having any difficulty with the availability of Ghanaian foods. Change in dietary practices amongst these more recent migrants was not described as being abrupt. Participants mentioned adopting potatoes very quickly because it was perceived to be like yam in terms of what it could be used to prepare and in taste as illustrated by this only first-generation participant with changed practices:

"So, availability was one of the reasons why we had to adapt. Because potatoes were like yam/cocoyam it was easy to switch to potatoes and do with potato whatever we did with yam or cocoyam. And then you get gradually introduced into other college menus, and you realize oh that was interesting, so you develop a taste for other foods that way" (P30, 1st generation, 45-64 yrs.).

In terms of economic access, all participants in this study mentioned that traditional foods were more expensive compared to UK foods. However, the bulk of participants with continuity practices did not think the cost of food affected their dietary choices and practices. Some participants with flexible practices mentioned the cost of traditional foods influenced their shopping habits and their ability to readily access traditional foods. However, these participants discussed ways by which they could substitute and combine cheaper alternatives from the supermarkets to be able to get the traditional Ghanaian taste they desired, as this example illustrates:

"The African foods are costly at times, so I try to blend with the foods here which are relatively cheaper" (P19, 1st generation, 45-64 yrs.).

Another participant's strategy was to buy Ghanaian foods in bulk and freeze them during seasons when prices were cheaper:

"Regarding the yams and plantains they are seasonal, so when the season is up I buy. For the yam, I can freeze them. For the plantain, I buy them when the need arises and when the prices are down" (P26, 1st generation, 25-44 years).

Time for cooking traditional foods

All participants identified a preference for Ghanaian foods over UK foods because the former was associated with more spice and a better taste, as this participant exemplifies:

"When we eat African food, it must be lots of oil, it has to have pepper, it has to taste special so that you want to chew your fingers off at the end of the meal (laughs), that comes part and parcel" (P4, 1st generation, 25-44 years).

Although, all preference for Ghanaian food was a similarity between the three groups, it did not imply all three groups valued consuming Ghanaian foods all the time. For instance, those with changed practices were of the view that preparation of Ghanaian foods was time-consuming and did not seem to think it was not necessary to spend that much time just cooking them. Participants mentioned that they consumed Ghanaian foods when they lived with their parents and their diets had changed significantly since living alone because they did not perceive that they had the time to cook or the skills to prepare Ghanaian foods.

"I like to try different dishes, but my mom has always prepared Ghanaian dishes. But I find them quite time-consuming; they take hours to prepare and minutes to eat" (P8, 2nd generation, 25-44 yrs.).

On the contrary, given the importance that was attached to traditional foods by the participants with continuity practices, and living in a context where they do not have the time and resources to cook every day, they reported cooking in bulk to last for weeks or months to save time.

4.3.3 Migration context

Pre-migration history was another important influence on the degree of change in dietary practices. Factors such as country of birth, year of migration, age at migration, rural vs urban residency in Ghana were important in predicting the different typologies of dietary practice. For instance, participants, who migrated to the UK as children and second-generation migrants born in the UK, were inclined towards having changed practices. Additionally, being a rural

dweller before migrating could result in unfamiliarity with host country foods which in turn makes it difficult to change and easy for one to continue with the original food culture. For example:

“It’s hard for us to have tea, tea stuff, as for us who were village people back in Ghana, we ate the very traditional local Ghanaian foods before moving here like Fufu, ampesi etc. So we continued that tradition here” (P1, 1st generation, 44-64yrs).

4.3.4 Food beliefs and perceptions

Perception of host country food/traditional food

There were some differences in the context for eating UK or Ghanaian foods based on participants’ perceptions of these foods. For instance, participants with continuity practices perceived UK foods as an exception or a way to get away from the usual, and thus described fewer contexts in which they ate UK foods.

“It’s not because we think it’s posh. Sometimes we just feel like buying something from outside. Sometimes we buy KFC or something else and we won’t cook just to have a change” (P12, 1st generation, 45-64yrs).

On the other hand, participants with flexible practices perceived UK foods as being convenient for the busy lifestyle in the UK. Consequently, these participants reported consuming Ghanaian foods only when there was perceived to be enough time to prepare them such as on a day off from work. For instance, one participant explained that on days that she is working she eats a mixture of Ghanaian and UK foods, but when she has off days she and her family are more likely to have Ghanaian foods throughout the day.

“For those days I don’t work, we eat our own local foods three times a day, either we have cereal in the morning or porridge, then in the afternoon it could be fufu, yam, rice or anything since we are home. On my working days, I have breakfast then take packed lunch, I do the same with my children, I prepare packed lunch for them and when we get home we have cereals” (P23 1st generation, 25-44 yrs.).

Perception of healthy eating

Participants' perception of the healthiness of Ghanaian foods vs the UK foods varied for different typologies. Some participants with continuity practices mentioned that Ghanaian foods were healthier than UK foods, and implied eating UK foods for a long duration could have health consequences:

"I see British foods as junk [unhealthy foods], I am not gonna be eating potatoes, no I prefer 'akple'. Give someone 'akple' and fried fish, okra, green leaf and another fish and chips for 6 months and you will see the difference". (P29, 1st generation, 25-44yrs).

Some participants with changed practices were of the view that UK foods were healthier than Ghanaian foods. One participant differentiated cooking practices between Ghanaians and the English and described the former as unhealthy:

"Ghanaian foods are heavily dependent on cooking oil. Especially our stews and sauces. English foods are mostly boiled. It's funny because the English traditional foods are healthier. As a matter of fact, with English foods, they take the oil out, Ghanaian foods we put the oil" (P5, 2nd generation, 25-44yrs).

Exposure to host culture through the media and books was reported as contributing to dietary change among participants with changed practices. Nutrition knowledge obtained through the media was mentioned as influencing some participants to adopt healthy eating habits. Apart from television, participants also mentioned government programmes that were aimed at promoting healthy eating. According to participants, this does not mean that in Ghana they did not have the knowledge to eat healthily. Participants were of the view that, national consciousness of health differed between the two countries. They implied in the UK, all media outlets talked about healthy eating behaviours, which is not the case in Ghana, where the media did not emphasize eating healthily. One participant with changed practices stated:

"But the culture here on TV emphasizes health and balanced diet. So, it started growing on me to the point where I started to check what I eat. There is advanced interest in this country as compared to home" (P30, 1st generation, 45- 64 yrs.)

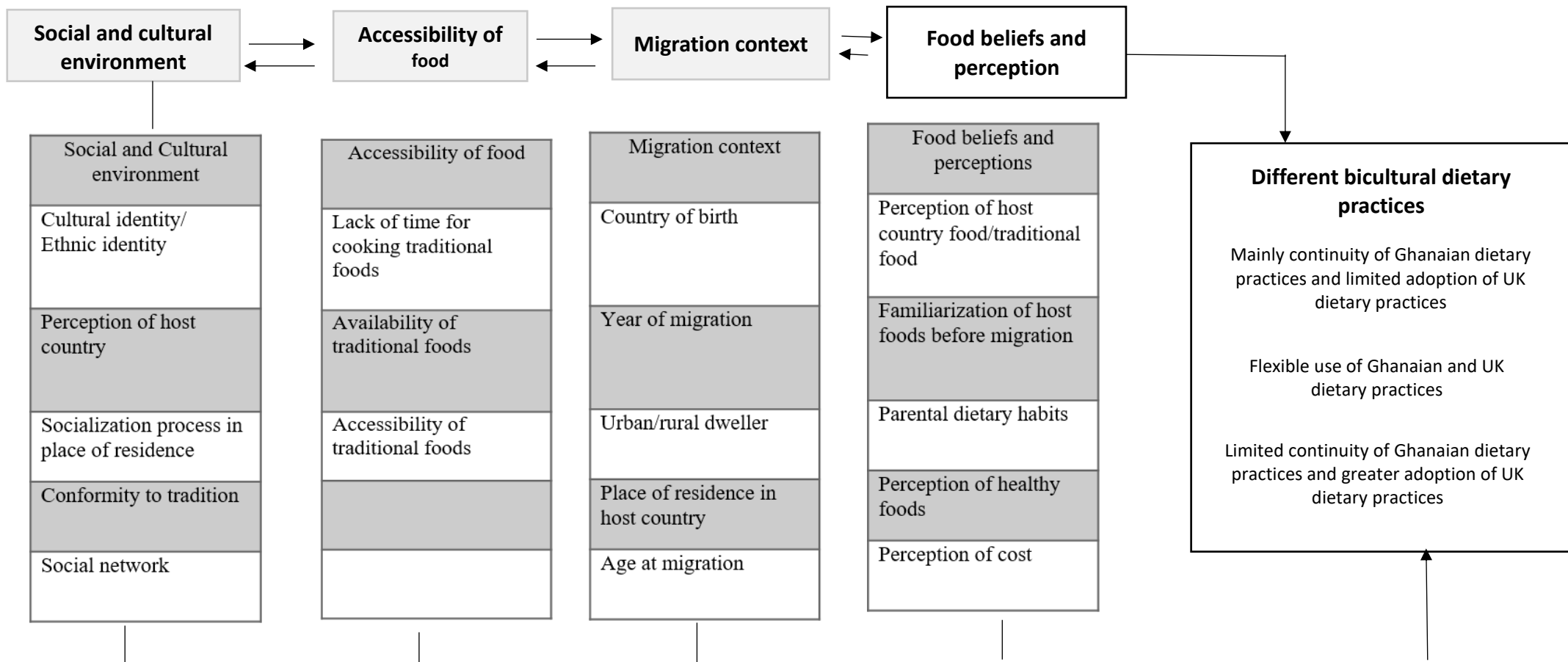


Figure 16: A conceptual framework showing cluster of factors and dietary practices of people of Ghanaian descent in Greater Manchester

4.4 Influence of social and economic factors in shaping dietary practices among Ghanaians living in Greater Manchester: The case of food insecurity

The above sections have looked at explanations for dietary typologies that emerged. In the next section, factors in the accessibility cluster (study 2) were further explored to gain insights into perceptions of food insecurity because there are indications that food insecurity is an increasing public health problem in the UK population and other high-income countries (Nelson et al., 2007, Dowler and Connor, 2012) and there is no information on how Ghanaian migrants have experienced food insecurity. It has therefore been treated separately here. In addition, the role of social support on food insecurity amongst Ghanaians living in Greater Manchester was explored. To be able to gain insight into the influence of social and economic factors influencing dietary behaviours, the study explored perceptions of food insecurity, what the factors are that might contribute to food insecurity and how people mitigate against food insecurity.

4.4.1 Perceptions of the prevalence of food insecurity

Except for a couple of participants, most participants did not suggest that they were food insecure themselves. One participant said her family could not afford foods they wanted to eat at some point in time.

“I think so, I think we have been there before, we couldn’t afford Ghanaian foods” (P31, 1st generation, 45-64yrs).

However, others recognized food insecurity existed within the community. These participants were of the view that Ghanaians may be food insecure, but would not want the community to know. They would rather keep their situation a secret because of pride, being stigmatized or the fear of being gossiped about. For example, one participant compared Ghanaians in the UK to Ghanaians in Holland where she used to live, and said the former will not go to food banks because of pride.

“It (food insecurity) is common, but we Ghanaians have the mentality that if we go to queue for food, it is demeaning, and if people see you they will gossip about you. Therefore, even if the person is on social welfare she will rather buy cheap unhealthy food rather than go to food banks. I personally know some Africans who go to food banks, even in Holland. I have an African friend who goes to the food banks, she needs it and she has no shame, but Ghanaians have pride. In Holland, I knew some Ghanaians who went to such foods. We are shy to be seen going there” (P12, 1st generation, 45-64 yrs.).

Apart from the fear of stigma, participants linked the possibility of non-disclosure of one’s insecurities be it food or poverty within the community to pride and the private nature of Ghanaians. Thus, those who are food insecure would not let their fellow Ghanaians know. However, this reluctance to disclose their insecurities does not extend to their own close and trusted network often in the church:

“You go to tell someone about your problem and before you know, people are talking about you. So, people are very conservative. Even us, when we started going to this church, they said we were secretive because no one knew anything about us. Ghanaians are like that, we have Ghanaians in our network, who will occasionally say oh am not well, can you lend £20 or £100 and I will return it. We do it for each other, we have that relationship” (P29, 1st generation, 25-44yrs).

Pride and fear of being stigmatised were also associated with going to food banks, as this quotation illustrates:

“It’s a matter of pride, it’s not in our culture to go to places to look for food. People will think, “What if I am seen?” (P4, 1st generation, 45-64yrs).

Although the bulk of participants indicated that Ghanaians would generally not use food banks there was one exception who reported visiting a food bank, but perceived the foods served at the food banks as culturally unappealing:

“I quite remember in 2009, we went to a food bank, and what they had were cereal, baked beans, tomato soups that’s it! It was not what we were expecting to have, so it puts people off, so why should I go there” (P11, 1st generation, 25-44 yrs).

4.4.2 Perceptions of availability, accessibility and utilization

The findings from this study do not indicate a problem in terms of availability of food for the Ghanaian community. Even traditional foods were perceived to be readily available, particularly in recent years. Some participants compared the food market in the UK with that of Ghana before they migrated in which they narrated that in Ghana sometimes Ghanaian foods were unavailable during certain times of the year, in contrast to the UK where food was generally available all year around.

What seemed to be a concern for some participants was access in terms of distance to travel to speciality shops and affordability of traditional and healthy foods. Participants mentioned that speciality ethnic shops were found in specific areas in Greater Manchester, so some had to travel quite a distance to purchase items. In contrast, others were of the view that in Manchester, because there was a reliable transportation system, even if you do not drive you can easily access food. Some supermarkets were also mentioned to sell ethnic food, especially in areas with large migrant populations. In terms of affordability, the interviews revealed that the bulk of participants could buy food because most of them were engaged in paid jobs. The high cost of traditional foods was only mentioned by a few participants when they discussed difficulties in accessing traditional foods and healthy foods. But these participants identified strategies they employed to be able to eat traditional foods.

“The traditional foods are available in the shops, the issue may be affordability” (P25, 1st generation migrant, 45-64 yrs.).

“Sometimes our foods can be a bit costly, depending on where you live. So, I live in the North of Manchester so we have to go like Cheetham hill or Hulme [where the same foods are cheaper] to buy certain ingredients” (P14, 2nd generation, 26-44 yrs.).

Nutritional concerns were reflected by some participants. For instance, one participant echoed that rather than availability of food it was access to healthy foods and a balanced diet which is a major concern to Ghanaians in the UK:

“Yes, I think Ghanaians in the UK are okay; in terms of eating healthy that is where our problem is, we get food to eat, and the problem is eating healthy” (P11, 1st generation, 25-44 yrs.).

“We cannot eat the same food every day but sometimes we just have "belly food" you just want your belly to be full, and it's not a balanced diet, and its one way [not a diversified diet] ... So, that's where I think we Ghanaians find difficult” (P11, 1st generation, 25-44 yrs.).

Factors perceived as contributing to food insecurity

According to participants, this perceived food insecurity was a transient period only for people who were struggling financially due to unemployment and/or immigration issues or newly arrived immigrants to the UK.

“But when you have some of the Ghanaians having work permit issues then availability of work and money becomes an issue especially with the government changing immigration issues leading to poverty in a sector of the community” (P4, 1st generation, 25-44 yrs.).

Participants mentioned the financial pressure to remit money back home as another factor that could result in Ghanaians living in the UK being food secure:

“But our main issue is money. Our money is not enough because the money is not for us alone, we have people at home we have to take care of, we have to pay bills, the bills are too much, and we have kids” (P11, 1st generation, 25-44 yrs.).

Also, the pressure to be able to have properties back in Ghana was also cited as having financial implication on dietary habits in the UK.

“I know so many Ghanaians that eat fufu frugally here and yet if you see the houses they are building back home you'd be amazed. It's sad.” (P21, 1st generation, 65+ yrs.).

Financial pressure from payment of bills in the UK was also cited as contributing to unhealthy dietary practices.

“Most of the times what Ghanaians can afford is not healthy. We think about the bills, especially bills and it makes us not to think or eat good foods. If I want to grill fish no! I will think of the gas bill and instead fry, because it's faster to fry. There are so many ways we Ghanaians feel the pinch. We worry about those things even though we work normally; we are not healthy because we don't eat healthily. We know what healthy foods are but we do not have a choice, for instance, there are certain cheap meats that you will never find a white person buying but we will buy” (P11, 1st generation, 25-44 yrs.).

4.4.3 Perceptions of how the Ghanaian community mitigates against food insecurity

There were frequent references to the social support that exists amongst Ghanaians whenever the issue of food insecurity was discussed. Participants explained that due to a perceived cultural trait of sharing and looking out for each, it would be hard for a Ghanaian to be food insecure.

“Ghanaians have always been communal people by large with a few exceptions. And wherever we are the communities have still been there, and that's why we have the Ghana Union. And the culture of looking out for each other continues wherever you see Ghanaian community” (P30, 1st generation, 45-64 yrs.).

Another participant echoed this perception in this quotation:

“Most people may be living with relations, so even if they don't have money, they will get access to food to eat” (P9, 1st generation, 25-44 yrs.)

Some participants shared experiences of having to help other Ghanaians who were financially struggling. Others mentioned having to rely on family and friends from the church during hard times as the following quotations illustrate:

“Even myself and my mom, sometimes we know people who don't even say anything themselves, but we hear that this person is struggling and we do a bit of shopping and send it to them and say this is for you guys and you know what it just stays between us. It's not something you will go and broadcast” (P8, 2nd generation, 25-44yrs.).

One participant revealed how she had identified a particular person within her network that she relied on in times of need:

“If I need money I have a Ghanaian woman I borrow from and I make it a point to pay back” (P29, 1st generation, 25-44yrs).

In another example, a participant mentioned her support to fellow Ghanaians, and explained that helping one another was a cultural norm for Ghanaians:

“When I see that my fellow Ghanaian is not working, I would say have this 20 pounds to get something for yourself. We as Ghanaian people do well with this kind of support. Or someone

can just shop, especially if someone delivers a baby and finds herself in some financial difficulty. Another thing is ...when we know that someone is in financial difficulty we will reach out to the person. I cannot sit here and eat alone when I know a fellow Ghanaian is suffering; we were not brought up that way. So even if one Ghanaian doesn't work, his fellow Ghanaian will give her food to eat" (P2, 1st generation, 45-64 years).

Another participant explained how he supported a fellow Ghanaian who was in need by making food available.

"I had a friend who had issues, suffered a divorce, had a bit of mental disorder so he needed a bit of help. I wasn't able to do much the council gave him a place I couldn't really help much, but as a friend I cooked and gave him some. I help by making food available" (P9, 1st generation, 25-44 yrs).

The interviews revealed that the social support was not always in the form of making food available. Sometimes it was in cash and other times in kind such as providing temporary accommodation.

"There are some people who offer others rooms in their homes, till they are financially okay and even buy them food too" (P9, 1st generation, 25-44 yrs).

The church appeared to play a prominent role in their lives. Within the church, participants mentioned that they had a network of close family and friends that they rely on in times of needs. Belonging to the same church was perceived as being one big family.

"So, when you belong to the same church, oh my God you are a family" (P28, 1st generation, 25-44 yrs).

Participants also perceived providing support to other members of the community as a religious obligation, for instance:

"As a Christian, I say it's by the Grace of God, we believe that God will not allow his creations to go hungry. For instance, ever since my daughter came to join me, my loved ones have shopped for us, my church members give me stuff" (P2, 1st generation, 45-64 yrs.).

"What God asked me to do is...[pauses] we find it difficult to see people suffering because of food. So I ask myself, can I make a difference, if I can, how can I? and what way? So what I

did, my husband and I, so we organized, every month, milk, toiletries, to perishable, to long life, a variety of stuff. So people pick it up at church” (P28, 1st generation, 25-44 yrs).

Some participants described themselves and other Ghanaians as very hard working and having a positive attitude generally to work. This trait was described with pride. According to participants, Ghanaians will do anything, implying engage in low paying jobs or work several hours to earn a living to feed their families.

“Ghanaians want to earn a living, even if they have to work several hours even if it is cleaning. It doesn’t matter if the job is respected or not. Ghanaians will want to do so they can take care of themselves” (P29, 1st generation, 25-44yrs.)

Participants used the word ‘manage’ in describing how they obtained food on limited resources. There were several examples of budgeting and cooking in bulk as a means of managing food on a limited budget. Often these practices were considered to be typically Ghanaian, as the following quotation shows:

“Because for instance if a Ghanaian has £5, she knows she can buy tomatoes, this and that and make soup and if I make soup I can eat for 3 days or more but other people spend their money straight away, and then the next day they don’t have money to buy food and then they have to go to the food banks. We manage and we try to work, we don’t want to depend on things like that so we try to work, to get the money to buy the food that we want” (P 11, 1st generation, 25-44yrs).

Two other strategies that were highlighted by participants were buying or always having staples or some basic food at home and shopping in numerous shops for the best price, as a means of mitigating against food insecurity.

“The Ghanaians I know have a lot of food to eat, I don’t know how they get it but even when I was young my dad always found a way to get food for us. Ghanaians always have rice, loads of tin tomatoes and some sort of meat. And once you have these you are sorted. I think we are much resourceful. I think when I was growing up people always commented on how I managed my resources in terms of foods. I shop at different shops for different things, usually I know where to go for the different things” (P16, 2nd generation, 25-44 yrs.)

Figure 17 below summarises perceptions of how the Ghanaian community mitigates against food insecurity, hence, ensure food security. The main factor that was identified to result in perceived food security was the social support from within the community, and this was shaped by an individual's social network, which in turn was perceived to be influenced by participants' cultural identity as Ghanaians and their religious beliefs. Social support was channelled through the churches and social groups within the Ghanaian community.

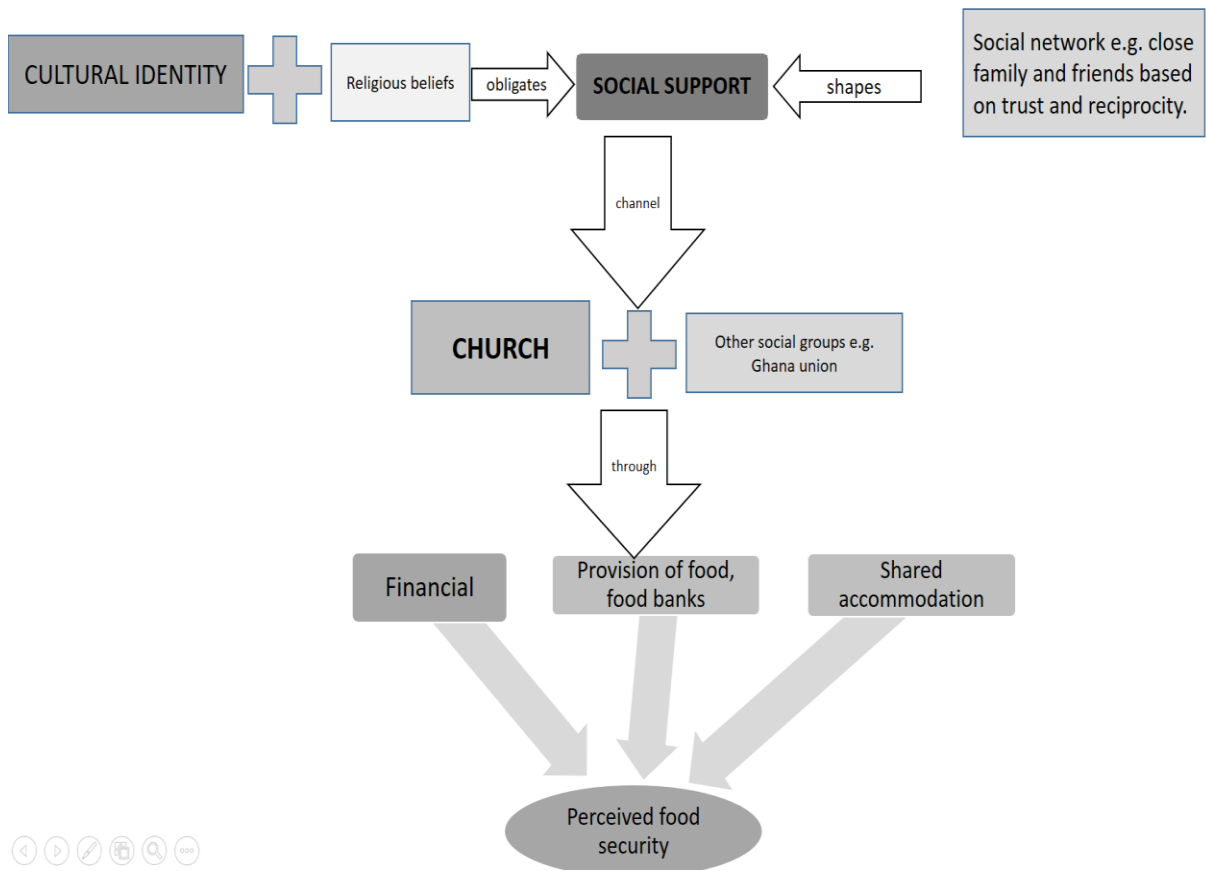


Figure 17: Perceptions of food security amongst Ghanaians living in Greater Manchester

4.5 Discussion of perceptions of changes in dietary practices and associated factors

Study 2 sought to describe and explain patterns in dietary practices amongst first and second generation Ghanaian migrants living in Greater Manchester. In exploring participants' dietary practices, three overarching dietary practice typologies emerged. Each typology was characterized by the meal format, the contexts for consuming such foods, structure, and patterning of meals (Leech et al., 2015), food purchasing and preparation. Findings show that all participants have retained some Ghanaian dietary practices and adopted UK dietary practices to varying degrees. These were: i) mainly continuity of Ghanaian dietary practices and limited adoption of UK dietary practices (continuity practices); ii) flexible use of Ghanaian or UK dietary practices (flexible practices); and iii) limited continuity of Ghanaian dietary practices and greater adoption of UK dietary practices (changed practices). The dietary practices identified were shaped by interrelating factors that fell into four main clusters: social and cultural environment, accessibility of foods, migration context, and food beliefs/perceptions. The importance that participants associated with cultural identity, having Ghanaian social networks and the availability of ethnic shops in the UK were crucial in maintaining traditional dietary practices. Important factors that increased the likelihood of adopting UK dietary practices were being a second-generation migrant, having non-Ghanaian social networks, having a busy lifestyle, and not having enough time to cook Ghanaian foods.

The three typologies identified in this study are similar to the three patterns demonstrated in the model of dietary acculturation by Satia-Abouta (2001), namely the maintenance of traditional eating patterns; the adoption of host country eating patterns and bicultural eating patterns. However, Satia-Abouta's model implies a strict division within the three patterns whereas this study found evidence of an overlap between typologies; an indication that dietary acculturation is not an all or nothing process. In other words, no participant had completely changed all Ghanaian dietary practices to those in the UK or completely maintained traditional dietary practices. Two of the typologies (flexible practices and changed practices) identified in this study have been observed in previous studies on migrants (Garnweidner et al., 2012, Tuomainen, 2009), the only difference being that in this study the first pattern is not 'strictly continuity', it is mainly continuity of traditional dietary practices in combination with a few dietary practices of the host population. The overlap between the UK and Ghanaian dietary

practices across all typologies suggests that participants in this study have 'bicultural' dietary practices or are 'integrated', which refers to a situation when migrant groups have an interest in both maintaining original culture while trying to adopt some cultural aspects of the new society (Berry, 1997).

The systematic mapping review of factors influencing dietary behaviours of ethnic minorities in Europe in study 1 of this PhD has shown that in the UK and Europe few studies have included migrants from Sub-Saharan Africa. The current research attributes change in dietary practices within this population group to a combination of complex interrelated factors. Most of the important factors identified in this current study fit into four of the clusters that emerged in this review for explaining dietary behaviours of ethnic minority groups in Europe; 'social and cultural environment', 'accessibility of foods' 'migration context' and 'food beliefs and perceptions'.

4.5.1 Process of change

Amongst participants with flexible and changed practices, the study showed that breakfast habits had generally shifted towards those of the majority population, which is consistent with Koçtürk's model (Kockturk-Runefors, 1991). For those with flexible practices, lunch varied between Ghanaian and UK foods. However, dinner still had cultural importance and family members were more likely to be around at the end of the day or during the weekends for participants in both the 'continuity' and 'flexible' groups. This finding supports Koçtürk's theory that posits changes may begin with breakfast followed by lunch, while supper usually remains unchanged for a longer time. Other studies have also shown this process of change among migrants (Mellin-Olsen and Wandel, 2005, Tuomainen, 2009). It is important to note that a couple of participants with continuity practices reported strictly consuming Ghanaian foods, a contrast with Koçtürk's argument that it is impossible for immigrants to completely adhere to old food habits following migration (Kockturk-Runefors, 1991). It is worth noting, however, that these cases were deviant as the bulk of participants consumed both Ghanaian and UK foods. A possible explanation for these deviant cases might be that immigrants change certain foods or preparation methods without even realizing; newly adopted foods (such as snacks and sweets) may not be perceived as real food, thus falling outside the scope of the usual diet (Kockturk-Runefors, 1991). To be able to clarify this, there is the need for future studies to undertake a detailed dietary assessment.

In terms of what changed, this study showed that, for migrants who migrated in early years, (1970 – 1980), the unavailability of Ghanaian shops meant that they were forced to adapt staple foods like potatoes first, suggesting that, during this period, availability of traditional foods was a more important driver of change than other factors. This finding contrasts with Koctürk's model, which suggests that staple foods are the last to change following migration. The theory may apply for those who migrated in later years and who live in areas with easy accessibility to ethnic shops to purchase traditional foods, or it may reflect the fact that Koctürk's model was based on her research among Turkish migrants, whose staples might have been more available in the host environment, whereas African staples differ considerably from what is/were available in Europe.

4.5.2 Drivers of dietary change

Findings also revealed that although participants perceived there was greater availability of shops with Ghanaian foods now compared with earlier years of migration, Ghanaian foods were perceived as expensive, mainly due to the fact that they were imported. Contrary to expectation, the relatively higher perceived cost did not seem to influence continuity of traditional foods amongst the bulk of the participants, perhaps because strategies were devised which included substituting certain ingredients to prepare Ghanaian foods and to maintain the 'Ghanaian taste'. Similar strategies to maintain traditional foods were also reported in a study conducted amongst migrants resident in Europe (Škreblin and Sujoldžić, 2003, Lawton et al., 2008, Garnweidner et al., 2012). Fluency with the host language and the years living in the host country was not as important in driving change as were cultural factors like religion, cultural beliefs and living in ethnic enclaves, as demonstrated in other studies (Jonsson et al., 2002b, Satia-Abouta et al., 2001). One possible explanation could be that almost all participants could speak English, which is the official language used in Ghana. Secondly, because most participants were Christians, religious prescriptions on foods like 'halal' did not seem to be an important determinant of diet, even among the few Muslims in the study.

Although findings in the literature suggests that change in diet following migration may result in unhealthy dietary changes (Gilbert and Khokhar, 2008), this study suggests that, among participants with changed practices, the host environment contributed to healthier dietary practices. It was suggested that exposure to host culture through the media, friendships and the work environment resulted in increased nutrition knowledge, which in turn led some

participants to adopt what they perceived to be healthier eating habits. Thus, dietary acculturation may not necessarily lead to unhealthy diet. This finding corroborates earlier studies amongst migrant in the Netherlands that showed that a greater degree of acculturation does not necessarily lead to unhealthy diets (Nicolaou et al., 2006). In contrast, others with continuity practices were of the view that greater availability of food resulted in unhealthy dietary practices due to the low cost of unhealthy foods in the UK. This contradiction in the influence of migration on healthy eating confirms the idea that dietary acculturation is a complex process which depends on several factors. The operant model of acculturation and ethnic minority health behaviour (Landrine and Klonoff, 2004), may go some way to explaining these seemingly contradictory findings. The model suggests that the context from which migrants originate interacts with the context to which they migrate in shaping health behaviours. If, for example, migrants originate from a context where fruit and vegetables are less available/eaten into a context where fruit and vegetables are more available/consumed then, with acculturation, they will be more likely to increase their consumption of fruit and vegetables, thus implying a healthy change. However, if they originate from a context where there is greater availability/ consumption of fruit and vegetables to a context where there is less availability/consumption then migrants may tend to eat less fruit and vegetables, hence an unhealthy change.

An implication of the varying perceptions regarding change in dietary practices resulting in healthy/unhealthy dietary practices is that it is possible that within this seemingly homogenous population, not everyone may require the same kind of intervention. Consequently, this study suggests the need for deep structure sensitivity in interventions, i.e. understanding the cultural, social, environmental, psychological and historical forces that influence dietary behaviour within a population, before designing interventions (Resnicow et al., 1998). For instance, exploring fruit and vegetable habits before migration vs. fruit and vegetables habits in the new environment. This is an important finding, given that acculturation studies generally lump people who identify themselves as one ethnic identity into broad categories and assumes ethnic minority groups to be identifiable groups of individuals with distinct characteristics (Hunt et al., 2004).

The context for consuming Ghanaian foods differed significantly for the different groups identified in this study. Amongst participants with changed practices, Ghanaian foods were eaten rarely during occasions such as family visits and Ghanaian parties. For these participants,

being born and raised in the UK predisposed them to more socialization with non-Ghanaians in the UK. The perception of social eating varied with context. Participants who had continuity practices described eating from a communal bowl as being the traditional practice, which they perceived as desirable. Traditionally Ghanaians eat in groups from a communal bowl based on gender and age and the meal eaten together is a medium for building relationships between families. However, this practice seemed to fade away for participants who migrated to urban areas in Ghana even before migration to the UK, when it totally disappears. The disappearance of communal eating among Ghanaians is consistent with previous studies (Tuomainen, 2014).

4.5.3 Drivers of maintenance of Ghanaian diets

The foremost explanation from participants' accounts that generally explains continuity of Ghanaian dietary practices and limited adoption of UK dietary practices was maintaining cultural identity as Ghanaian but also the importance attached to the specific ethnic group identity within the large Ghanaian community. Continuing with Ghanaian dietary practices was deemed as important by both first and second-generation migrants. This was unsurprising given that the importance of one's identity in dietary choices and the role of food culture in migrants' identity have been shown in previous studies (Nicolaou et al., 2009, Kassam-Khamis et al., 2000, Kohinor et al., 2011). Due to the importance attached to eating traditional foods, participants with continuity practices used strategies such as cooking in bulk to be able to consume Ghanaian food all the time. People with changed practices on the contrary, did not attach the same level of importance to eating traditional foods and seemed to have Ghanaian foods only in particular contexts such as family visits or Ghanaian special occasions.

Participants with continuity practices identified factors such as having Ghanaian social networks, church social gatherings, desire to conform to tradition and more readily available ethnic shops in Greater Manchester to facilitate continuity of Ghanaian dietary practices. Having non- Ghanaian social networks, as expected, seemed to influence the degree of adoption of UK dietary practices amongst participants with changed practices. The role of social networks in driving dietary behaviours and food choice amongst migrant populations has been identified in previous studies (Nicolaou et al., 2006, Mellin-Olsen and Wandel, 2005).

Participants' perception of host dietary practices reinforced continuity of traditional dietary practices. Participants compared the taste of Ghanaian foods with UK foods, and in all accounts

perceived UK foods as tasteless and not spicy enough. This may explain why participants in all three typologies identified a taste preference for Ghanaian foods over UK foods. The importance of spiciness also emerged in a study amongst migrants in Norway (Garnweidner et al., 2012) and contradicts Koçtürk's theory (1999) that accessory foods which include spices are the first to change in the process of adaptation to a new food pattern. Taste has been mentioned in several studies as an important driver of food choice amongst migrant population (Khunti et al., 2008, Halkier and Jensen, 2011, Garnweidner et al., 2012). In addition, UK foods were perceived by people with continuity practices as limited in variety and as being unhealthy, while participants with changed practices often perceived UK dietary practices as healthier than Ghanaian practices. These contrasting views might be due to several reasons. For instance, in this study, perspectives of participants of UK foods comprise a range of foods which includes fast foods and therefore comparisons could have been made between traditional Ghanaian foods and fast foods.

Although participants' use of their own definitions of what comprises Ghanaian and UK foods may be considered a strength of this study, it has limitations. For instance, there were some contradictions in the different accounts with regards to what were perceived as Ghanaian or traditional foods. Some participants perceived non-alcoholic beverages such as tea with milk as not traditional, while others perceived this as a typical Ghanaian breakfast. This variation in perception is not surprising given that dietary practices are not static and have evolved over the years due to, for example, the nutrition transition (Popkin and Gordon-Larsen, 2004). Moreover, participants migrated at different time points, and therefore memories of changes in dietary practices may differ depending on the time period since migration. Another explanation for not having a distinct line between certain foods as Ghanaian or UK foods might also be due to the historical colonial influence by the British. The concept of acculturation relies on an important premise about historical origin and movement of a minority population, with the assumption that two distinct groups are coming into new contact following migration for the first time (Hunt et al., 2004). While the notion that the first encounter between two previously separated cultures may make some sense for some immigrant situations it may not be the case for others. In the present study, some participants seemed to be familiar with UK foods before migration, which implies migrating to the UK was not the first encounter with the UK culture. The British presence in West Africa brought about changes in the traditional diet. In Ghana, people in the urban south, where the British predominantly resided incorporated some practices like

including milk, tea and breakfast cereals in their regular diet (Tuomainen, 2009), which further blurs the line between what is traditional Ghanaian and not traditional. For such groups of migrants who were already familiar with UK diet a question arises: does the change/continuity of UK foods merit the label of dietary acculturation? This is an important area for future research.

4.5.4 Conclusion

This study's findings demonstrate the complexity of dietary change, indicating that it is dependent on several factors. This study population can be described as an integrated group with bicultural dietary practices, i.e. both Ghanaian and British. All participants continued with some traditional practices, which is an indication of how migrants value their original habits, although the importance of cultural identity as a driver of dietary practices varied across groups. The dietary practices identified were shaped by interrelating factors that fell into four main clusters: social and cultural environment, accessibility of foods, migration context, and food beliefs/perceptions. The importance that participants associated with cultural identity and the availability of ethnic shops in the UK were crucial in maintaining traditional dietary practices. Important factors that increased the likelihood of adopting UK dietary practices were being a second-generation migrant, having non-Ghanaian social networks, having a busy lifestyle, and not having enough time to cook Ghanaian foods.

4.6 Discussion of the influence of social and economic factors in shaping dietary practices: The case of food insecurity

This section discussed the findings regarding participants' perceptions of food insecurity, what the factors are that might contribute to food insecurity and how people mitigate against food insecurity.

4.6.1 Perceptions of prevalence of food insecurity and perceptions

In this study, most participants did not suggest that they were food insecure themselves. It is important to note however that, there was some acknowledgment that food insecurity exists within the community but perhaps manifested in different ways than in the host population. A few participants indicated that food insecurity may be a transient period only for people who may have newly arrived in the UK, struggling financially due to unemployment or immigration issues. This finding confirms previous studies that have reported associations between food insecurity and unemployment (Dhokarh et al., 2011). It also corroborates reports from studies in Canada that showed that recent immigrants had more issues, for instance lacked money to purchase food (Gauthier, 1996). Other participants in this study were of the view that Ghanaians were proud and private people and therefore may be reluctant to admit they were in need because of the fear of being stigmatised as being lazy or gossiped about. However, this reluctance to disclose their insecurities about food did not extend to their own close and trusted network, often in the church.

4.6.2 Perceptions of causes and factors contributing to food insecurity

Rather than availability of food, it was access to healthy foods and balanced diets which were perceived as contributing to food insecurity amongst the Ghanaian community living in Greater Manchester. Even traditional foods were perceived to be readily available in recent years in the UK partly because the food environment was compared with that of Ghana before migration in which participants reported food was unavailable during certain times of the year (as shown in the first part of the qualitative research on dietary practices). Indeed, in many Sub-Saharan African countries, there may be food scarcity during certain times of the year, because food is

dependent on subsistence agriculture (Watson and Hiscock, 2002) and rainfall. These, combined with drought, inadequate agricultural policies, high population density and natural disasters contribute to food insecurity (Watson and Hiscock, 2002). This is in contrast to high income countries, where people have easy access to both healthy and unhealthy foods if they have sufficient income. People on low income however, have easy access to cheap unhealthy foods all year around (Hill and Peters, 1998) and this enabling factor has been reported in many studies on migrant studies to influence eating behaviour (Roberts et al., 2013). In addition, high-income countries like the US, Australia and New Zealand, studies indicate that ethnic minority populations tend to reside in poor neighbourhoods where healthy foods are scarce; even when healthy foods are available they tend to be unaffordable to these groups of people (Roberts et al., 2013). This suggests that the nature of food insecurity is different for the different contexts (low and high-income countries). This might help explain participants' perception regarding food insecurity; as food is always available in the UK, even if it's 'belly food' which participants explained as "*food that just fills the belly*", (refers to foods eaten just to get a feeling of fullness and the suppression of hunger; just for satiety), so they may not describe their situation as being food insecure. In Africa, food insecure families experience food scarcity and tend to have high energy expenditure patterns.

Given that food security at a minimum includes not only nutritious foods but also culturally acceptable foods, availability and accessibility of foods was also explored in this study. Participants who could not always afford traditional foods devised strategies to continue eating traditional meals included substituting and combining cheaper alternatives from the supermarkets. This study also showed that most people had financial obligations to send money home towards supporting other family members and securing property in Ghana. This was prioritised and thus had implications for access to healthy foods. An implication of this finding is that migrants prioritise financial obligations in their home country and this tends to influence their dietary habits negatively in the UK. This is consistent with findings from a study in Australia that indicated that over two-thirds of refugees run out of food and the reasons they attributed to this included sending money home and large household bills (Koc and Welsh, 2001). The high cost of utility bills was also deemed as a barrier to healthy dietary practices in this study. For instance, being compelled to fry foods rather than grill as the frying method is quicker and saves energy.

4.6.3 Factors mitigating food insecurity

Factors that emerged as contributing to the perceived food security within the bulk of the Ghanaian community included having a positive attitude to work. By this, participants implied that one has some level of choice regarding food security. Thus, if you were willing to work hard, that is engage in two jobs or do anything it takes, then you can feed your family. This attitude goes some way to explaining the reluctance of people to admit to being in need as the community may perceive them as lazy.

One major finding is the fact that social support from within the community was seen to play a vital role in mitigating food insecurity by these participants. This social support was deemed as a common trait that all Ghanaians showed and was perceived either as a cultural or religious obligation. The practice of kinship support, either emotional or social, has been identified as a normal practice amongst African populations, usually in rural areas before migration and plays a social role that serves as a pre-requisite for cultural harmony rather than reflecting coping mechanisms (Renzaho and Mellor, 2010). Several studies have shown the relationship between social support and food security (Martin et al., 2004, Dhokarh et al., 2011). The church and other social groups such as the Ghana Union seemed to have an important role in ensuring food security within the community. Within the church, people seemed to have close allies that they engaged with for specific needs, be it food or financial support when needed. Indeed, participating in social activities allowed people to relate to each other and develop a bond that is important for the development of social networks (Putnam, 1995). This study also showed that individuals were reluctant to make use of food banks due to fear of gossip, being perceived as lazy by the community or because food on offer at the food banks may be culturally unappealing. Paradoxically, this reluctance did not extend to their own close/trusted network, often from the church. The disclosure of need and acceptability of help from the church could be because the church context forms a trusted base from which people operate. Another possible explanation could be because food banks in the church were open to all and not targeted specifically at people who may be perceived as vulnerable. In the UK and other European countries accessing food banks is based on a proven need and therefore it is possible people do not want to be seen as being ‘officially needy’.

Many participants used the word ‘manage’ in describing how they obtained food on limited resources and appeared to be very proud of this skill. For instance, instead of going to eat out,

money was saved and used in buying ingredients to cook food which could last for a longer period. A number of strategies participants used includes combining cheaper alternatives to prepare foods they preferred to eat (Osei-Kwasi et al., 2017).

In summary, this study shows that most people can manage on limited resources and from the social support within the community. However, people go for ‘belly food’, which tends to be unhealthy and do not prioritise their own health. Food insecure household may be reluctant to make use of food banks for the fear of gossip and pride; paradoxically, this reluctance does not extend to close network. The church and other social groups form a trusted base in which people operate; support given through these channels is more acceptable than through the “official context”.

The next chapter presents the results and discussion of the quantitative secondary data analysis.

5 Results and discussion of quantitative secondary data analysis (study 3)

Introduction

This chapter presents the results and discussion of the quantitative study of this PhD. The first part describes dietary change by comparing dietary intake among Ghanaian adults residing in Ghana (rural and urban) and in three European cities (which may be due to nutrition transition and dietary acculturation). The second section of the chapter presents results of investigations into the influence of acculturation on dietary intake of Ghanaians living in Europe. The final section presents the discussion of the results.

5.1 Baseline characteristics of study population

Table 15a shows characteristics of the study participants in Europe stratified by sex. **Table 15b** shows characteristics of study participants of rural and urban Ghana. Of the 1806 participants from Europe, there were more women (56.1%) than men (43.9%), and the mean (\pm SD) age was 47.2 ± 10.8 for men and 45.4 ± 9.9 years for women. The mean length of stay in Europe was similar for men and women 16.8 ± 9.7 SD and over a third (40%) of men and women had lived in Europe for over 20 years. People who had lived longer in Europe tended to be older; 68% of 51-60 years' age group and 81% of the participants older than 60 years had lived in Europe for over 20 years. Most of the Ghanaian men (75%) and women (64%) living in Europe were older than 25 years when they migrated. Educational level was higher among Ghanaian men compared to women; there were more Ghanaian men (42.4%) than women (38.5%) with lower vocational schooling or elementary or secondary education. Similarly, more men (19.6%) had a higher vocational or university education compared to women (10.4%). For BMI of participants in Europe, over half of the men (51%) were overweight whilst almost half of the women were obese (48%).

Amongst Ghanaians living in Ghana, the mean age for urban Ghana was 45.3 ± 11.5 and rural Ghana was 48.4 ± 14.4 . Educational level was slightly higher in urban Ghana; about 5 % had a higher vocational or elementary education compared to 4% in rural Ghana, whilst more than half of Ghanaians living in rural Ghana had never been to school compared to 44% in urban Ghana. More people in rural Ghana (77.3 %) compared to urban Ghana had a BMI of less than

25 kg/m² whilst over a third in urban Ghana (34.1 %) were overweight or obese (25.6 %) compared to rural Ghana.

Table 14a: Background characteristics of study participants for Europe

		Men	Women	Total	P value
Sample size (%)		n=792 (43.9)	n=1014 (56.1)	1806	
Age, mean ± SD (years)		47.2 ±10.8	45.4 ± 9.9		
BMI categorized per WHO standards, not specific to ethnicity	<25 kg/m ²	253 (32.0)	162 (16.0)	415 (23.0)	<0.001
	25-30 kg/m ²	402 (50.8)	369 (36.5)	771 (42.8)	
	≥ 30kg/m ²	136 (17.2)	480 (47.5)	616 (34.2)	
Age at migration (years), n (%)	≤ 25 years	174 (22.0)	318 (31.2)	490 (27.1)	
	> 25 years	593 (74.9)	650 (64.1)	1243 (68.8)	
Completed education total (all countries combined), n (%)	Never been to school or elementary schooling only	95 (12.1)	285 (28.3)	380 (21.2)	<0.001
	Lower vocational schooling or lower secondary schooling	334 (42.4)	387 (38.5)	721 (40.2)	
	Intermediate vocational schooling or intermediate/higher secondary schooling (general)	204 (25.9)	229 (22.8)	433 (24.1)	
	Higher vocational schooling or university	154 (19.6)	105 (10.4)	259 (14.4)	
Residence duration, n (%)	≤10 years	206 (28.5)	254 (28.4)	460 (28.4)	0.167
	11-20 years	212 (29.3)	298 (33.3)	510 (31.5)	
	20 + years	305 (42.2)	342 (38.3)	647 (40.0)	
Ethnic Identity, n (%)	Integrated	458 (57.8)	575 (56.7)	1033 (57.2)	0.768
	Assimilated	11 (1.4)	12 (1.2)	23 (1.3)	
	Separated	320 (40.4)	420 (41.4)	740 (41.0)	
	Marginalized	3 (0.4)	7 (0.7)	10 (0.6)	
	More acculturated	469 (59.2)	587 (57.9)	1056 (58.5)	0.570
	Less acculturated	323 (40.8)	427 (42.1)	750 (41.5)	

		Men	Women	Total	P value
Social network, n (%)	Integrated	444 (86.2)	557 (85.8)	1001 (86.0)	0.731
	Assimilated	44 (8.5)	46 (7.1)	90 (7.7)	
	Separated	17 (3.3)	28 (4.3)	45 (3.9)	
	Marginalized	10 (1.9)	18 (2.8)	28 (2.4)	
	More acculturated	488 (94.8)	603 (92.9)	1091 (93.7)	0.197
	Less acculturated	27 (5.2)	46 (7.1)	73 (6.3)	
Cultural orientation, n (%)	Integrated	597 (92.7)	733 (95.1)	1330 (94.0)	0.398
	Assimilated	1 (0.2)	2 (0.3)	3 (0.2)	
	Separated	46 (7.1)	34 (4.4)	80 (5.7)	
	Marginalized	0 (0.0)	2 (0.3)	2 (0.1)	
	More acculturated	598 (92.9)	735 (95.3)	1333 (94.2)	0.047
	Less acculturated	46 (7.1)	36 (4.7)	82 (5.8)	
Generation status n (%)	1 st generation	784 (99.1%)	989 (97.5%)	1773 (98.2%)	0.012
	2 nd generation	7 (0.9%)	25 (2.5%)	32 (1.8%)	

Table 15b: Background characteristics of study participants for urban and rural Ghana

		Urban Ghana (1429)	Rural Ghana (1103)	Total (2532)	P-value
Sample size (%)		Male 28.9% Female 71.1%	Male 39.1% Female 60.9%		
Age, mean ± SD (years)		45.3 ± 11.5	48.4 ± 14.4		< 0.001
Completed education total (all countries combined), n (%)	never been to school or elementary schooling only	607 (43.7)	607 (58.8)	1214	< 0.001

		Urban Ghana (1429)	Rural Ghana (1103)	Total (2532)	P- value
Sample size (%)		Male 28.9% Female 71.1%	Male 39.1% Female 60.9%		
	lower vocational schooling or lower secondary schooling	543 (39.1)	314 (30.4)	857	
	intermediate vocational schooling or intermediate/higher secondary schooling (general)	173 (12.5)	74 (7.2)	247	
	higher vocational schooling or university	66 (4.8)	37 (3.6)	103	
BMI categorized per WHO standards, not specific to ethnicity	<25 kg/m ²	575 (40.3)	850 (77.3)		< 0.001
	25-30 kg/m ²	487 (34.1%)	191 (17.4)		
	>= 30kg/m ²	366 (25.6)	58 (5.3)		

5.2 Level of acculturation

Regarding acculturation, ethnic identity, social network and cultural orientation did not differ much between males and females. Most men and women across all three proxies were classified as integrated (ethnic identity = 54%, social network = 86% and cultural orientation = 94%), indicating high orientation to their respective host country cultures i.e. British, German and Dutch as well as the Ghanaian culture. Also, with regards to ethnic identity, most Ghanaian men and women (41%) were classified as separated, indicating that a lot of people also scored themselves as being more Ghanaian as opposed to social network where a few were classified as separated (3.9%) and cultural orientation (5.7%). For residence duration in Europe, the mean length of stay in Europe was similar for men and women 16.8 ± 9.7 SD and over a third (40%) of men and women had lived in Europe for over 20 years.

5.3 Comparison of dietary intake between rural and urban Ghana and Europe

In the first stage of the analysis, as a baseline comparison, dietary intake (i.e. the weighted intake frequency/week of food categories) amongst Ghanaians residing in Europe was compared with Ghanaians living in rural and urban Ghana. This comparison between Europe, rural and urban Ghana helped to place the dietary intake of migrants into context and extend our understanding of how the two theories (nutrition transition and dietary acculturation) might be related. **Figure 18** shows the differences in weighted frequency of intake for the different study sites.

There were differences in dietary intake between Ghanaians living in Europe compared to Ghanaians in rural and urban Ghana, an indication of dietary acculturation and between rural and urban Ghana which also showed the presence of nutrition transition. For instance, the highest intake of traditional staples (plantain, roots and tubers) was observed amongst Ghanaians living in rural Ghana, followed by urban Ghana and Europe (with weighted intake of plantain, roots, and tubers of 0.56, 0.40 and 0.22 respectively). This finding implies there was a shift in the intake of traditional staples for Europe, although this remained important in the diets of migrants given that plantain, roots and tubers were the second largest contributors to staples in Europe. In all three study locations, however, the intake of rice and other cereals were almost the same across study sites (rural Ghana=0.11, urban Ghana=0.17, and Europe

=0.18). The intake of pasta and potatoes were similar between urban and rural Ghana (0.06 and 0.04) but highest for Europe (0.14) compared to rural Ghana.

Similarly, there was a shift in the intake of complementary foods from a more traditional fish based diet in rural and urban Ghana to a more westernised diet in Europe, i.e. red and processed meat, dairy and poultry. The intake of fish and fish preparations, red and processed meat were similar between rural and urban Ghana but differed when compared to Europe with a higher intake in the latter compared to rural and urban Ghana. In Europe, other sources of protein (such as milk, cheese and yoghurt and Legumes, beans, seeds) were the most important (0.25) as shown in **Figure 19**. In all three study locations, eggs contributed least to the complementary food group.

For accessory foods, fruit was the most important across all study sites as shown in **Figure 18**. However, for the more westernised diets, the intakes differed across sites. For instance, in Europe, fruit, cakes, sweets, and spreads were the most important contributors to accessory foods (0.42. 0.40). This was followed by sugar-sweetened beverages (Urban Ghana = 0.15. Europe =0.12, rural Ghana=0.07).

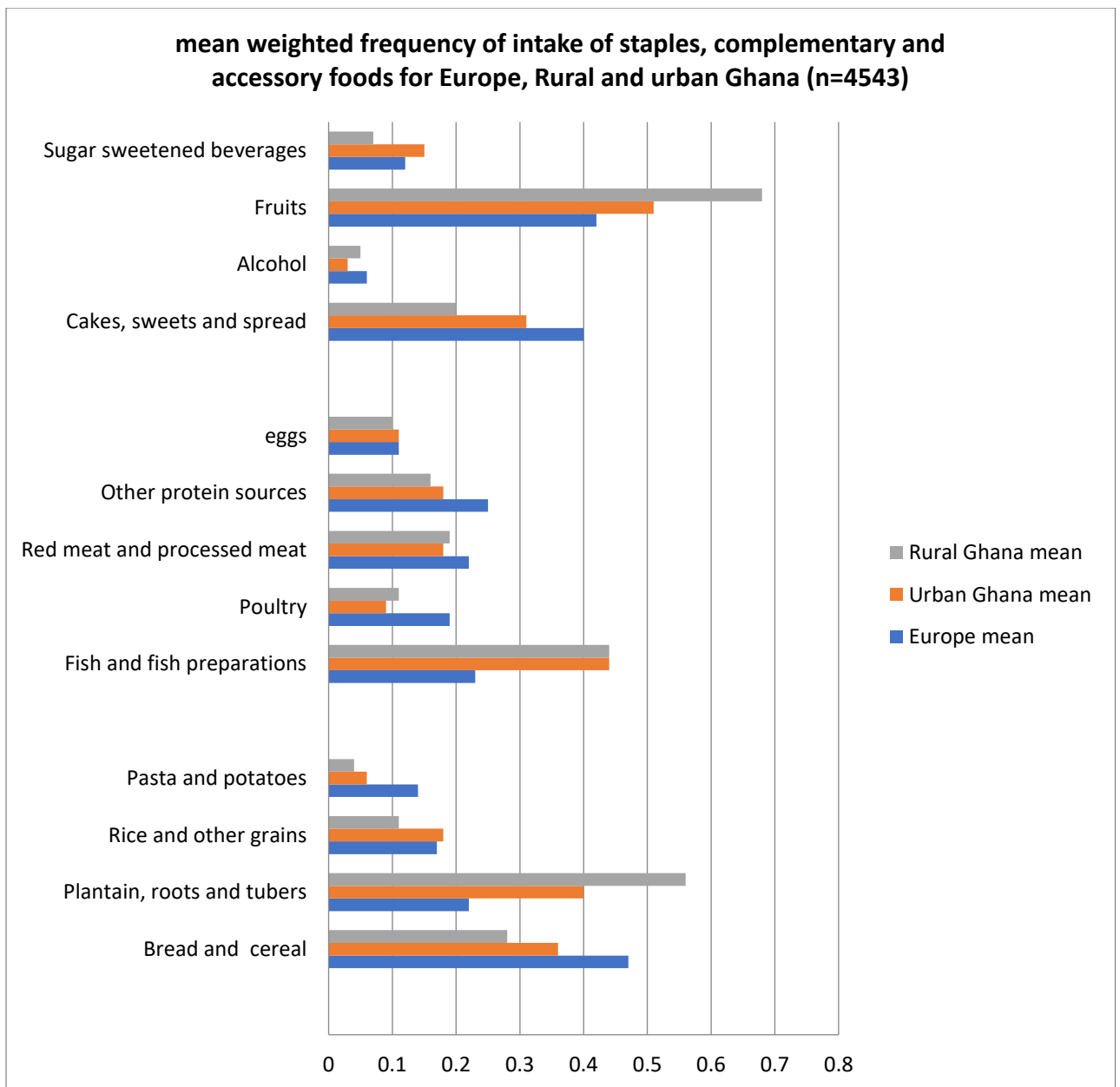


Figure 18: Mean weighted frequency of intake for Europe, Rural Ghana and Urban Ghana, adjusted by age and gender.

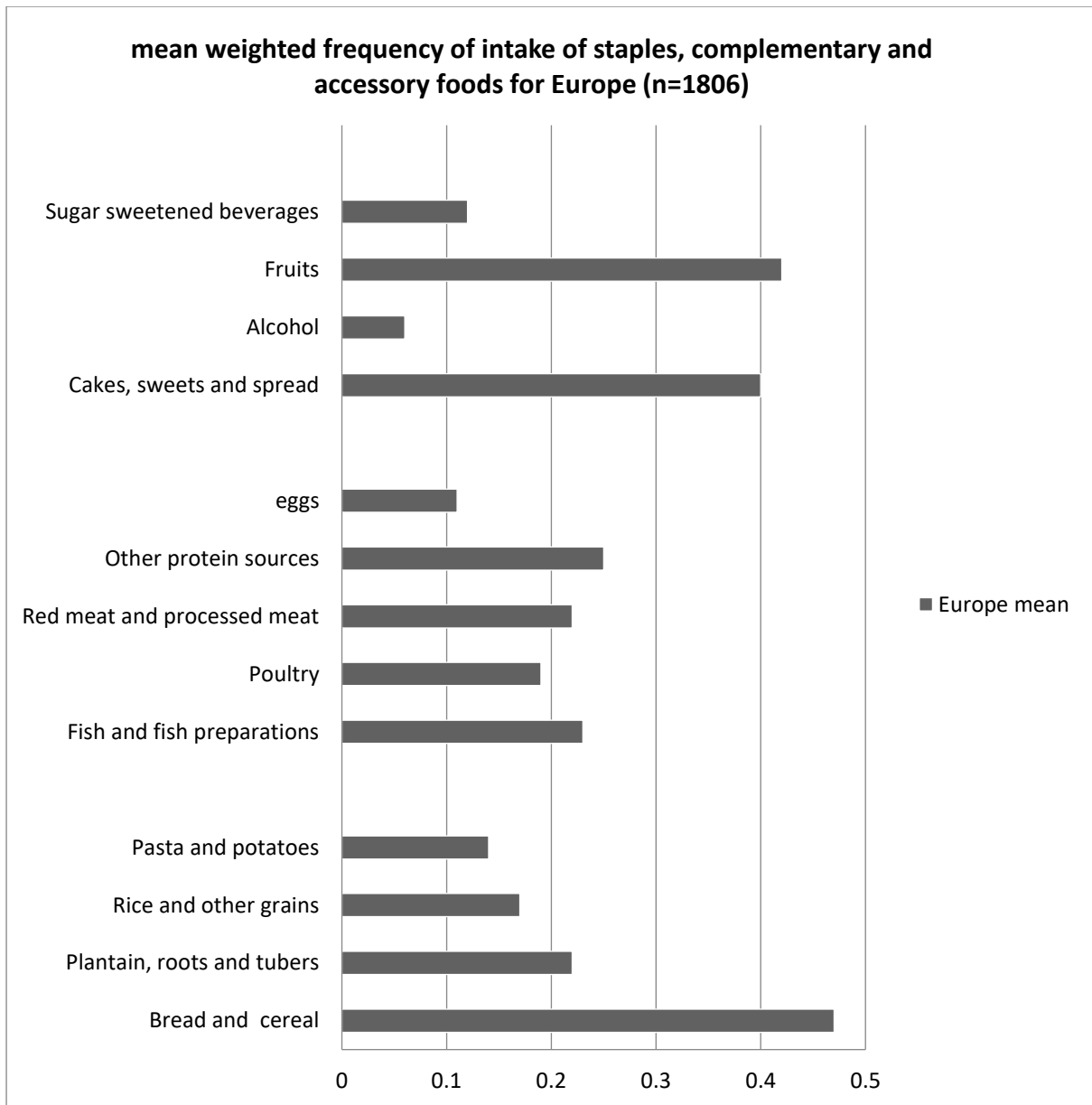


Figure 19: Mean weighted frequency of intake for Europe

5.4 Association between acculturation and dietary intake

In the second stage of the analysis, a series of separate regression analyses were performed to investigate the associations between acculturation and dietary intake in Ghanaian migrants. There were inconsistent relationships between different dimensions of acculturation and weighted food intakes (**Tables 16-18**). For instance, plantain roots and tubers were a more important source of staples in the integrated and separated groups but less important contributors to staples for the marginalised group compared to the assimilated group (when using ethnic identity, social contacts and cultural orientation as proxies for acculturation). Other staples like bread and cereals contributed less to the intake of staples in the integrated, and separated groups, and more in the marginalised group compared to the assimilated group (while using ethnic identity as proxy of acculturation), but when using cultural orientation as a proxy of acculturation, the marginalised groups had lower intakes of bread and cereals. Residence duration did not influence the intake of plantain roots and tubers. However, pasta and potatoes were a more important source of staples for participants who were resident in Europe for > 20 years compared to those who had lived in Europe for ≤ 10 years. Overall, none of these associations between proxies of acculturation and staple foods was statistically significant ($p < 0.05$).

As was the case with staples, there were inconsistent relationships across the different acculturation proxies in relation to intakes of complementary foods. Vegetable soups and stews were a more important source of complementary foods in the marginalised group when compared to the assimilated group (when using cultural orientation as a proxy of acculturation) and this difference was statistically significant ($p = 0.02$). Vegetable stews and soups also contributed less to complementary foods for the residence duration > 20 years' group compared with residence duration in Europe for ≤ 10 years and this was statistically significant. There was a higher intake of poultry among the integrated, separated and marginalised group compared to the assimilated (when using cultural orientation as a proxy of acculturation), but this was only statistically significant for the integrated group ($p = 0.04$) compared to the assimilated group. There were lower intakes of other sources of protein (milk, cheese and yoghurt and legumes, beans, seeds) among the integrated and separated groups (when using ethnic

identity, social network and cultural orientation as proxies of acculturation) compared with the assimilated group.

The associations between the intake of accessory foods and the different acculturation proxies were also inconsistent. For instance, sugar-sweetened beverages were a more important source of accessory foods in the integrated, marginalised and separated groups compared to the assimilated group (when using social network as a proxy of acculturation), but contributed less to the intakes of accessory food in the same groups when using ethnic identity as a proxy of acculturation. These differences were not statistically significant. Cakes sweets and spreads were a more important source of accessory food for the residence duration in Europe for 10-20 year group and > 20 years compared to ≤ 10 years stay in Europe, and these were statistically significant ($p=0.04$, $p=0.00$ respectively).

No interaction was observed between acculturation and site for the intake of most of the food categories

Table 16: Differences in weighted intake frequencies for staples across acculturation strategies among Ghanaian living in Europe

Staples				
	Bread and cereals	Plantain	Rice and other grains	Pasta
	B [95% CI]	B [95% CI]	B [95% CI]	B [95% CI]
Acculturation variables				
Ethnic identity (ref=Assimilated n=23)				
Integrated (n=1033)	-0.11[-0.29, 0.08]	0.03[-0.13, 0.20]	0.09[-0.03, 0.21]	-0.02[-0.15, 0.11]
Separated (n=740)	-0.13[-0.32, 0.06]	0.07[-0.09, 0.24]	0.09[-0.03, 0.21]	-0.03[-0.16, 0.09]
Marginalized(n=10)	0.11[-0.19, 0.40]	-0.06[-0.32, 0.20]	-0.02[-0.21, 0.16]	-0.02[-0.22, 0.18]
Social contacts (ref=Assimilated n=303)				
Integrated(n=1001)	0.01[-0.03,0.04]	0.01[-0.02,0.04]	0.00[-0.03,0.02]	-0.01[-0.04,0.01]
Separated (n=301)	0.00[-0.06,0.05]	0.01[-0.04,0.06]	0.00[-0.04,0.03]	0.00[-0.04,0.04]
Marginalized(n=201)	-0.01[-0.04,0.02]	-0.01[-0.04,0.01]	0.01[-0.01,0.03]	0.01[-0.01,0.03]
Cultural orientation (ref=Assimilated n= 3)				
Integrated (n=1334)	0.01[-0.26,0.27]	0.12[-0.11,0.36]	-0.04[-0.21,0.13]	-0.09[-0.27,0.09]
Separated (n=464)	-0.01[-0.28,0.26]	0.13[-0.11,0.36]	-0.02[-0.20,0.15]	-0.09[-0.28,0.09]
Marginalized (n=5)	0.20[-0.08,0.48]	-0.02[-0.26,0.23]	-0.13[-0.31,0.05]	-0.06[-0.25,0.14]
Residence duration (Ref=\leq10 years n= 460)				
11-20 years (n=510)	0.00[-0.04,0.05]	0.00[-0.04,0.04]	0.02[-0.01, 0.04]	-0.01[-0.05,0.02]
\geq 20 + years (n=647)	-0.01[-0.05,0.04]	0.00[-0.04,0.03]	-0.02[-0.04, 0.01]	0.03[0.00,0.06]
Beta-coefficients and their 95% confidence intervals (CIs) were calculated by linear regression, and were adjusted for age, sex, site, education, BMI and interaction terms; *P < 0.05				

Table 17: Differences in weighted intake frequencies for complementary foods across acculturation strategies among Ghanaian living in Europe

Complementary foods					
	Vegetable soups and stews	Fish and fish preparations	Poultry	Meat and meat products	Other sources of protein sources (milk, cheese and yoghurt and legumes, beans, seeds)
Acculturation variables					
Co-variates	B [95% CI]	B [95% CI]	B [95% CI]	B [95% CI]	B [95% CI]
Ethnic identity (ref=Assimilated n=23)					
Integrated (n=1033)	0.01[-0.11,0.14]	0.06[-0.05,0.18]	.07[-.024,.17]	0.01[-0.11,0.13]	-0.20[-0.36, -0.04]
Separated (n=740)	0.03[-0.09,0.16]	0.07[-0.05,0.18]	.07[-.021,.17]	0.00[-0.12,0.12]	-0.21[-0.37, -0.06]
Marginalized(n=10)	-0.04[-0.24,0.16]	0.08[-0.09,0.26]	-.04[-.187,.11]	0.00[-0.18,0.18]	0.01[-0.24,0.26]
Social contacts (ref=Assimilated n=303)					
Integrated(n=1001)	0.03[0.00,0.05]	-0.01[-0.03,0.00]	0.00[-0.01,0.01]	0.00[-0.03,0.02]	-0.01[-0.05,0.02]
Separated (n=301)	0.01[-0.03,0.0]	-0.01[-0.03,0.00]	0.00[-0.01,0.01]	0.00[-0.03,0.04]	-0.01[-0.05,0.04]
Marginalized(n=201)	0.00[-0.02,0.02]	-0.01[-0.03,0.01]	0.01[-0.01,0.02]	0.00[-0.02,0.01]	0.01[-0.02,0.03]
Cultural orientation (ref=Assimilated n= 3)					
Integrated (n=1334)	-0.01[-0.19,0.17]	0.04[-0.13,0.20]	0.14*[0.00,0.27]	-0.11[-0.27,0.06]	-0.11[-0.33,0.12]
Separated (n=464)	0.03[-0.15,0.21]	0.06[-0.10,0.23]	*	-0.13[-0.30,0.04]	-0.16[-0.38,0.07]
Marginalized (n=5)	0.22*[0.03,0.41]	-0.13[-0.30,0.04]	0.13[-0.01,0.26]	-0.08[-0.26,0.10]	-0.17[-0.41,0.06]
Residence duration (Ref=\leq10 years n= 460)					
11-20 years (n=510)	-0.03[-0.06,0.00]	0.02[-0.01,0.04]	0.02[-0.01,0.04]	-0.01[-0.04,0.02]	0.00[-0.04,0.04]
\geq 20 + years (n=647)	-0.07*[-0.10, -0.04]	0.01[-0.01,0.04]	0.02[-0.01,0.04]	0.00[-0.03,0.02]	0.04*[0.01,0.08] *

Adjusted for age, education, sex, site, BMI and interaction terms; *P < 0.05

Table 18: Differences in weighted intake frequencies for accessory foods across acculturation strategies among Ghanaian living in Europe

Accessory foods	Fruits	Sugar-sweetened beverages	Cakes, sweets and spreads	Alcoholic beverages
Acculturation variables	B [95% CI]	B [95% CI]	B [95% CI]	B [95% CI]
Ethnic identity (ref=Assimilated n=23)				
Integrated (n=1033)	0.18[-0.09,0.45]	-0.05[-0.13,0.02]	-0.11[-0.36,0.14]	0.03[-0.08,0.14]
Separated (n=740)	0.21[-0.06,0.48]	-0.05[-0.12,0.03]	-0.10[-0.35,0.15]	0.03[-0.08,0.13]
Marginalized(n=10)	0.08[-0.35,0.50]	-0.03[-0.17,0.11]	-0.17[-0.57,0.22]	0.06[-0.10,0.23]
Social contacts (ref=Assimilated n=303)				
Integrated(n=1001)	0.01[-0.05,0.06]	0.04[-0.01,0.08]	-0.05[-0.10,0.00]	0.00[-0.02,0.03]
Separated (n=301)	0.05[-0.03,0.13]	0.05[-0.01,0.12]	-0.11*[-0.18, -0.03]	0.01[-0.02,0.04]
Marginalized(n=201)	-0.02[-0.07,0.02]	0.02[-0.01,0.06]	0.00[-0.04,0.03]	0.00[-0.01,0.02]
Cultural orientation (ref=Assimilated n= 3)				
Integrated (n=1334)	-0.12[-0.51,0.27]	-0.04[-0.34,0.27]	0.13[-0.23,0.49]	0.02[-0.13,0.18]
Separated (n=464)	-0.07[-0.46,0.32]	-0.04[-0.34,0.27]	0.09[-0.27,0.45]	0.02[-0.13,0.18]
Marginalized (n=5)	-0.18[-0.59,0.22]	0.01[-0.31,0.33]	0.17[-0.20,0.55]	0.00[-0.16,0.16]
Residence duration (Ref=\leq10 years n= 460)				
11-20 years (n=510)	-0.08[-0.14, -0.01]	0.01[-0.04,0.06]	0.06*[0.00,0.12] *	0.00[-0.02,0.03]
\geq 20 + years (n=647)	-0.04[-0.11,0.02]	-0.05[-0.10,0.00]	0.08*[0.02,0.14] *	0.01[-0.02,0.04]
Adjusted for age, education, sex, site, BMI and interaction terms; *P < 0.05				

5.5 Exploratory analysis and results of checking assumptions of regression

To be able to perform a multi-linear regression, some assumptions had to be tested: 1. variables have a linear relationship; 2. there should be **no significant outliers**; 3. residuals are independent, 4. residuals are normally distributed and 5. variance of residuals does not differ by predicted value (homoscedasticity). In **Figure 19**, the results demonstrate that the residual followed a normal distribution pattern for one of the food items. Residuals were approximately normally distributed for most of food items and this is shown in Appendix C

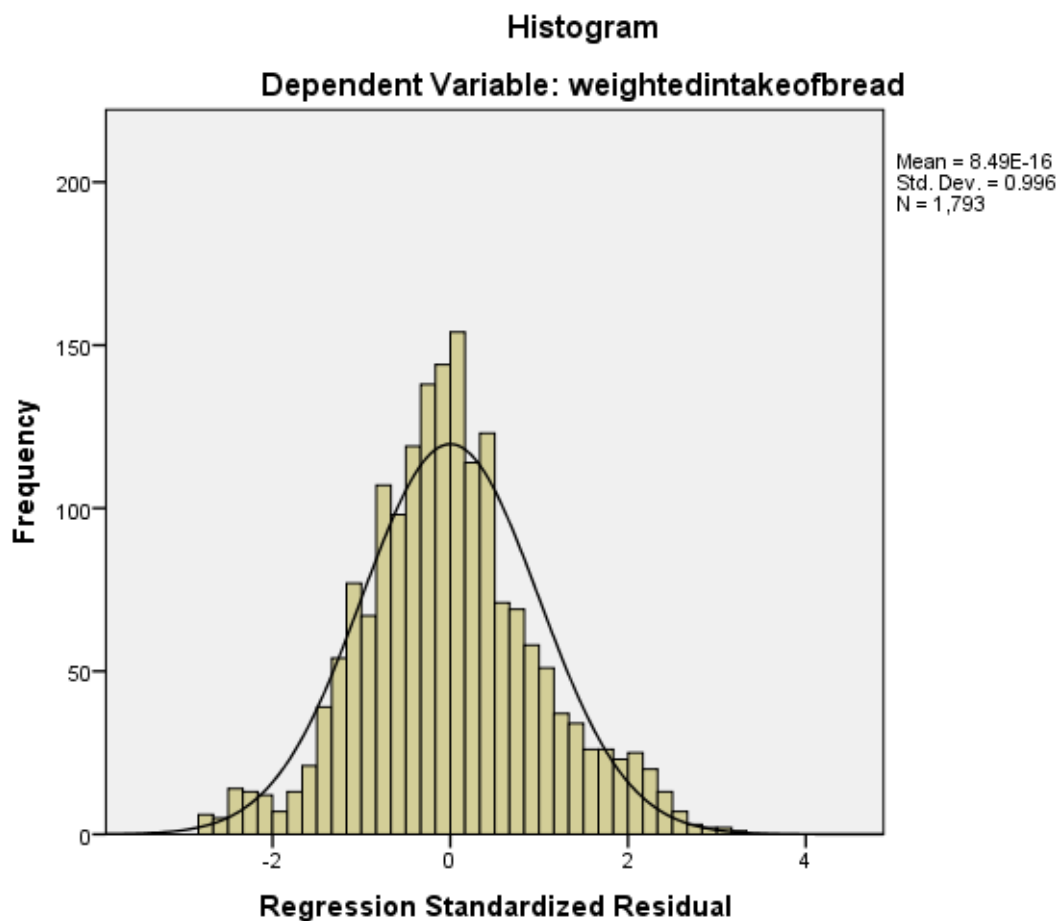


Figure 20: Histogram output from checking regression assumptions

In **Figure 21**, the residual followed the diagonal line closely, thereby satisfying another assumption for multi linear regression.

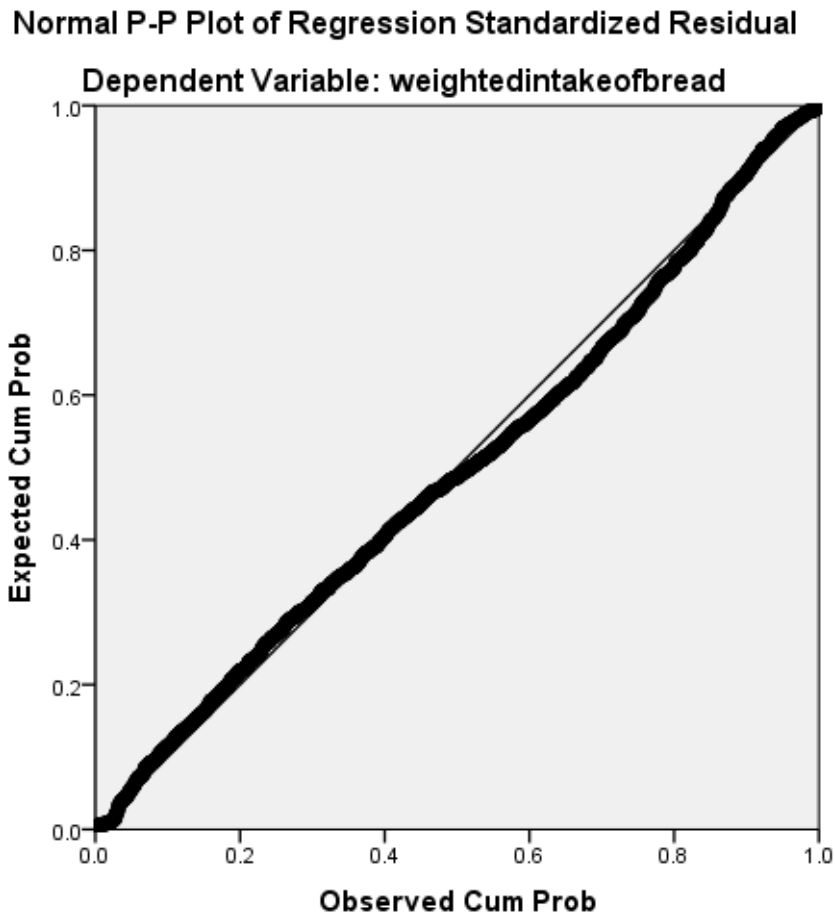


Figure 21: Normal P-P Plot of regression standardized residual

5.6 Discussion

This study sought to explore the association between acculturation and dietary intake amongst people of Ghanaian descent living in Europe. To be able to do this, first, as a baseline comparison, dietary intake amongst Ghanaians residing in Europe was compared with Ghanaians in rural and urban Ghana to establish dietary change which may be due to nutrition transition and dietary acculturation, after which the association between acculturation and dietary intake were explored for Europe. Dietary intake was estimated as weighted intake frequency per week. Foods were categorised into 14 food categories, and these were consequently grouped as staples, complementary and accessory foods based on the Koctürk model. In choosing which foods to test in this study, traditional indicator foods like plantain,

roots and tubers and foods associated with the westernisation of the diet like pasta and potatoes were included in the three food groups in order to shed light into biculturalism (Satia-Abouta et al., 2001).

5.6.1 Evidence for dietary change with migration

The varying contribution of the various foods to staples, complementary and accessory foods between Europe and Ghana is an indication of dietary change following migration whilst the differences in dietary intake between rural and urban Ghana shows the presence of the nutrition transition (Popkin, 2002).

The results of this study showed that the largest contributors to staples for Ghanaians living in Europe was bread and cereals whilst that of Ghana (both rural and urban) was plantain roots and tubers. This finding implies that there is a shift in the intake of traditional staples following migration even though the traditional staples still remain important in the diet. The intake of plantain roots and tubers were highest in rural Ghana followed by urban Ghana, an indication of the nutrition transition. This finding supports earlier findings from the RODAM study that also showed that there were differences in dietary patterns across the different study sites (Europe, rural and urban Ghana) (Galbete et al., 2017). It is also consistent with other studies that have been conducted in West Africa, in which traditional patterns of diet were identified characterized by high intakes of plantain and other foods (Frank et al., 2014, Zeba et al., 2014). A difference with those studies is that the present study assessed the relative importance of foods within the three groups, as defined in Koctürk's theory of dietary change while the previous studies explored dietary patterns using principal component analysis.

In Europe, the largest contributors to complementary foods were milk, cheese and yoghurt and legumes, beans, seeds, red and processed meat and poultry whilst in both urban and rural Ghana the diet was characterised by a higher intake of fish and fish preparations. This shows that there is also a shift in the intake of complementary foods from a more traditional fish based diet to a more dairy, red and processed meat diet which can be seen as a more westernised diet following migration. Apart from the intake of other protein sources (e.g. dairy products) which were higher in urban Ghana compared to rural Ghana, there were only small difference between the intake of poultry, meat and processed meat between rural and urban Ghana. What this shows is that in rural and urban Ghana, the diet in terms of complementary foods is becoming similar

and shifting towards a more westernised diet. This is an indication of the nutrition transition and may be as a result of development in both rural and urban areas with increased access to supermarkets (Satia-Abouta, 2010) which tend to be filled with imported foods. Also, rapid urbanisation and improved contacts between rural and urban areas due to infrastructure may help the transfer and introduction of westernised dietary practices to rural Ghana (Popkin and Gordon-Larsen, 2004, Frank et al., 2014).

The intake of accessory foods in the different study sites also provided more evidence for dietary change towards a more westernised diet following migration and also the nutrition transition. For instance, Europe showed the highest intake of cakes, sweets and spreads, followed by urban Ghana and rural Ghana, whilst fruits remained the most important contributors for rural Ghana, followed by urban Ghana and then Europe. Sugar sweetened beverages were also more important in Europe and urban Ghana compared to rural Ghana.

For dietary change in Europe, the differences in the relative contribution of indicator foods of the traditional diet (e.g. plantain roots and tubers) and host country foods (e.g. pasta and potatoes) is also an indicator of bicultural dietary patterns amongst Ghanaians living in Europe. This is unsurprising given that assessment of acculturation level in section 5.1 (baseline characteristics) showed that most participants were integrated- indicating high orientation to their respective host country cultures i.e. British, German and Dutch as well as the Ghanaian culture. This finding is consistent with findings from the qualitative study of this PhD, which showed all Ghanaians maintained aspects of their traditional diet but adopted host country foods (Osei-Kwasi et al., 2017).

5.6.2 Associations between acculturation and dietary intake

The results indicate that dietary intake amongst Ghanaians living in Europe differ from Ghanaians living in rural and urban Ghana but found no consistent evidence for the cultural change presumed to underlie dietary change among Ghanaians living in Europe. For instance, all four proxies of acculturation used in this study; ethnic identity, social network, cultural orientation and residence duration had no significant associations with any of the staple foods and could therefore not explain the differences in intakes with Ghanaians living in Ghana. This also implies there were no differences in the intake of staples between the integrated, the assimilated, the separated and marginalised group or the more exposed or less exposed to the

host country. This finding corroborates earlier studies on acculturation and dietary intake. For example, studies that measured fat-related dietary patterns found no association between acculturation and fat intake (Song et al., 2004). Findings also contrast with those of other studies that have found associations between acculturation and dietary patterns (Sharma et al., 1999, Vyas et al., 2003)

Focusing on only the traditional indicator staple foods (i.e. plantain, roots, and tubers), this study provides limited evidence to support Koctürk's hypothesis about staples (that posits that foods that are close to identity remain unchanged for a very long time). Comparative data showed that in Ghana, plantain, roots and tubers were the largest contributors to staples, contributing over 50%, while this was not the case in Europe. What this possibly means is that, when people migrate, foods perceived to be close to one's identity may still be important in the sense that they are still consumed, but their relative importance to the food groups (as defined by Koctürk) may change or be 'diluted' by other foods. The shift in the intake of staples seems to begin prior to migration, when the intakes between rural and urban Ghana is considered.

Unlike the staples, there were significant relationships between some complementary foods and acculturation on the basis of cultural orientation and residence duration in Europe. Acculturation (using cultural orientation as a proxy) provided some explanations for the differences in intake of vegetables stew and soups between the marginalised and the assimilated groups, with the former having a higher intake. This finding implies the 'less acculturated' had a higher intake compared to the 'more acculturated' as expected. Similarly, a longer duration in Europe resulted in a lower intake of vegetables soups and stews and a higher intake of poultry and acculturation dairy products (e.g. milk, cheese and yoghurt) which may be described as more westernised foods as expected.

With accessory foods, a longer duration in Europe which can be perceived as more exposure showed a significant positive relationship with the intake of cakes, sweets, and spreads. Findings of the influence of duration of stay in the host country corroborate earlier studies that reported that longer residence duration in the United States resulted in significant increases of fats/sweets (Pan et al., 1999). The intake of the other accessory foods did not show consistent associations with acculturation which implied their intake does not vary with acculturation.

This study gives limited support to the differential changes in diet suggested by Koctürk; accessory foods are the first to change while staples (that are presumed to be more closely

associated with identity) may remain unchanged for a long time. A previous study that used qualitative methods to understand the adaptation process to a new food pattern following migration, as hypothesised by Koctürk, also gave limited support to the hypothesis (Mellin-Olsen and Wandel, 2005). One possible explanation could be that Koctürk's model was based on her research among Turkish migrants and their staples might have been more available in the host environment, whereas African staples differ considerably from what is/were available in Europe as shown in the qualitative component of this PhD conducted amongst Ghanaians in Greater Manchester (Osei-Kwasi et al., 2017). In the latter study, where factors that influenced differences in dietary practices following migration were explored, availability of traditional foods seemed more important as a driver of maintaining traditional practices as compared to other factors identified in the study. This was also reported in another study conducted amongst Filipino migrants living in America (Vargas and Jurado, 2015).

Changes in dietary intake because of dietary acculturation are similar to those of the nutritional transition, that is fuelled by industrialisation and globalisation of the food market (Holmboe-Ottesen and Wandel, 2012, Popkin, 2009). The concept of acculturation relies on an important premise about historical origin and movement of a minority population, with the assumption that two distinct groups are coming into new contact following migration for the first time. This study shows that although there is a shift in dietary intake, rural and urban Ghanaians were all familiar with all foods (traditional foods and westernised or host country foods). This implies the process of westernisation of the diet was initiated before migration for this population group. This finding corroborates the qualitative findings of this thesis that also showed that participants were familiar with UK foods before migrating and also previous studies amongst Surinamese South Asians and Afro Carribeans of the Netherlands that showed inconsistent relationships between acculturation and diet, and suggested that the study population may have already been familiar with westernised diets before migrating (Nicolaou et al., 2006)

This study found no consistent patterns in the association between dietary intake (weighted intake frequency) and acculturation. Inconsistencies in the association between acculturation and dietary intake are reported in the literature (Sturkenboom et al., 2016, Satia-Abouta et al., 2002), and has been attributed to several issues including methodological considerations such

as variations in the way dietary intake is assessed and its conceptualisation. A possible explanation for the inconsistencies in this study firstly, could be that the variables studied as proxies of acculturation failed to adequately capture aspects of acculturation that affects diet (Fox et al., 2017), given that acculturation is a complex and dynamic process. Secondly cross-sectional data may not be suitable to capture the dynamic process. Several scales have been developed to measure acculturation over time, an indication of its diverse conceptualizations and the measurement still remains as a matter of controversy and debate (Hunt et al., 2004). Lastly, researchers often operationalize/represent the level of acculturation as cultural change (Hunt et al., 2004) and various measures are currently being used in migration research. Given that culture is broad and complex, it is unsurprising that the concept of acculturation still remains elusive. Another possible explanation could be that acculturation proxies commonly used in the literature do not differentiate this population group.

An implication of this is that there is still the need for research to firstly clearly conceptualise acculturation and secondly operationalise the concept well in order to capture nuances of acculturation. Another possible implication is that perhaps researchers should channel their efforts into other areas to explain dietary change and not focus so much on acculturation given the evidence so far.

5.6.3 Strengths and limitations

This study is the first to explore dietary acculturation amongst a homogeneous migrant population living in different European cities. A major strength is the inclusion of Ghanaians in Ghana to try and disentangle the effect of acculturation versus nutrition transition. Foods were categorised based on Koctürk's model. The large sample size (n=1806) of Ghanaians residing in Europe is a strength of the study. Additionally, the comparison using weighted intake frequencies has provided insight into the relative contributions and the replacement of foods following migration. Another strength of this study is the use of different acculturation measures. The single item measures such as length of residence in the host country and language proficiency as well as the dimensional classification which shows that acculturation is a process of cultural change and not a particular strategy (i.e. more or less acculturated) (Landrine and Klonoff, 2004).

One major weakness of this study is trying to investigate the process of dietary acculturation using a cross-sectional design. Another limitation is the high proportion of first generation migrants. Findings of this study, therefore, may be generalizable only to other first generation migrant groups from SSA.

5.7 Conclusion

This study used data from the RODAM study to provide insights into dietary change by comparing dietary intake among Ghanaian adults residing in Ghana (rural and urban) and in three European cities and to examine the association between acculturation and dietary intake amongst Ghanaians living in Europe. The differences between the dietary intake of Ghanaians living in Ghana and Ghanaians living in Europe is an indication of dietary change following migration whilst difference between rural and urban Ghana showed the presence of the nutrition transition. Findings showed bicultural dietary intake patterns. However, the study failed to find consistent evidence for the role of acculturation in dietary change among Ghanaian migrants. Furthermore, this study gives limited support to the differential changes in diet suggested by Koçtürk; accessory foods are the first to change while staples (that are presumed to be more closely associated with identity) may remain unchanged for a long time. The lack of consistency in the direction of the effect of acculturation on diet demonstrates the complexity of acculturation and indicates that other factors may be more important in explaining dietary acculturation that were not captured in this study. This suggests further research is needed exploring the physical environment of food, for instance, availability of foods and accessibility of food. Future research should consider a prospective analysis of acculturation and temporality in the assessment of dietary intake to be able to accurately assess dietary change. Improvements are recommended in the operationalization of acculturation to be able to effectively capture the concept in public health research.

The next chapter presents the integration of the quantitative and qualitative findings of this PhD. This comprises general discussions based on the findings of all three studies. The theoretical contributions, limitations and strengths of the study, implications for research, practice and policy are presented at the end of the chapter.

6 Overall discussion of all studies

The overall aim of this PhD, was to identify and account for dietary practices among people of Ghanaian descent living in Europe. To address the main aim of this PhD the following questions were formulated:

1. What factors influence dietary behaviour among ethnic minority groups living in Europe?
2. What dietary practices exist among people of Ghanaian descent living in Europe?
3. What are the factors associated with dietary practices among people of Ghanaian descent living in Europe?

This chapter summarises the main findings for the research questions by integrating the different components of the PhD (mixed methods). This is then followed by highlights of the contributions of this research to existing knowledge, methodological considerations, strengths and limitations of this PhD, implications of the findings for future research policy and practice and conclusion

6.1 Summary of findings of research questions

What factors influence dietary behaviour among ethnic minority groups living in Europe?

In study 1, a broad range of factors (n=63) and clusters (n=7) influencing dietary behaviour were identified encompassing: social and cultural environment (16 factors), food beliefs and perceptions (11 factors), psychosocial (9 factors), accessibility of food (10 factors), social and material resources (5 factors), migration context (7 factors), and the body (5 factors). Most of the sixty-three individual factors identified were in two clusters, ‘social and cultural environment’ and ‘food beliefs and perceptions’. Gaps in the literature included a need for researchers to explore the underlying mechanisms that shape dietary practices, which can be approached from more holistic, systems-based studies exploring relationships between factors and clusters.

What dietary practices exist among people of Ghanaian descent living in Europe?

The mixed method study suggests that there is no clear transition to UK dietary practices; rather Ghanaians living in Europe have bicultural dietary practices (i.e. having both Ghanaian and UK dietary practices), an indication that Ghanaians are an integrated group of migrants living in Europe. In the qualitative study, three overarching typologies of dietary practices emerged of i) continuity practices; ii) flexible practices; and iii) changed practices. Each typology was characterised by the meal format, the contexts for consuming such foods, structure, and patterning of meals, food purchasing and preparation. The qualitative study indicated that participants retained, to a varying degree, some aspects of Ghanaian dietary practices while adopting different aspects of the UK food culture. The quantitative secondary data analysis showed differences between dietary intake of Ghanaians living in Ghana and Ghanaians living in Europe, an indication of dietary change following migration, whilst differences identified between rural and urban Ghana showed the presence of the nutrition transition.

What are the factors associated with dietary practices among people of Ghanaian descent living in Europe?

The dietary practices identified in the qualitative study were shaped by interrelating factors that fell into four main clusters (identified in study 1): social and cultural environment, accessibility of foods, migration context, and food beliefs/perceptions. The importance that participants associated with cultural identity and the availability of ethnic shops in the UK were crucial in maintaining traditional dietary practices. Important factors that increased the likelihood of adopting UK dietary practices were being a second-generation migrant, having non-Ghanaian social networks, having a busy lifestyle, and not having enough time to cook Ghanaian foods. This study showed that in the context of migration, dietary practices are not just about diet and activities related to eating, rather they serve as an important medium for expressing cultural and ethnic identity, which is consistent with previous migration studies (Garnweidner et al., 2012, Nicolaou et al., 2009).

In the qualitative study, participants identified that food insecurity existed among Ghanaians in the community and this was shown to be associated with certain dietary choices such as eating 'belly foods' which tend to be unhealthy. Food insecurity was perceived to be buffered by the social support provided within the Ghanaian community through participants' social networks.

The quantitative secondary data analysis failed to find consistent evidence for the role of acculturation in dietary change amongst people of Ghanaian descent living in Europe based on the measures applied in this PhD. Furthermore, the study gave limited support to the differential changes in diet suggested by Koctürk; accessory foods are the first to change while staples (that are presumed to be more closely associated with identity) may remain unchanged for a long time.

6.2 Reflection on the main findings

The following section reflects on the main findings of this PhD.

Biculturalism

Bicultural dietary patterns were discernable amongst people of Ghanaian descent living in Europe in this PhD (both studies 2 and 3). This implies that participants in this research neither completely changed Ghanaian dietary practices to that of the host country or completely maintained traditional dietary practices. This finding is consistent with findings from previous studies (Garnweidner et al., 2012, Tuomainen, 2009). This is unsurprising given that assessment of acculturation level also showed that most participants were integrated (Berry, 1997) - indicating high orientation to their respective host country cultures i.e. British, German and Dutch as well as the Ghanaian culture.

Although findings in the literature suggest that change in diet following migration may result in unhealthy dietary changes (Gilbert and Khokhar, 2008), this PhD suggests that, amongst participants with changed practices, the host environment also contributed to healthier dietary practices. Thus, dietary acculturation may not necessarily lead to unhealthy diet. In contrast, others with continuity practices were of the view that migration had resulted in unhealthy dietary changes. This contradiction in the influence of migration on healthy eating confirms the idea that dietary acculturation is a complex process which depends on several factors. The operant model of acculturation and ethnic minority health behaviour (Landrine and Klonoff, 2004), may go some way to explaining these seemingly contradictory findings. The model suggests that the context from which migrants originate interacts with the context to which they migrate in shaping health behaviours. An implication of the varying perceptions regarding a change in dietary practices resulting in healthy/unhealthy dietary practices is that it is possible

that within this seemingly homogenous population, not everyone may require the same kind of intervention.

This PhD showed that there is also a shift in the intake of staples, complementary and accessory foods. For instance, for complementary foods, there was a shift from a more traditional fish based diet to a more dairy, red and processed meat diet which can be seen as a more westernised diet following migration. This finding is consistent with a recent study that analysed dietary patterns using the RODAM data (Galbete et al., 2017). Apart from the intake of other protein sources (e.g. dairy products) which were higher in urban Ghana compared to rural Ghana, one major finding from this PhD is the intake of westernised foods is not limited to Europe or urban areas, it is also consumed in rural Ghana. Most studies in Ghana have only focused on dietary changes in urban areas where findings have shown that traditional foods are gradually being replaced by foods high in energy-dense but nutrient poor, sugary and salty foods (Agyei-Mensah and de-Graft Aikins, 2010). It is therefore not surprising that some participants in the qualitative study seemed to be familiar with westernised foods before migration because migrating to the Europe was not the first encounter with the western foods.

Socioeconomic status

It is important to note that although dietary behaviour is generally considered to be associated with SES (Roberts et al., 2013), in this PhD, SES did not seem to be important in differentiating the different types of dietary practice typology identified in the qualitative study. Given the low income/middle income status of some participants, and the perceived high cost of Ghanaian foods, it was surprising that relatively higher perceived cost did not seem to influence continuity of traditional foods amongst the bulk of the participants, perhaps because strategies were devised which included substituting certain ingredients to prepare Ghanaian foods and to maintain the 'Ghanaian taste'. Similar strategies to maintain traditional foods were also reported in studies conducted amongst migrants residing in Europe (Škreblin and Sujoldžić, 2003, Lawton et al., 2008, Garnweidner et al., 2012). For most participants continuing with traditional foods was because of the importance attached to eating as a way of expressing their cultural/ethnic identity. Regarding age, children's preference for consumption of UK foods was also highlighted. However, the bulk of the participants seemed to have influenced their children to adopt traditional foods.

Food insecurity

This research also showed that participants perceived barriers to accessing healthy foods as contributing to food insecurity within the community, rather than unavailability of food per se. Most people had financial obligations to send money home towards supporting other family members and securing property in Ghana. This was prioritised and thus had implications for accessing healthy foods. An implication of this finding is that migrants prioritise financial obligations in their home country and this tends to influence their dietary habits negatively in the UK. This is consistent with findings from a study in Australia that indicated that over two-thirds of refugees run out of food and the reasons they attributed to this included sending money home and large household bills (Koc and Welsh, 2001). The high cost of utility bills was also deemed as a barrier to healthy dietary practices in our study. For instance, being compelled to fry foods rather than grill as the frying method is quicker and saves energy. Findings from this PhD show that, within the Ghanaian community, most people can manage on limited resources and from the social support within the community, however people go for ‘belly food’, which tends to be unhealthy and do not prioritise their own health.

Acculturation

This research failed to find consistent evidence for the role of acculturation in dietary change among people of Ghanaian descent living in Europe based on the measures applied in this PhD. Inconsistencies in the association between acculturation and dietary intake are reported in the literature (Sturkenboom et al., 2016, Satia-Abouta et al., 2002), and has been attributed to several issues including methodological considerations such as variations in the way dietary intake is assessed and its conceptualisation as discussed in study 3. The lack of evidence of the association between the proxies of acculturation and dietary intake does not support findings in the qualitative study where ethnic identity and social network emerged as important factors influencing dietary practices of Ghanaians in Greater Manchester.

A possible explanation for the inconsistencies between studies 2 and 3 regarding the influence of acculturation (social networks, ethnic identity) could be because in study 2 dietary practices encompassed meal format, context and patterns whilst in study 3 the focus is on meal format in the form of quantitative measures of dietary intake. Perhaps these factors (social networks, ethnic identity, cultural orientation and residence duration) better explain the differences in the meal context and structure more than dietary intake. This also shows the importance of the mixed methods approach in addressing the research questions in this PhD as this approach

gives a more comprehensive understanding than using either quantitative or qualitative methods only.

6.3 Reflection– based on theory

In seeking to identify and account for dietary practices of Ghanaian migrants, models of dietary acculturation as proposed by Satia-Abouta (2002) and Koctürk-Runefors (1991) were appraised in this research for the first time amongst migrants from West Africa. Earlier studies that have explored dietary change using these models in Europe have mainly been among South Asian populations (Mellin-Olsen and Wandel, 2005). The nutrition transition was also explored amongst Ghanaians living in Ghana as a baseline comparison for dietary intake. While the model of dietary acculturation by Satia-Abouta (2002) provides very useful insights into dietary acculturation, the model tends to be incomplete because it does not identify what could be expected in the change process. It focuses on the possible factors that can result in dietary change following migration. Koctürk's model fills in this gap by proposing a model to enhance the understanding of adaptation to new food pattern. Thus, the two models complement each other. This PhD provided a unique opportunity to discuss the usefulness of Koctürk's model together with Satia- Abouta's model.

The three typologies identified in this PhD are similar to the three patterns demonstrated in the model of dietary acculturation by Satia-Abouta (2001), namely the maintenance of traditional eating patterns; the adoption of host country eating patterns and bicultural eating patterns. However, Satia-Abouta's model implies a strict division within the three patterns whereas this PhD found evidence of an overlap between dietary typologies, whereas this study found evidence of nuances in bicultural dietary practices. In other words, no participant had completely changed all Ghanaian dietary practices to those in the UK or completely maintained traditional dietary practices. Rather all participants had both dietary practices of home and host country, but the difference was in the degree to which participants adhered to the two practices. This research builds on existing knowledge of dietary change by providing insights into factors influencing variations in the degree of continuity or change, which the other models do not show. In terms of what foods changed following migration, this study showed that, for migrants who migrated in early years, (1970 – 1980), the unavailability of Ghanaian shops meant that they were forced to adopt staple foods like potatoes first, suggesting that, during this period, availability of traditional foods was a more important driver of change than other factors. This

finding contrast with Koctürk's model, which suggests that staple foods are the last to change following migration. This contrasting finding was also confirmed by the quantitative research that showed a shift from the traditional staples (plantain roots and tubers) to bread and cereals following migration. What this possibly means is that, when people migrate, foods perceived to be close to one's identity may still be important in the sense that they are still consumed but their relative importance to the food groups (as defined by Koctürk) may change or be 'diluted' by other foods. This PhD also provided insight for understanding dietary change between rural and urban Ghana and dietary change following migration. Findings showed there was a shift in dietary intake from traditional diets to westernised diets from rural to urban Ghana and to Europe, an indication of the presence of the nutrition transition and dietary acculturation.

Amongst participants with flexible and changed practices, the study showed that breakfast habits had generally shifted towards those of the majority population, which is consistent with Koctürk's model (Kockturk-Runefors, 1991). For those with flexible practices, lunch varied between Ghanaian and UK foods. However, dinner still had cultural importance, and family members were more likely to be around at the end of the day or during the weekends for participants in both the 'continuity' and 'flexible' groups. This finding supports Koctürk's model that changes may begin with breakfast followed by lunch, while supper usually remains unchanged for a longer time. Other studies have also shown this process of change among migrants (Mellin-Olsen and Wandel, 2005, Tuomainen, 2009). It is important to note that a couple of participants with continuity practices reported strictly consuming Ghanaian foods, a contrast with Koctürk's argument that it is impossible for immigrants to completely adhere to old food habits following migration (Kockturk-Runefors, 1991). It is worth noting, however, that these cases were deviant as the bulk of participants consumed both Ghanaian and UK foods. A possible explanation for these deviant cases might be that immigrants change certain foods or preparation methods without even realising; newly adopted foods (such as snacks and sweets) may not be perceived as real food, thus falling outside the scope of the usual diet (Kockturk-Runefors, 1991).

6.4 Strengths and limitations of the mixed methods

The next section provides a discussion of the strengths and limitations of the quantitative and qualitative phases of the study, and to the mixed methods study design. Findings in this PhD should be interpreted in light of the methodological considerations discussed.

6.4.1 Qualitative research

This study is the first to explore the influence of migration on dietary practices of Ghanaians living in the Greater Manchester area. It does not only explore the process of dietary change but goes further to analyse in-depth the factors influencing variations in the degree of continuity and change. For public health experts to effectively design nutrition interventions, a greater understanding of what accounts for these variations is crucial. One possible limitation of the qualitative study was the possibility that translation bias might have been introduced through the five interviews conducted in “Twi”. While translation is acceptable in research, it is known to potentially introduce bias through incorrect interpretations (Temple and Young, 2004). Nonetheless, the researcher is a Ghanaian, and speaks “Twi” fluently, so conducted the interviews and was able to serve as the translator, therefore checking the accuracy of interpretations. Her cultural identity as Ghanaian also facilitated recruitment of participants into the study. Although the study sought diversity regarding of generation type, age and SES, only a few second-generation migrants are represented in this study. Hence the findings may be biased toward first generation migrants. Like other qualitative studies, findings from this study did not seek to be generalised to all other migrant groups in the UK. Rather, theoretical concepts generated from the findings may have relevance to other migrants’ groups in a similar context. For example, second generation migrants, who no longer live with their parents are more likely to adopt more of the host country dietary practices compared to first generation migrants. Thick descriptions have been provided on the context, for instance, occupation, age and social networks of participants so that readers can judge if findings are transferable to other settings.

6.4.2 Quantitative secondary data analysis

This study is the first to explore dietary change amongst a homogeneous migrant population living in different European cities. A major strength is the inclusion of Ghanaians in Ghana to try and disentangle the effect of acculturation versus nutrition transition. The large sample size (n=1806) of Ghanaians residing in Europe is a strength of the study. Additionally, the comparison using weighted intake frequencies has provided insight into the relative contributions and the replacement of foods following migration. Another strength of this study is the use of different proxies of acculturation. The single item includes measures such as length of residence in the host country and language proficiency as well as the dimensional classification which shows that acculturation is a process of cultural change and not a particular strategy (i.e. more or less acculturated) (Landrine and Klonoff, 2004).

One major weakness of this study is trying to investigate the process of dietary change using a cross-sectional design. The FPQ was also not validated, and future research should consider a prospective analysis of acculturation and temporality in the assessment of diet to be able to assess dietary change accurately. Another limitation is the high proportion of first generation migrants. The different recruitment strategies used for the different European sites and the different response rates for the different study sites may be a weakness of this study. However, a non-respondent' analysis showed that although a certain bias is likely like all population surveys, it is unlikely that this may affect the findings using the RODAM data (Agyemang et al., 2016). In addition, RODAM study used robust, standardised approaches at all study sites (Agyemang et al. 2014). Findings of this study, therefore, may be generalisable to first generation migrant groups from sub-Saharan Africa migrants living in Northern Europe.

6.4.3 Mixed methods design

A major strength of this PhD was using mixed methods design to identify and account for dietary practices amongst people of Ghanaian descent living in Europe. To reiterate the rationale for using a mixed method made in section 3, the main aim of employing a mixed methods design was to provide a more comprehensive understanding of the dietary practices using qualitative in-depth interviews and quantitative secondary data analysis than could be

achieved using either quantitative or qualitative method. The decision to use mixed methods was based upon the strength in using different methods to answer different research questions. The qualitative analysis was used to identify patterns of dietary practices and factors associated with these practices, while the quantitative secondary data analysis was used to describe one element of dietary practice (meal format in the form of intake) and to examine the effect of specific factors identified in the qualitative study on meal format amongst Ghanaians living in different European cities. A qualitative or quantitative design alone would not have been adequate to address the different research questions for this PhD.

The qualitative research revealed explanation for the different dietary practices identified for Ghanaians living in Greater Manchester, however, no dietary data was collected in the qualitative study. Thus, the qualitative study was complemented by dietary intake data in study 3, which gave insight into the diets of Ghanaians living in Europe. Given that this PhD sought to explore the associations between acculturation and diet, some of the factors identified in the qualitative research informed the choice of proxies to be used for acculturation in the quantitative secondary data analysis. Without the quantitative part of the research, it would have been difficult to make generalisation of this PhD findings to a wider Ghanaian population. The qualitative data provided in-depth understanding and lived experiences, thus providing contextualised accounts for dietary practices and this was complemented by the benefits of using the large RODAM data set to increase generalisability.

Another major strength of this PhD is the systems approach that was employed in studying dietary practices. Clustering factors into systems provided a more adequate means of depicting interrelationships between the factors and also shows the complexities of dietary change better than relying on existing models.

Most research focuses on just dietary intake (Earland et al., 2010, Ellahi, 2014) and do not explore the underlying mechanisms shaping these behaviours. The use of larger data sets along with qualitative research is not a common practice in nutrition research, and this PhD shows the potential benefits of such an approach.

The main challenge in the mixed methods approach used in this study was the longer time required to collect/manage and analyse the qualitative and quantitative data and to write up and integrate the findings compared to undertaking either a qualitative or quantitative research only. Secondly, the use of secondary data also limited the extent to which study 3 contributed to the

mixed method approach used in this PhD because other important variables in the qualitative study that could explain dietary practices were not available in the RODAM data set for instance availability of traditional foods. Another potential limitation is the issue related to the use of different samples. The qualitative sample was drawn from Greater Manchester whilst the quantitative sample was drawn from London, Amsterdam and Berlin. Notwithstanding the value of the findings from the qualitative regarding addressing the research questions, the absence of a sample from Greater Manchester in the quantitative analysis represents a limitation. However, the decision to not do a survey in Greater Manchester and to use the RODAM data was made for pragmatic reasons which are outlined in Chapter 3.

In addition to discussing the methodological issues of the mixed methods, it was important to reflect on how the researchers personal background and characteristics and experiences may have influenced the design and interpretations of the findings. For instance, my decision to explore certain topics such as food insecurity in this research is influence by my background as a nutritionist and my interest in that area of nutrition research. Another researcher might not have focused on the same topics that were explored in this PhD. My position as a pragmatist also influenced the decision to use mixed methods approach. Additionally, mixed methods research is increasingly being used in my past research institution where I worked as a researcher and therefore I was receptive to the idea of using this where appropriate. But most importantly my decision to use mixed method was determined by my belief that we cannot adequately identify dietary practices and account for dietary practices with either quantitative or qualitative methods on their own.

Finally, my own background as a Ghanaian migrant with a strong identity as a Ghanaian could result in a possibility of a lack of objectivity in terms of interpretations of the findings because of assumed knowledge. As a result, the data was examined thoroughly for quotes that supported and contrasted my assumptions. The monthly supervision with academic supervisors to discuss themes and my interpretations ensured that the final thesis presented a balanced view of the data.

6.5 What are the implications for policy and practice?

Although this PhD does not assess the prevalence of NR-NCDs, there is sufficient evidence that there is the need for dietary interventions amongst Ghanaian migrants living in Europe (Agyemang et al., 2016) and this PhD has provided some perspectives to design interventions. This PhD suggests the need for deep structure sensitivity in interventions, which means understanding the cultural, social, environmental, psychological and historical forces that influence dietary practices within migrant populations, before designing interventions (Resnicow et al., 1998). For instance, exploring traditional food availability, social networks or prevalence of fruit and vegetable intake before migration vs. in the new environment. This is important, given that migrant studies often define ethnicity in broad categories and assumes homogeneity in characteristics of large ethnic minority groups (Hunt et al., 2004). Whilst this PhD provides insight that could go into designing interventions, another implication for practice is that within this seemingly homogenous population, not everyone may require the same kind of intervention. There is the need for individual/group assessment to determine which dietary practices are prevalent so that dietary counselling can be focused on maintaining traditional dietary practices/ flexible or changed practices. For instance, Ghanaians with continuity practice should be encouraged to maintain healthy Ghanaian dietary practices whereas those with changed practices should be advised to adopt healthy dietary practices similar to the host country. The overlap between the UK and Ghanaian dietary practices across all typologies suggests that participants in this study are an 'integrated' group' (Berry, 1997). This finding may also have implications for nutrition professionals working with this population. For instance, given that most Ghanaians are integrated in the UK culture, nutritionist/dieticians may easily communicate or have nutrition intervention materials using English language without the need for translators.

The typologies of dietary practices and clusters of factors identified in this PhD can provide insight into what to look out for when nutritional professionals working in practice around cultural competence. This will enable these professionals to effectively deliver services that meet the social and cultural needs of their clients. . Additionally, findings have provided insights into dietary change following migration among West Africans which can be used for teaching purposes in migration and health. This PhD also suggest that churches and other social organisation within migrant communities might be a means for nutrition interventions.

Currently routine data collected in most European countries do not provide insight into dietary practices of migrant groups. Such data if available can inform policies for nutrition interventions applicable or specific to migrant groups. Considerable variations in dietary behaviours across and within different ethnic groups (Gatineau and Mathrani, 2011) limits the extent to which research tools that are used in high-income countries can be used, as these are usually developed for the host population and may not be suitable for migrant groups (Stronks, 2003). However, including routine data from migrant groups can result in the addition of new foods to update FFQ's or food composition data in order to capture all available foods in the European market, thus bridging this gap in knowledge related to the dietary behaviours of migrant groups.

6.6 What are the implications of this PhD for future research?

The current PhD addresses some of the gaps in knowledge regarding dietary change and its drivers amongst West African migrants. The clusters of factors presented in study 2 offers a way for nutrition researchers and practitioners to understand the complexity of dietary change amongst adults. A few factors were tested in study 3; however, an opportunity for research is to explore the relative importance of various factors in the clusters and their associations with dietary practices. While cross sectional studies have their advantages in exploring new areas of research they are unable to make causal associations. Longitudinal studies will allow for the consideration of temporality in the assessment of diet so that dietary change is well captured. Measurement of diet in combination with health parameters is also recommended to be able to assess the implications of dietary change on health outcomes among this population.

Perceptions data may not suffice to capture the extent of food insecurity within the Ghanaian community; therefore, future survey-based research is needed to better assess the accessibility and utilisation pillars of food insecurity. There is the need to explore the implications of food management and coping strategies such as eating belly foods for dietary quality and health among this population.

There is also the need to understand dietary practices amongst children and second-generation migrants as there is a limited representation of second generation migrants in the mixed method study, and the review also showed a dearth of evidence on dietary practices of children.

Therefore, future studies should focus on dietary practices of second generation migrants, children and older adults who are not well represented in this PhD.

Finally, improvements are also recommended in the understanding, conceptualisation and operationalization of acculturation to be able to effectively capture the concept in public health research. It is important that researchers are able to select proxies of acculturation that best matches the research topic and is able to adequately capture aspects of acculturation that affects diet their population group

6.7 Conclusion

This PhD has contributed to the current scientific literature on dietary change following migration among people of Ghanaian descent living in Europe. It provides insight into dietary practices and associated factors. The following conclusions can be drawn from this PhD:

- Ghanaians living in Europe can be described as an integrated group with bicultural dietary practices. Maintaining traditional dietary practices is an indication of how Ghanaian migrants value their original dietary habits, although the importance of cultural identity as a driver of dietary practices varied across people in the different typologies.
- Dietary change amongst people of Ghanaian descent living in Europe is a complex process, it is not a linear process and it is dependent on several inter-related factors. The dietary practices identified were shaped by interrelating factors that fell into four main clusters: social and cultural environment, accessibility of foods, migration context, and food beliefs/perceptions. The importance that participants gave to cultural identity and the availability of ethnic shops in the UK were crucial in maintaining traditional dietary practices. Important factors that increased the likelihood of adopting UK dietary practices included being a second-generation migrant, having non-Ghanaian social networks, having a busy lifestyle, and not having enough time to cook Ghanaian foods.

- Most Ghanaians can manage on limited resources and from the social support within the community, however people go for ‘belly food’, which tends to be unhealthy and do not prioritise their own health.
- The differences between the dietary intake of Ghanaians living in Ghana and Ghanaians living in Europe is an indication of dietary change following migration whilst difference between rural and urban Ghana showed the presence of the nutrition transition. The study failed to find consistent evidence for the role of acculturation in dietary change amongst people of Ghanaian descent living in Europe based on the measures applied in this PhD.

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Appendix

Appendix A: Systematic mapping review

Appendix A consists of supplementary information for the systematic mapping review.

A.1: Published protocol for the systematic mapping review

A.2: Search strategy for MEDLINE

A.3: Quality appraisal tool for quantitative studies

A.4: Quality appraisal tool for qualitative studies

A.5: results of quantitative scoring Criteria

A.6: results of qualitative scoring Criteria

A.1: Protocol for systematic review

UNIVERSITY of York
Centre for Reviews and Dissemination


National Institute for
Health Research

PROSPERO International prospective register of systematic reviews

Factors influencing diet and dietary behaviour among minority ethnic groups in Europe: a systematic mapping review

Hibbah Saeed, Mary Nicolaou, Katie Powell, Michelle Holdsworth, Laura Terragni, Lea Maes, Karie Stronks

Citation

Hibbah Saeed, Mary Nicolaou, Katie Powell, Michelle Holdsworth, Laura Terragni, Lea Maes, Karie Stronks. Factors influencing diet and dietary behaviour among minority ethnic groups in Europe: a systematic mapping review. PROSPERO 2014:CRD42014013549 Available from http://www.crd.york.ac.uk/PROSPERO_REBRANDING/display_record.asp?ID=CRD42014013549

Review question(s)

What factors influence diet and dietary behaviour among minority ethnic groups living in Europe across the lifecourse?

Searches

Electronic databases that will be searched for articles are; MEDLINE, EMBASE, Web of Science, Cochrane Library, CINAHL, ProQuest, PsycINFO, Campbell Collaboration Library of Systematic Reviews. These databases are estimated to contain the majority (>90%) of all health and related research literature (Zhang et al., 2006). Applied Social Sciences Index and Abstracts (ASSIA) and postgraduate dissertations will also be searched through ProQuest. All electronic databases will be searched from 1999 to 2014. This time period was chosen because we anticipated that any determinants identified before 1999 would be referred to in more recent literature and also spot checks to identify key date of some key papers showed that most key papers emerged after 1999. Citation follow-up technique will be used to identify studies that might not have been picked up through the search of the electronic databases. In the event that few papers or articles are found, experts in the subject area, first authors or key researchers working in the fields of diet and dietary behaviour, and ethnicity and health will be contacted for help in identifying any relevant sources of data, other published data that might have been missed in the search of the electronic databases or unpublished data. There will be no restrictions on language.

Types of study to be included

Inclusion criteria

All studies that identify an association between a risk factor and the diet or dietary behaviour of minority ethnic groups living in Europe will be included. Such factors might include motivation, knowledge or perceptions.

Objective and subjective measures of dietary outcomes will be included.

Any studies that identify diet as a modifier in the pathway between a particular variable and a disease will be included.

Exclusion criteria

All studies that analyse diet as a confounder in a relationship between ethnicity and disease

All studies that explore whether ethnicity is a determinant of diet and do not attempt to explain why

Studies examining beliefs and practices around breastfeeding and weaning

Studies examining the nutrient status of particular ethnic groups without mention of foods eaten

Studies presenting descriptive information about diet will be excluded.

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Condition or domain being studied

All observational and intervention studies using quantitative and qualitative methods that examine diet and dietary behaviour among minority ethnic groups in Europe will be included. Other studies that may focus on nutrition related diseases (e.g. obesity) and include relevant data on dietary behaviour on minority ethnic groups will also be included.

Participants/ population

All population groups including institutionalised populations; people of all age range, non-indigenous ethnicities and health statuses will be included.

Non-human studies/laboratory based studies will be excluded

Intervention(s), exposure(s)

Not applicable

Comparator(s)/ control

Not applicable

Context

Research conducted only in Europe will be considered

Outcome(s)

Primary outcomes

Factors influencing diet and dietary behaviour among minority ethnic groups

Secondary outcomes

None

Data extraction, (selection and coding)

The screening process

Title and abstract screening:

Three independent reviewers (HS, KP, and MN) will screen titles and abstracts of identified studies for relevance, according to the review inclusion criteria. Spot checks will be conducted on a sample of screened sources to assess the extent of agreement between reviewers. This will be done by randomly selecting 10% of the total articles and double screening by each of the reviewers (HS, KP, and MN). When there is disagreement between two reviewers during the spot checks, the third reviewer will be consulted.

Full- text reviews:

Full- texts of all records that were selected in the title and abstract review phase will be searched through the electronic data bases used in the search. Corresponding authors will be contacted through email for full text of their papers that may not be retrieved through the databases. The retrieved full –texts papers will be reviewed by one of the team of five independent researchers (HS, MN, KP, MH, LT). Spot checks will be conducted on 10% of randomly selected full text papers to assess the extent of agreement between reviewers by the led researcher (HS).

Data extraction:

Data from papers included in the full text- review phase will be extracted by six independent researchers ((HS, MN, KP, MH, LT, and LM).

An extraction tool will be developed to collate data from the literature. The tool will be used to identify general information and study characteristics (author, year of publication, country, and study design, sample size), population characteristics (gender, age, body mass index, country of origin, years since migration, acculturation, education, migration history, and other relevant demographics), assessment methods and study findings in relation to determinants on an individual, social, cultural or physical level. In the event that not all details needed are presented

in the article, the lead study author will be contacted to provide missing information.

Risk of bias (quality) assessment

The standard quality assessment criteria for evaluating primary research papers from a variety of fields will be used to assess quality of studies developed by Kmet et al (2004). The quality of articles that will be included after the full text review will be assessed by one of the team of six independent researchers involved in data extraction.

Strategy for data synthesis

A descriptive map of the determinants will be developed from the review findings. Because of the expected heterogeneity in the study design and study participants no meta-analyses are

Planned.

Analysis of subgroups or subsets

The possibility will be explored for subgroup analysis based on gender, ethnicity, socio-economic status and across the life course (children, adult, older adult).

Dissemination plans

A manuscript will be written and presented to a peer-reviewed journal. The review also forms part of a PhD – thesis.

A report will also be published on the DEDIPAC newsletter and be available on the DEDIPAC website (<https://www.dedipac.eu/>)

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Anticipated or actual start date

19 May 2014

Anticipated completion date

30 January 2015

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JPI HDHL, DEDIPAC

Conflicts of interest

None known

Language

English

Country

England, Belgium, Netherlands, Norway

Subject index terms status

Subject indexing assigned by CRD

Subject index terms

Diet; Ethnic Groups; Europe; Food Habits; Humans; Minority Groups

Stage of review

Ongoing

Date of registration in PROSPERO

04 September 2014

Date of publication of this revision

04 September 2014

Stage of review at time of this submission	Started	Completed
Preliminary searches	No	Yes
Piloting of the study selection process	No	Yes
Formal screening of search results against eligibility criteria	Yes	No
Data extraction	No	No
Risk of bias (quality) assessment	No	No
Data analysis	No	No

PROSPERO

International prospective register of systematic reviews

The information in this record has been provided by the named contact for this review. CRD has accepted this information in good faith and registered the review in PROSPERO. CRD bears no responsibility or liability for the content of this registration record, any associated files or external websites.

A.2: Example of a search strategy MEDLINE

#	Searches	Results
1	*Diet/ or *Food Habits/ or Nutritional Status/ or Food Preferences/ or nutrition*.ti,ab.	236837
2	*"Emigrants and Immigrants"/ or *cultural diversity/ or *Minority Groups/ or *"Transients and Migrants"/ or *Ethnic Groups/ or multiculturalism*.mp. or *ethnic minorit*/ or BME.mp. or black minorit*.mp. or ethnic*.mp. or asylum seeker*.mp. or refugee*.mp. or african caribbean*.mp. or *West Indies/ or *Afro-caribbean*/ or *Non-white/ or *Coloured population/ or *Black*/ or *Afric*/ or *Indi*/ or *Caucasian*/ or *Caribbean*/ or *Arab*/ or *Black Afric*/ or *South Asia*/ or *Trinidad/) and Tobago.ti,ab. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	86
3	(((((*chinese*/ or *china/ or *irish traveller*/ or gyps*.mp. or *roma/ or *Asian/ or *Pakistan*/ or *banglades*/ or *turk*/ or *iran/ or *Iranian*/ or *irak*/ or *Maghreb*/ or *tunisi*/ or *morocco*/ or *liby*/ or *algeri*/ or *Surinam*/ or *latin American*/ or *cameroo*/ or *equado*/ or *eritre*/ or *chil*/ or *estoni*/ or *latvi*/ or *lithuani*/ or *goergi*/ or *armeni*/ or *azerbaija*/ or *kazakhsta*/ or *ukrain*/ or *belaru*/ or *moldov*/ or *croati*/ or *Czech republic*/ or *pol*/ or *romani*/ or *serbi*/ or *slovaki*/ or *sloveni*/ or *albani*/ or *bulgari*/ or *macedoni/ or *montenegr*/ or *angol*/ or *beliz*/ or *beni*/ or *bhuta*/ or *boliv*/ or *botswan*/ or *brazil*/ or *Burkina faso/ or *burund*/ or *chad/ or *colombi*/ or *cong*/ or *costa ric*/ or *ivoria*/ or *comor*/ or *cub*/ or *White/) and Black Caribbean.mp.) or *white/) and Black African.mp.) or *White/) and Asian.mp.) or *Mixed ethnic background/ or *multiple ethnic background*/ or *Central African Republic/ or djibout*.mp. or domini*.mp. or equado*.mp. or egypt*.mp. or ethiop*.mp. or fij*.mp. or gabo*.mp. or gambit*.mp. or ghan*.mp. or grenad*.mp. or guatemal*.mp. or guine*.mp. or guinea Bissau.mp. or guyan*.mp. or hait*.mp. or hondura*.mp. or hungar*.mp. or indones*.mp. or ira*.mp. or jamaic*.mp. or jord*.mp. or keny*.mp. or kiribat*.mp. or kore*.mp. or koso*.mp. or leban*.mp. or lesot*.mp. or liber*.mp. or macedon*.mp. or madagassc*.mp. or malaw*.mp. or lao pdr.mp. or malays*.mp. or mald*.mp. or marshall island*.mp. or	831415

	maurit*.mp. or mexic*.mp. or micronesi*.mp. or moldov*.mp. or mongol*.mp. or mozambi*.mp. or myanma*.mp. or namib*.mp. or nep*.mp. or nicaragu*.mp. or nig*.mp. or nigeri*.mp. or Dominican republic.mp . or el-salvado*.mp. or kyrgyz republic.ti,ab. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	
4	(((((pala* or panam* or papua new guinea or paragu* or per* or phillipen* or rwand* or samo* or sao tome) and principe) or Senegal* or Seychelles or sierra leon* or solomon islands or Somali* or south afric* or south suda* or sri lank* or st luc* or st vincen* or suda* or surina* or Swaziland or Syrian arab republic or tajikista* or tanzan* or thail* or timoe-leste or tog* or tong* or turkmensista* or tuval* or ugand* or uzbekist* or vanuat* or venezuel* or vietna* or west bank) and gaza) or yemen or zambi* or zimbabw*).ti,ab.	8747
5	2 or 3 or 4	838745
6	Europe/ or *Russia/ or *Ukraine/ or *France/ or *Spain/ or *Sweden/ or *Norway/ or *Germany/ or *Finland/ or *Poland/ or *Italy/ or *Great Britain/ or *Romania/ or *"Republic of Belarus"/ or *Kazakhstan/ or *Greece/ or *Bulgaria/ or *Iceland/ or *Hungary/ or *Portugal/ or *Austria/ or *Czech Republic/ or *Serbia/ or *Ireland/ or *Latvia/ or *Bosnia-Herzegovina/ or *Croatia/ or *Lithuania/ or *Slovakia/ or *Estonia/ or *Denmark/ or *Netherlands/ or *Switzerland/ or *Moldova/ or *Belgium/ or *Albania/ or *"Macedonia (Republic)"/ or *Turkey/ or *Slovenia/ or *Montenegro/ or *cyprus/ or *malta/ or *Azerbaijan/ or *Luxembourg/ or *Georgia/ or *Andorra/ or *Liechtenstein/ or *Monaco/ or *Vatican City/ or *San Marino/ or (Europ or Russia or Ukraine or France or Spain or Sweden or Norway or Germany or (Finland or Poland or Italy or United Kingdom or Great Britain or Romania or Belarus) or (Kazakhstan or Greece or Bulgaria or Iceland or Hungary or Portugal or Austria or Czech Republic or Serbia or Republic of Ireland or Latvia) or (Lithuania or Croatia or Slovakia or Estonia or Denmark or Netherlands or Switzerland or Moldova or Belgium or Albania or Macedonia or Turkey or Slovenia or Montenegro or Cyprus or Azerbaijan or Luxembourg or Georgia or Andorra or Malta or Liechtenstein or San Marino or Monaco or Vatican city) or (Bosnia adj1 Herzegovina)).ti,ab.	414123

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A.3: Quality appraisal questions for qualitative papers

Quantitative

1 Question / objective sufficiently described?	
2 Study design evident and appropriate?	
3 Method of subject/comparison group selection or source of information/input variables described and appropriate?	
4 Subject (and comparison group, if applicable) characteristics sufficiently described?	
5 If interventional and random allocation was possible, was it described?	
6 If interventional and blinding of investigators was possible, was it reported?	
7 If interventional and blinding of subjects was possible, was it reported?	
8 Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? means of assessment reported?	
9 Sample size appropriate?	
10 Analytic methods described/justified and appropriate?	
11 Some estimate of variance is reported for the main results?	
12 Controlled for confounding?	
13 Results reported in sufficient detail?	
14 Conclusions supported by the results?	

A.4: Quality appraisal questions for qualitative

1 Question / objective sufficiently described?

2 Study design evident and appropriate?

3 Context for the study clear?

4 Connection to a theoretical framework / wider body of knowledge?

5 Sampling strategy described, relevant and justified?

6 Data collection methods clearly described and systematic?

7 Data analysis clearly described and systematic?

8 Use of verification procedure(s) to establish credibility?

9 Conclusions supported by the results?

10 Reflexivity of the account?

A.5: Results of quantitative scoring Criteria Items

Study	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Summary score
Koochek et al., 20011	2	2	2	2	n/a	n/a	n/a	2	1	2	2	2	2	2	21/22
Volken et al., 2013	2	2	2	2	n/a	n/a	n/a	2	2	2	2	2	2	2	22/22
Edwards et al., 2010	2	0	1	2	n/a	n/a	n/a	0	0	2	2	0	2	1	12/22
Ross et al., 2009	2	2	2	2	n	n	n	1	1	1	1	0	2	2	16/22
Skreblin and Sujoldzic, 2003)	2	1	1	2	n	n	n	2	1	1	0	0	2	2	14/22
Brustad et al., 2008a	2	1	2	2	n	n	n	2	1	1	1	0	2	2	16/22
Brustad et al., 2008b	2	2	2	2	n/a	n/a	n/a	2	2	2	2	2	2	2	22/22
Kumar et al., 2004	2	2	2	2	na	na	na	1	2	2	2	1	1	2	19/22
Kassam-Khamis et al., 2000	1	1	1	0	na	na	na	1	1	1	0	0	2	1	10/22

Kassam-Khamis et al., 2000																
Harding et al., 2008b	2	2	1	2	na	na	na	2	2	2	2	2	2	2	2	21/22
Nicolaou et al., 2006	2	2	2	2	na	na	na	2	2	2	2	2	2	2	2	22/22
Nielsen et al., 2014	2	2	1	1	n	n	n	1	2	2	1	1	2	2	17/22	
Carrus et al., 2009	2	1	1	1	n	n	n	1	1	2	2	1	2	2	16/22	
Perez-Cueto et al., 2009	2	2	1	2	n/a	n/a	n/a	1	2	2	2	2	2	2	20/22	
Raberg Kjollesdal et al., 2014)	2	2	2	1	0	0	n/a	1	2	2	2	2	2	2	20/26	
Raberg Kjollesdal et al., 2010	2	1	1	2	1	1	0	2	2	2	2	0	1	1	18/28	
Khunti et al., 2008	2	2	2	1	n/a	n/a	n/a	1	n/a	2	n/a	n/a	2	2	14/16	
Johansen et al., 2010	2	2	1	2	1	n/a	n/a	2	2	2	2	2	2	2	22/24	

A.6: Results of qualitative scoring Criteria Items

Study	1	2	3	4	5	6	7	8	9	10	Summary score
Lawrence et al., 2007	2	2	2	1	1	1	1	0	2	2	14/20
Lawton et al., 2008	2	2	2	1	2	2	2	0	2	1	16/20
Fargerli et al., 2005	2	2	2	0	2	2	2	2	2	2	18/20
Garnweidner et al., 2012	2	1	2	2	2	2	2	2	2	2	19/20
Grace et al., 2008	2	2	2	2	1	2	1	1	1	1	15/20
Halkier et al., 2011	2	1	2	2	1	1	1	1	1	2	14/20
Kohinor et al., 2011	2	2	2	1	2	2	1	1	2	1	16/20
Ahlqvist and Wirfalt, 2000	2	2	2	1	2	2	2	2	2	1	18/20
Terrangi et al., 2014	2	2	2	1	1	1	1	0	2	1	13/20
Jonsson et al., 2002a	2	2	2	2	2	2	2	1	1	0	13/20
Hendriks et al., 2012	1	1	1	2	2	2	1	0	1	0	11/20
Rawlins et al., 2013	2	1	2	1	1	1	1	0	2	2	11/20
Tuomainen, 2009	2	2	2	2	2	1	1	0	2	0	14/20
Nicolaou et al., 2009	2	2	2	2	2	2	1	2	2	2	19/20
Nicolaou et al., 2013	2	1	2	2	1	0	0	0	1	2	11/20
Nicolaou et al., 2012	2	2	2	2	2	2	2	0	2	2	18/20
Nielsen et al., 2013	2	2	2	2	1	2	2	0	2	1	16/20
Jonsson et al., 2002b	2	2	2	2	2	2	2	1	1	0	16/20
Mellin-Olsen et al., 2005	2	2	2	2	2	1	2	1	2	2	18/20

Appendix B: Qualitative research

Appendix B consists of supplementary material for the qualitative research

B.1: Ethics application protocol

B.2: Consent form

B.3 information sheet

B 4: Interview guide

B.5: Letter of support from Ghana Union

B.6: Ethics approval letter

B.7: Example of annotated transcript

B.8: Example of codes

B.9: Data summary and display

B.1: Ethics application protocol : **Hibbah Araba Saeed**

Background

Several studies have underlined the important role of dietary factors in the obesity epidemic and its prevention (Landman and Cruickshank, 2001, Palou and Bonet, 2013). In the past, (before the millennium) the focus was on the study of specific nutrients or foods in understanding obesity but this has changed towards general dietary behaviour (Thomas, 2001; p. 731).

There is evidence that dietary behaviours of migrant populations become more unhealthy following migration to high income countries, as healthy components of traditional diets are replaced by convenient processed foods and less healthy foods, which contributes to obesity risk (Gilbert, 2008, Gataineau and Mathrani, 2011a). However, this change in dietary behaviours has not been studied among Ghanaians and other migrants from sub-Saharan Africa living in the UK. These changes to less healthy dietary habits among migrants in most high-income countries have been shown to be associated with poverty. In the UK, it is reported that minority

ethnic groups tend to have higher levels of poverty than the average White British person (Platt, 2009). Poverty is characterized by general insecurities in life including food insecurity (Oslon, 1999).

Dietary habits among UK populations have been studied extensively for instance, through the National Diet and Nutrition Survey (NDNS) (Whitton C et al., 2011). The NDNS is designed to gather data on food consumption, nutrient intakes and dietary behaviours of the UK population. Dietary assessment tools used in such surveys have been developed for the host population and may not be suitable for minority ethnic groups (Stronks, 2003), thus the limited research on minority ethnic groups. Research on African migrants in the UK has been focused on the description of diet and documentation of the individual level determinants of diet (Leung and Stanner, 2011). However, determinants at the family, community and societal level have not been explored. The types of social networks that an individual is embedded in for instance are likely to influence dietary behavior (Tuomainen H, 2014). Migrant communities tend to maintain the cultural practice of eating together with family and other community members (Tuomainen H, 2014), therefore a better understanding of the role of social networks and other environmental determinants in dietary behaviour among Ghanaians could lead to the development of more appropriate interventions to promote healthy dietary habits.

Aim

This study seeks to explore socio-ecological factors associated with dietary behaviours among Ghanaians living in the UK.

Objectives

- To explore and account for changes in dietary behaviour following migration among first generation Ghanaian migrants living in Manchester
- To explore changes in dietary behaviour among second and third generation Ghanaian migrants living in Manchester.
- To explore how social networks in which Ghanaians are embedded influence
 - current dietary behaviours.
 - experiences of food security.
- To explore beliefs and perceptions around food among Ghanaians living in Manchester.

Methodology

Approach and methods

Qualitative interviews are particularly useful for exploratory studies (Bryman, 2012). Considering that individual accounts are needed to understand factors associated with dietary behaviours and topics related to migration, the most appropriate qualitative data collection method is in-depth interviews. In-depth interviews using a semi-structured interview guide has an advantage over other qualitative designs, because the researcher is able to guide the participant so that particular topics of interest can be discussed ((Bryman, 2012; p. 472). Given that there are five objectives in the qualitative study, using in-depth interviews will allow the researcher to be able to cover all topics by guiding the participants to discuss specific issues.

Study population

Every Ghanaian adult 25 years and above who lives in Manchester is eligible to participate. The age limit for eligibility was chosen to ensure consistency across the different parts of the PhD as the next part of the PhD involves analysing dietary data from Ghanaians aged 25 years and older living in London. This data is being collected in an ongoing project i.e. Research on Obesity and Diabetes among African Migrants. Findings from this qualitative study will be compared with the findings from other parts of the study hence the choice for 25 years and older.

The focus of this study is in Manchester because of the following:

- a. Size of population -Manchester is one of the cities in the UK with the largest populations of Ghanaians.
- b. Practical reasons - proximity which reduces travel time and costs for the researcher.
- c. Familiarity with the area and with Ghanaians living there, which will facilitate access.

In depth interviews

The interviews will be conducted face to face with participants in their homes. I have developed a range of semi-structured questions to use as an interview guide (please see Appendix 3) based on the objectives of the qualitative study. The interview will be conducted in English. English is widely spoken among Ghanaians so it is anticipated that there will be no language barriers to participation for these participants. However, where a participant prefers to be interviewed

in a Ghanaian language I will translate the questions into the language during interviewing verbally, as I speak and understand most of the major Ghanaian languages. In the unlikely event that an interview is conducted in a Ghanaian language, I will translate the audio into English when transcribing. Interviews are expected to last for about an hour. Generic questions will be asked from the start, such as asking participants: Could you tell me a little about yourself? Starting with questions that ask them to talk about themselves will help to establish a good rapport between participants and the researcher.

Recruiting participants

The Ghana Union is an organization committed to serving the Ghanaian population in the UK. I have already met the Chairman of the Ghana Union of Manchester and preliminary discussions with him about the research have begun. The Chairman has pledged to support recruitment of participants to the study (Please see Appendix 5 for evidence of Ghana Union Chairman's support). The Ghana Union has branches in the major cities in UK including London and Manchester. The Union works in partnership with community and religious organizations and governmental organizations therefore involving the Chairman in recruiting will facilitate recruitment of participants. The chairman of the Ghana Union has agreed to give my supervisors and I the platform to speak to their members about the study as a group during one of their meetings. I will leave information sheets for everyone at the meeting. I will ask people who immediately express an interest in the research at these meetings for their contact telephone numbers. The information sheets will have my contact details so that other people can contact me if they wish to participate in the study. I will telephone potential participants who have shared their details with me after a minimum of 24 hours to see if they are still willing to participate and to arrange a date to meet them to conduct the interview at their convenience. I will ask for participant's home address only when they have agreed to participate and are willing to sign the consent forms and be interviewed. I will assure them that their contact information will also be shared with only my supervisors (Prof Michelle Holdsworth/Dr Katie Powell).

Recruitment will continue until data saturation is achieved (Creswell, 2009). Data saturation means collecting data until new data does not reveal new themes or insights. Due to time and financial constraints, no more than 35 interviews will be conducted.

Participants will be given a further opportunity to ask questions about the research at the start of the interviews. Written consent will be taken before the interview begins.

Data analysis

I will undertake data collection and analysis concurrently so that issues arising in early interviews can inform sampling and interviewing of later participants (Creswell, 2009).

I will transcribe audio tapes after each interview to provide a record of what was said during interviews. Nvivo will be used to facilitate data management. Qualitative analysis will be conducted through thematic analysis. I will be seeking to explain what factors account for changes in dietary behaviour and also the role of social network and other factors on dietary behaviours and food insecurity.

B2: Consent form

Consent Form

Title of Research Project: Issues that influence diet among Ghanaians living in the UK

Name of Researcher: Hibbah Araba Saeed

Participant Identification Number for this project:

Please initial box

1. I confirm that I have read and understand the information sheet explaining the above research project and I have had the opportunity to ask questions about the project.

2. I understand that my participation is voluntary and that I am free to Withdraw without giving any reason and without there being any negative consequences up until one week after the interview. In addition, should I not wish to answer any particular question or questions, I am free to decline

3. I understand that my responses will be kept strictly confidential. I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the report or reports that result from the research.

4. I agree for the interview to be audio recorded.

5. I agree to take part in the above research project.

Name of Participant

Date

Signature

Lead Researcher

Date

Signature

To be signed and dated in presence of the participant

Copies:

Once this has been signed by all parties the participant should receive a copy of the signed and dated participant consent form, the letter/pre-written script/information sheet and any other written information provided to the participants. A copy of the signed and dated consent form should be placed in the project's main record (e.g. a site file), which must be kept in a secure location.

B.3: Information sheet

Information Sheet

This is an invitation to take part in a research project. Before you decide whether to participate, it is important that you understand why the research is being done and what it will involve. Please take the time to read the following information carefully and discuss it with others if you wish. Thank-you for taking the time to read this.

Research Project Title

Issues that influence diet among Ghanaians living in the UK.

Research Project Purpose

Although there has been a lot of research into diet in recent years, there is a limited information on the diet and food practices of Ghanaians in the UK. The Ghanaian population is one of the largest African communities in the UK and Europe. This research is looking at issues that influence diet among Ghanaians living in the UK.

Why have I been chosen?

All Ghanaians living in Manchester aged 25 years or over are can take part in the research project. You have been invited because you are understood to identify as Ghanaian.

Do I have to take part?

It is up to you whether to take part or not. If you do decide to take part, the researcher will ask for telephone number to arrange a date for a face to face interview at your convenience. You may withdraw from taking part if you change your mind. You do not have to give reasons for your withdrawal. Your interview responses cannot be withdrawn from the study once they have been analysed so for this reason, you may withdraw up to one week after the interview.

What will happen to me if I take part?

If you do agree to be take part, you will be required to sign a consent form before the interview begins. During the interview, you will be asked to talk to the researcher about the foods that you eat your shopping habits and factors that influence you dietary behaviours. If you agree, the interview will be audio-recorded and written up. Your interview responses will be stored securely on a password protected computer and only the research team will have access. Your responses will not be shared with anyone outside of the research team. All audio recordings and notes will be destroyed at the end of the study in October, 2017.

What are the possible disadvantages and risks of taking part?

The risks involved in taking part are low. However, during the interview, I will ask about your dietary behaviours and food security, which some people might consider to be sensitive. If at any stage during the interview, you feel you are uncomfortable you can withdraw without giving reason. You can discuss any concerns with me before, during and after the interview. The interview is expected to last about an hour. Participants will be given a £20 Voucher as compensation for their time after the interview has ended. Participants who withdraw before the interview ends will not be given the voucher.

What are the possible benefits of taking part?

There are no immediate personal benefits in taking part in the research, however, the information you provide may inform future nutrition policies and services to benefit Ghanaians and other people of African origin living in the UK.

What if something goes wrong?

If you have a complaint about the research project, you should contact

Jon Nicholl, Dean of the School of Health and Related Research

Address:

School of Health and Related Research (ScHARR)

Faculty of Medicine, Dentistry and Health

University of Sheffield

Regent Court, 30 Regent Street

Sheffield

S1 4DA

Tel: (+44) (0)114 222 5453

Fax: (+44) (0)114 272 4095 (non-confidential)

E-mail: J.Nicholl@sheffield.ac.uk

What will happen to the results of the research project?

The results of the research project will be submitted to the School of Health and Related Research (ScHARR) of the University of Sheffield (UK) to be examined for a Doctor of Philosophy degree. The results will also be shared through publication in academic journals and conferences. No individual will be identified in any of the publications. The results will also be fed back to Ghana Union of Greater Manchester and the Manchester City Council through an executive summary report.

Who is organising and funding the research?

The data collection is sponsored by the University of Sheffield and my tuition fees for the PhD are sponsored by the Ahmadiyya Jamaat International, UK.

Who has ethically reviewed the project?

This research project has been reviewed by the School of Health and Related Research Ethics Committee at The University of Sheffield.

Who to contact for further information

If you have any other questions, please contact the researcher:

Ms Hibbah Araba Saeed

School of Health and Related Research (ScHARR)

The University of Sheffield

Regent Court, 30 Regent Street

Sheffield, S1 4DA

Email – hasaeed1@sheffield.ac.uk

B.4: Interview guide

INTERVIEW GUIDE

March 2015

Sub-questions to be used as possible prompts.

SECTION A: Personal history and social networks

- 1. Could you tell me a little about yourself?**
- 2. Tell me about the people who are important in your life?**
Probe – who do you spend time with? Who do you talk to? Who do you do things with?
- 3. Can you tell me about your day and how food fits in to it?** Probe for meal patterns, regular, erratic, convenience
Probe for role of social networks in dietary behaviour: eating together with others (who and how many people?), eating out, sitting down to eat, and preparing food? Which things are important to the participant? [Work situation and how that influences the meal pattern as well as types of food eaten?].

Section B: Perceptions of change in dietary behaviours following migration and food security

For first generation migrants to the UK

- 4. Tell me about your memories of eating in Ghana before migration?**
 2. Probe – food types eaten, shopping habits, food preparation habits, eating habits.
- 5. Has your diet changed since you migrated to the UK?** If yes, probe for how these changes came about? If no, was that intentional? Probe for shopping habits and changes since migration. Probe for availability and accessibility of preferred foods.

For second or third generation migrants to the UK

- 6. Does the food that you eat differ to that eaten by your parents or any older friends or relatives that you might have in the UK?** Probe for how changes came about? Probe for availability and accessibility of preferred foods.

Questions 7 and 8 for all participants (1st/2nd/3rd generation migrants)

3.

7. Can you tell me about your shopping habits?

4. (*Probe for experiences of food insecurity*) Can you tell me about your recent experiences of shopping for food and how they might differ or not to those you had in Ghana? (*For only 1st generation migrants*) Frequency of shopping visits, type of shops used? [Probe for role of social environment in mitigating against food insecurity; e.g. role of church/faith community in providing for poorer members].

Section C: Beliefs and perceptions of food

8. Tell me about things that are important to you with respect to food?

5. Probe for perception of healthy food, status and role of traditional vs. convenient foods (how does this relate to food costs), husband and children's food preferences.

B.5: Letter of support from Ghana Union

Ghana Union of Greater Manchester



80 Bellot Street
Cheetham Hill
Manchester
M8 0AZ



Telephone: 07968825643

www.ghanaunion.org

Email: adudwumaa@aol.com (Acting Chairman)

TO WHOM IT MAY CONCERN
HIBBAH ARABA SAEED

I hereby write to confirm that Miss Hibbah Araba Saeed is an active member of Ghana Union of Greater Manchester. She has informed the Union of her studies at the University of Sheffield. This letter further confirms that she has the support of the Union in matters concerning her studies. We are prepared to assist her in any way possible.

Please do contact me if I could be of any further assistance.

Thank you.

Yours sincerely,

Yaw Adu-Dwumaa
(Acting Chairman)

B.6: Ethics approval letter



Downloaded: 06/06/2017
Approved: 10/03/2015

Hibbah Saeed
Registration number: 130228811
School of Health and Related Research
Programme: PhD

Dear Hibbah

PROJECT TITLE: Ghanaians living in the UK: A socio-ecological approach to understanding factors associated with dietary behaviours

APPLICATION: Reference Number 002878

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 10/03/2015 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 002878 (dated 06/03/2015).
- Participant information sheet 006135 version 1 (06/03/2015).
- Participant consent form 006136 version 1 (06/03/2015).

If during the course of the project you need to [deviate significantly from the above-approved documentation](#) please inform me since written approval will be required.

Yours sincerely

Jane Spooner
Ethics Administrator
School of Health and Related Research

B.7: Example of annotated transcript

Date: 07/04/15

Transcriber: HAS

Length: 01.11.11

Respondents: a couple

I: interviewer, **R:** respondent (wife) and husband

I: Tell me a bit about yourself?

R: OK, mmm I am R.28, R.29 is my husband and we are very busy people at the moment. And we have a reason for that. I am managing a project at the moment and if I don't finish at the end of the day, I still have to stay on and continue. Sometimes I come the next morning, which means, I sleep at work.

Commented [U1]: Identifying as a busy person

Husband: just give a typical example, today she went to work at 7. 55 am yesterday and came back today at 3.30 pm.

I: I see what kind of project is this?

R: It's for people with learning disability and autism. I have worked with children before but this

R: It's for people with learning disability and autism. I have worked with children before but this is a new position that has just being given, so am working and looking after this young men and young lady. It's a new project. So we putting in a lot of effort so that's my work pattern. R.29 stays back.

Commented [U2]: Putting effort into work

Husband: At the moment I am the mom and dad.

R: (laughs). Even though he's got his work load as well, church work, yes and the children. Sometimes I wake up and the children are in bed and I go to work, so the only time I talk to them is through phone calls to see how they are doing. So since yesterday this is the time they are seeing me.

Commented [U3]: Limited time with children

I: you really have a busy life then

R: Yes, I am busy

Husband: It's not like Ghana where your mom /auntie can come and take care of the kids.

Commented [U4]: Life is different to Ghana

R: Apart from that, we are 95% involved in church activities. Despite the phone calls and txt messages from church members. People need support, you've got to be there for them, and yeah that's our life.

I: how many children ?

R: 2.

I: how long have you lived in the UK?

R: since December 2006. 9 years

I: Right, let me shift my questions to food, **How does food fit into your busy life schedule**

R: Breakfast is very very important to me because If I don't eat, I will have crisis. Crisis is not being unwell. But just that I don't have energy to go on and that irritates me. Things that should not irritate me would make me angry. I would not get angry and react, but I will be unhappy.

Commented [U5]: Breakfast as a mood balancer

And then if I eat later in the day, I will have heart burns. So for some time now I am very particular about breakfast. Even If I won't eat anything, I will have milo. (Chocolate beverage)

Commented [U6]: Physical consequences of timing meals

Commented [U7]: Particular about food routines

I: what's your usual kind of breakfast?

R: Laughs ...A variety, some days I can just eat rice and stew.

Husband interrupts, and that's supposed to be breakfast (both laugh)

R: The reason is because that can stay for long and not make me snack in between.

Commented [U8]: Food choice strategies to limit food intake/limit snacking

Husband: Duncan Williams (a renowned pastor in Ghana) says some people break their fast with banku, kenkey and fufu. We all laugh!!

Commented [U9]: Speculation about what other's eat

R: I do have cereal sometimes, And I will have a big bowl, not medium. I can sometimes have akpele (a staple meal) If it's ready or any left over. But recently, I have tried to have more fruits or smoothie in the mornings, not freshly made, but from the shop.

Commented [U10]: Breakfasting on traditional meal if it is pre-prepared and left over

Commented [U11]: Trying to eat more fruit

I: What about the children?

R: We are very particular about the health of the children because they are still growing and learning and they go out to school. We understand that when they go to school they might skip their meals so breakfast we ensure they have healthy cereal is there. iam butter egg is there

Commented [U12]: Seeing health as important for learning and food is linked to this

My husband will make kooko (maize flour porridge) or rice pudding.

Husband: we make sure they eat breakfast

Commented [U13]: Making sure that children have breakfast

I: what about you R.29?

Husband: Well, I am a typical Anlo (his tribe) man. I can just wake up in the morning and make banku and fried fish.

Commented [U14]: Dietary choices for specific meals seen as typical

R: Gosh and call me to come and eat.

R: I would do that

Husband: I like typical Ghanaian type of breakfast, tea, milo etc. Back in Ghana I used to skip breakfast and I developed Ulcer, so I try not to. And I am reducing tea and fizzy drinks. So when I wake up in the morning say 4 o'clock, I will have a jug of warm water before I have breakfast. But I still have the tendency of eating Ghanaian foods.

Commented [U15]: Food as cause of illness

Commented [U16]: Ghanaian foods as risk for ulcer

R: When I was growing up we didn't have akpele or banku in the morning, but he's influenced me

I: ha ha and do you enjoy it?

R: Well I have no choice, sometimes you learn to adapt and then learn to do things together

Commented [U17]: Familial preferences influence other family members

I: What about other meals for the day

R: Outside the home, I will go for MacDonald, ready meals. Today I spoke to my boss. I told her we need an oven in the kitchen because the staffs end up microwaving food. For the past 3 weeks that what I have noticed. So I have decided to take food from home, which is mostly cooked my

R: Well I have no choice, sometimes you learn to adapt and then learn to do things together

Commented [U17]: Familial preferences influence other family members

I: What about other meals for the day

R: Outside the home, I will go for MacDonald, ready meals. Today I spoke to my boss. I told her we need an oven in the kitchen because the staffs end up microwaving food. For the past 3 weeks that what I have noticed. So I have decided to take food from home, which is mostly cooked my

R.29; I take cooked foods from home. There are some of the ingredients and preservatives in the readymade foods that makes me ill. I react to it, not on my skin. So I have changed to home

Commented [U18]: Eating pre-prepared food at work
A desire for cooling facilities at work (to make fresh food?)

Commented [U19]: Ingredients linked to illness

cooked meals, plus I don't like sandwiches anyway. And I will snack on.....

Commented [U20]: Home cooked meals as a way of avoiding unwelcome reactions

Husband: snack on snickers (laughs)

R: I like this biscuits with the yellow cover, not too sweet, not too salty. I tend to pack a lot of fruits in my bag and water.

Commented [U21]: Snacking on biscuits and fruit

I: And when you come home?

R: When I come home all that I need to have is an African food and fortunately it's ready before I come.

Husband: usually it's the same, I have sandwich from home as well, I prefer to make sandwiches than to buy. But I like my fruit yoghurt, especially strawberry. I walk to Morrison's and buy it.

The 70 p one. And I drink a lot of water, I like biscuits as well, rich tea, cream crackers.

Commented [U22]: Preferences for biscuits

Evening meals is always Ghanaian, Jollof, rice, kenkey, banku okro soup. I don't tend to like fufu I have influenced her, so we hardly eat fufu.

R: Don't start... That was so many years ago, 12 years, 2 kids....(we all laugh)

Husband: I don't like anything processed, sausage, pork, I don't even like beef, so mostly its chicken and beef. So mostly are meals are chicken and fish. Lamb, duck, turkey no!!

Commented [U24]: Food preferences

I: any particular reason?

Husband: No maybe its the way they are reared in Ghana and also the fat in it....for beef, because of the recent story in the news about horses. For months no beef in this house

Commented [U25]: Horse meat scandal affects food choice

I: do you sit together to eat? And with others?

R: we always sit together on the table, Fridays we have a church group, we prepare jollof rice, people like our jollof rice

Commented [U26]: Eating practices – eating at a table with others

Eating with church group

I: Are these people Ghanaians?

R: no, British..and from various ethnicities and they all love our jollof rice. And this Friday is going to be the same. They will come around, we pray, read the bible and afterwards have dinner...talk

Commented [U27]: Eating practices linked to religious activities

Husband: Usually we tend to eat together as a family. But because of R.28's work, ...I used to wait for her even when am hungry but sometimes whist waiting she will call saying that, I have not finished.

R: and it's necessary, I can just leave, being a boss

Commented [U28]: Work affecting eating practices

Husband: to be honest, the situation in this country. I can see how it affects families, even those of us from outside (migrants), so you have to be intentional to keep the family going. So it's just the conditions here.

R: and it's necessary, I can just leave, being a boss

Commented [U28]: Work affecting eating practices

Husband: to be honest, the situation in this country, I can see how it affects families, even those of us from outside (migrants), so you have to be intentional to keep the family going. So it's just the conditions here.

I: what kinds of conditions are you referring to?

Husband: work, I mean purely work, one person is going, the other is coming, so it does not promote family values. That's why we have broken homes, single parents....

Commented [U29]: Eating practices associated with maintaining family values

R: I think one of the things apart from these is we have other family friends from Ghana, so we go to their homes, we also invite them and cook. So that is just purely Ghanaian.

Husband: the last time was R.28's Birthday, we usually tend to do it on birthdays either for the children or any of the adults. We can have waakye, aprapransa, proper okro soup, that kind of variety. We can't do without it.

Commented [U30]: Social events as an opportunity for Ghanaian food
Can't do without Ghanaian food

I: can you tell me memories of eating in Ghana?

R: It was beautiful, we loved it, its full of life, togetherness, friendship. Look being a Ghanaian I am passionate about this because I have missed it. And when you finish eating you can sit there and talk and talk until the food on your hands will go dry. This Easter I can't feel it. In Ghana you can smell the flavor on the street. So Ghana is Ghana (laughs) OMG!

Commented [U31]: Food and togetherness in Ghana

Commented [U32]: Food is smelt on the street/open/shared experiences

Husband: One thing I miss. I remember I will be at work, R.28 will call me ask when are you coming, she will cook and wait for me, when we had R.29le her mother came. And she will cook food; she had a backyard farm so we could get access to all these fresh vegetables.

I: apart from getting foods from the backyard farm can you tell me about your shopping habits?

R: This place, (UK) because you can trust what is in the packaging.....(not complete)

B.8: Examples of codes exported from NVIVO

A40						X ✓ fx Eating behaviour						
1	2	3	4	5	6	A	B	C	D	E		
1	Name					Sources	References	Created On	Created			
2	Beliefs and Perceptions around food					0	0	10/02/2016 11:15	HAS			
3	African foods					2	6	27/10/2015 00:45	HAS			
8	convenient foods					1	1	27/10/2015 01:32	HAS			
9	enablers of healthy eating					2	7	27/10/2015 01:32	HAS			
11	health issues					2	2	27/10/2015 01:04	HAS			
18	home cooked meals					7	9	27/10/2015 00:28	HAS			
19	hospitality					1	1	06/01/2016 15:56	HAS			
20	inhibitors of healthy eating					11	33	27/10/2015 01:32	HAS			
22	perception of healthy diet					16	25	06/01/2016 14:47	HAS			
24	perception of posh					1	1	06/11/2015 13:34	HAS			
26	processed foods					1	2	06/01/2016 14:26	HAS			
27	snack					9	12	27/10/2015 00:28	HAS			
28	suggestions on how to eat healthy					1	2	07/01/2016 14:38	HAS			
30	traditional foods vs western foods					11	21	24/12/2015 18:49	HAS			
36	unhealthy diets					3	7	27/10/2015 01:00	HAS			
40	Eating behaviour					0	0	10/02/2016 11:15	HAS			
41	earlier years after migration					2	4	12/11/2015 17:43	HAS			
42	factors that influence eating					14	35	06/11/2015 13:51	HAS			
65	food choice					1	2	12/11/2015 17:51	HAS			
71	food dislikes					4	5	27/10/2015 00:32	HAS			
75	GMO					2	2	12/11/2015 18:28	HAS			
76	healthy eating					20	89	27/10/2015 00:58	HAS			
85	heavy foods					3	3	06/01/2016 16:41	HAS			
86	meal pattern					13	21	27/10/2015 01:27	HAS			
135	meal preparation					1	3	27/10/2015 01:28	HAS			
142	memories by 2nd gen migrant					2	2	06/01/2016 14:34	HAS			
143	memories of eating in Ghana					14	35	27/10/2015 00:40	HAS			
145	non Ghanaian foods					2	8	12/11/2015 16:24	HAS			
147	parent of second generation migrant					1	4	12/11/2015 16:52	HAS			
148	selective eating					1	1	07/01/2016 14:05	HAS			
149	shopping behaviour					4	11	27/10/2015 01:28	HAS			

B.9: Data summary and display

Data summary and display - Excel

File Home Insert Page Layout Formulas Data Review View Tell me what you want to do

D7 X ✓ fx Eats out with wife sometimes but mentions that growing up eating junk food was not allowed by mother, so that training has stayed with him. He also has a network at work. they go out for food and beer

	A	B	C	D	E	F
1				Descriptive themes- Eating behaviour		
2		Meal Pattern				Food preparation
3	Cases	patterning (direct summary, quotation, researcher comment) AK, M, age=25-44 yrs, migrated at 10yrs, paid job, married, high SES	Formal: types of food combinations	context: eating out, family or occasion	other	cooking in bulk
7		AK, M, age=25-44 yrs, migrated at 10yrs, paid job, married, high SES	orders lunch from canteen at work, eats an African meal for dinner at home. Mom ensures only healthy foods are eaten, a habit she had even in Ghana. Dad prefers traditional foods. He started making his own choices when got into teenage years and then university. He loves to eat with a bowl of salad, but wife is more interested in the meat, she doesn't like salad like he does. Wife has tailored her cooking now to suit husband and includes more vegetables and less oil. have bicultural pattern. He sees himself as both Ghanaian and British and has two groups of social network, African and Western. The list of African foods he likes is reducing and he doesn't know if its because he has stayed here so long or because he has mixed his taste "I can tell you my dad, till this day, easily 98 % every single day eats fufu. He would eat it for breakfast lunch and dinner, if he could". "I will make a bowl of salad and chew through it as if it was about.....Like the pirate bowl you will put in the oven, I will fill that vegetables, just vegetables. my wife has a funny saying.....shes like where's the price? As	Eats out with wife sometimes but mentions that growing up eating junk food was not allowed by mother, so that training has stayed with him. He also has a network at work. they go out for food and beer sometimes. "I would eat MacDonald's every once in a couple of months but it's not something that I will make habitual. KFC chicken is nice, but it's greasy! Sorry am not gonna eat that every day, its nasty!.... It's instilled into us. when myself, my sister and my brothers get together, we will eat right		wife cooks in bulk, just like his mother did. It's an African cultural trait to cook in bulk maybe because of the large family unit or unexpected guest when she's get into cooking, she will lock herself for hours. 2-3 hours standard for her to produce what she wants. Like so many Africans, like my mum she doesn't cook for the two of us. She cooks in bulk I don't know how many Africans will cook for just 2-4 people for a night and cook again tomorrow. It's not our culture. Because of our large family units have always being big we don't cook for the now, we cook in bulk. There are few exceptions even if we don't have large families we may expect people to come around. And this is across the borders She's only comfortable when she's spent hours preparing this meal, whatever it is, so there is enough for tonight, tomorrow night and maybe the night after. So if anyone comes to our home unexpectedly there's always food.

Ready | eating behaviour | food insecurity | beliefs and perceptions | weight | others | 100%

13:53 14/06/2017

Appendix C: Secondary data analysis

Appendix C consists of supplementary data for the quantitative secondary data analysis

C.1: Publication proposal for RODAM

C.2: Data transfer agreement

C.3: Ethics approval letter

C.4: Ghana food propensity questionnaire- Copyright © 2013 by German Institute of Human Nutrition Potsdam-Rehbruecke (DIfE)

C.5: Example of syntax used in SPSS

C.6: Example of regression output in SPSS

C7: Outputs for checking regression assumptions

C. 1: Publication proposal RODAM

Manuscript #	Date of submission	Date of approval
	24/03/2016	
1. Applicant	Hibbah Araba Saeed (Hasaeed1@sheffield.ac.uk) The University of Sheffield School of Health and Related Research (SCHARR) Section of Public Health 30 Regent Street, Sheffield,S1 4DA	
2. Title/subject of publication	Dietary acculturation amongst Ghanaian migrants living in Europe: findings from the RODAM study	
3. Proposed authors	H. A Saeed, M. Nicolaou, M. Holdsworth, K. Powell, Cecilia Galbete, Ina Danquah, Matthias Schulze, and other RODAM team members to be specified. We would also like to invite two members of the DEDIPAC	

	consortium of work package 2.4 to be involved as they have expertise on dietary acculturation: C. Mejean, L. Terragni.
4. Contact information 1st author	As above.
5. Background to study	<p>High levels of obesity amongst migrant populations may be influenced by dietary behaviours, which may be shaped by people’s social and cultural environments. The social factors that influence migrant populations may vary in different countries, such as migration history, the level of acculturation in the host country and an individual’s social position. These differential social factors may play a role in shaping dietary acculturation, therefore leading to differences in the structure of the diet between similar populations living in different countries. Dietary acculturation may result in one of 3 scenarios, maintenance of a traditional diet, adoption of a new diet or finally, a bi-cultural eating pattern. The Koctürk model¹ was developed to enhance the understanding of adaptation to a new food pattern following migration. In this model, foods are grouped into staple foods, complementary foods and accessory foods. The model seeks to explain how foods change along the two axes of which identity (e.g. cultural) and taste are the extreme points. The model postulates that migrants will continue to consume foods that are strongly tied with their cultural identity. According to Koctürk, accessory foods change quickly when diets are undergoing change as these have a less central role for identity. She also explains that complementary foods may remain unchanged over a long period while staple foods may remain the same for several generations.</p> <p>This study aims to explore the process of dietary acculturation and the contribution of the broader social environment to this process of a homogenous population (of Ghanaians) living in different environments (rural and urban Ghana vs different European countries).</p> <p>Our assumption is that differences in the structure of the diet between sites, i.e. Ghana vs Europe (UK vs Netherlands vs Germany) implies that there has been some dietary acculturation of Ghanaians overall living in Europe. Dietary acculturation would be identified by Ghanaians living in Europe eating less of traditional foods and more adapted foods.</p> <p>Potential differences between European Ghanaians living in different countries would point to variations in the experience of the populations in the</p>

	different environments which include their migration history, level of acculturation in their host country and their social position.
6. Aim and research question	<p>Hypothesis: The social environment moderates the adaptation to a new food pattern amongst migrants (as outlined in the Koctürk model ⁶).</p> <p>AIM: To examine whether there are differences in dietary acculturation and explore which factors might explain these differences amongst Ghanaian migrants living in Europe.</p> <ol style="list-style-type: none"> 1. What are the differences in the structure of the diet (i.e. traditional and adapted staples, complementary and accessory foods) amongst Ghanaians in Europe and their counterparts living in rural and urban Ghana? 2. What are the social factors associated with dietary acculturation amongst Ghanaians living in Europe?
7. Data and population	Data of RODAM participants with dietary data from all 5 RODAM sites. RODAM participants still living in rural Ghana will serve as a ‘control’ group in this study.
8. Analysis plan	<p>Dependent variable: Frequency of intake of the different food groups (freq./week) (traditional and adapted staples; traditional and adapted complementary foods; traditional and adapted accessory foods).</p> <p>Independent variable: 1. Social factors: This will be studied using a number of proxies: acculturation (Only for those in Europe), rural and urban dweller when in Ghana, and social position (education).</p> <p>Assessment of acculturation will be operationalised using two methods². The RODAM study has pre -defined unidimensional proxies which are</p>

⁶ Koctürk-Runefors T (1991) A model for adaptation to a new food pattern: the case of immigrants. In Palatable Worlds; Sociocultural Food Studies, pp. 185–192 [EL Fürst, R Prättälä, M Ekström et al., editors]. Oslo: Solu

² Raza, Q., et al. "Dietary acculturation among the South-Asian Surinamese population in the Netherlands: the HELIUS study." *Public health nutrition*(2016): 1.

³Berry, J. W. 1997. Immigration, acculturation, and adaptation. *Applied psychology*, 46, 5-34.

considered to reflect exposure to the host culture. A combination of the following variables will be used. **First method-unidimensional proxies**

1. Migration generation (1st or 2nd). Participants born in the host country are assumed to be more exposed to the host culture.
2. Residence duration. Our assumption is a higher number of years of residence indicates greater exposure to the host country (≤ 35 years; ≥ 35 years)
3. Age at migration. We assume a younger age represents greater exposure to host country.
4. Difficulty with host country language. Two questions were asked regarding host language. If both questions are answered negatively (i.e. less difficulty with host country language), we assume it reflects greater exposure to the host culture.

The **second operationalising of acculturation** will adopt Berry's dimensional perspective of acculturation³. Acculturation will be measured using 26 items¹ based on ethnic identity (2 items) social contacts (4 items) and cultural orientation (20 items)².

1. Ethnic identity- two questions on how participants feel about their identity will be rated on a 5-point scale. For both questions scoring ≥ 3 will be classified as "Yes" and < 3 will be classified as a "No". "Yes", on both question corresponds with integration, "Yes" on the first question and "No" on the second question will be conceptualised as assimilation. "Yes", on the first question and "No" on the second will be classified as separation while "No" on both questions will be classified as marginalization.
2. Social network will be assessed by the four items in the culture section of the RODAM study. A mean score of the two items of having friends from host country and spending time within a social network of the host country will be calculated and a score of \geq will be classified as "Yes" and a score of < 3 as "No". This will also be performed for social network of country of origin. Based on the combination of these classifications, participants will be categorized into Berry's four strategies for classification. "Yes" on both items will be defined as integration, "Yes" on host country's social network and "No" for country of origin will be conceptualised as assimilation and the vice versa will be captured as separation. Finally, "No" on both items will be captured as marginalization.

	<p>3. Cultural orientation- This will be assessed using 10 items from the RODAM study. It asks participants to what extent they agreed on 10 statements regarding the host culture. All items were rated on a 5 point Likert scale¹. A mean score for the 10 items will be calculated. If the mean score regarding the host culture is ≥ 3 it will be classified as “yes” and a mean score of <3 as “No”. This will also be undertaken based on the culture of origin. If participant scores “yes” in both items, it will be defined as integration. “Yes” on host culture and “No” on culture of origin will be defined as assimilation. Finally, “No” on host culture and “Yes” on culture of origin will be defined as separation while no on both items will be captured as marginalization. NB (Each of these perspectives of acculturation can differ amongst participants i.e. it is possible for someone to be integrated socially but still be separated when it comes to ethnic identity, therefore they would be analysed separately)</p> <p>Differences in the frequency of intake of the different food groups for the different study sites will be tested. First, Amsterdam, Berlin and London will be considered as Europe, all together (ANOVA) and secondly, for the different European sites, rural and urban Ghana.</p> <p>Multiple regression analysis will be used to assess whether there are differences in food intake of Ghanaians living in Europe with the social factors (i.e. different acculturation strategies, social position and migration history) compared with Ghanaians living in rural Ghana by adjusting for age and educational level.</p> <p>Analysis will be stratified by gender.</p>
<p>9. Timing</p>	<p><i>Start analysis: May 2016</i></p> <p><i>Writing Manuscript: November 2016</i></p> <p><i>Completion of (first draft) manuscript: December 2016</i></p>

C.2: Data transfer agreement

RODAM Data Transfer Agreement

This agreement is made 13 July 2016 between the Academic Medical Center ("AMC") acting on behalf of the RODAM Consortium ("RODAM"), P.O. Box 22660, 1100 DD, Amsterdam, The Netherlands, represented by the head of the Department of Public Health, Prof. Karien Stronks,

And

The University of Sheffield of Western Bank, Sheffield, S10 2TN, United Kingdom (referred to as "the Recipient"). Hereafter referred to collectively as "Parties" and individually as "Party".

BACKGROUND

The AMC, on behalf of RODAM, manages data sets derived from information provided by participants in the RODAM Study ("the Study Participants"). An employee of the Recipient ("Investigator"), wishes to use certain information held by AMC on behalf of RODAM ("the Data") as set out in the Appendix ("the Research"). The Data are to be used by Recipient for the Research, which is approved by the RODAM Publication Group. AMC on behalf of RODAM is willing to supply the Recipient with the Data for a period of 9 months to conduct the research under the terms and conditions of this Agreement.

NOW IT IS AGREED by Parties as follows:

1. That the Investigator and other relevant employees of the Recipient involved in the Research have read and will abide by the "RODAM Agreement on data ownership, data storage, access rights, and publication procedures" (appendix 4). All future correspondence pertaining to the Data and the Research should be addressed to RODAM coordination office (Dr Erik Beune: e.i.beune@amc.uva.nl).
2. This agreement does not affect the ownership of the Data. No license to use any Intellectual property is granted or implied by this Agreement except the rights expressly granted in this Agreement.
3. The Recipient will retain the Data in a secure location on its premises and will not permit the Data or any part of it to come into the possession or control of any other organization or any individual other than those employees who are involved in the Research described in Appendix 1 under direct supervision of the Recipient. The Recipient will not transfer the Data in whole or in part to third parties.
4. The Recipient will use the Data only to carry out the Research described in Appendix 1 to this Agreement. The Recipient will not use the Data or any parts thereof for any commercial purpose or any purpose that is subject to consulting or licensing obligations to third parties.

AGREED BY THE PARTIES THROUGH THEIR RESPECTIVE SIGNATURES

SIGNED for and on behalf of AMC:

Signature: 

Print Name: Prof Karlen Stronks Date: 13 juli 2016

SIGNED for and on behalf of RECIPIENT:


(1) Signatory on behalf of Recipient 



Dr Michael Arnett
Director of IP Development and Commercialisation
Research and Innovation Services
University of Sheffield

Printed Name: Date: 12 JUL 2016

Acknowledged by Investigator:

(2) Signature of Investigator 

Printed Name: MICHELLE HOLDSWORTH Date: 13/7/16

APPENDIX: RODAM Publication Proposal Form (Manuscript #ROD_26HS)

Please note: A project specific appendix to be added here which must be approved by RODAM and collaborator before signing the document.

C.3: Approval letter from ScHARR ethics committee



Downloaded: 06/06/2017
Approved: 01/12/2016

Hibbah Saeed
Registration number: 130228811
School of Health and Related Research
Programme: PhD

Dear Hibbah

PROJECT TITLE: Secondary data analysis of the RODAM study (Research on obesity and type 2 diabetes among African migrants)

APPLICATION: Reference Number 012118

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 01/12/2016 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 012118 (dated 30/11/2016).

If during the course of the project you need to [deviate significantly from the above-approved documentation](#) please inform me since written approval will be required.

Yours sincerely

Jennifer Burr
Ethics Administrator
School of Health and Related Research

C.4: Ghana food propensity questionnaire- Copyright © 2013 by German Institute of Human Nutrition Potsdam-Rehbruecke (DIfE)

Ghana Specific Food Propensity Questionnaire RODAM



Adapted from European Food Propensity Questionnaire <https://efbo.dife.de/portal/en>

General Information

RODAM number

Today's date (day/month/year)

Name interviewer

Start time (hh:mm)

Date of birth (day/month/year)

Your gender male female

Diet changes

Did you change your diet during the last 12 months? no partially yes

Please indicate the reason for having changed your diet (e.g. weight gain, overweight, diabetes, gastrointestinal diseases, lifestyle change etc.)

.....

.....

Bread variety

- | | | | | | |
|--|--------------------------------|---------------------------------|------------------------------------|-------------------------------------|---------------------------------|
| Rye-, Multigrain bread and buns | <input type="checkbox"/> never | <input type="checkbox"/> rarely | <input type="checkbox"/> sometimes | <input type="checkbox"/> frequently | <input type="checkbox"/> always |
| Whole grain bread and buns | <input type="checkbox"/> never | <input type="checkbox"/> rarely | <input type="checkbox"/> sometimes | <input type="checkbox"/> frequently | <input type="checkbox"/> always |
| White-, wheat bread, -buns, toast,
sugar bread, tea bread | <input type="checkbox"/> never | <input type="checkbox"/> rarely | <input type="checkbox"/> sometimes | <input type="checkbox"/> frequently | <input type="checkbox"/> always |
| Crispbread, white | <input type="checkbox"/> never | <input type="checkbox"/> rarely | <input type="checkbox"/> sometimes | <input type="checkbox"/> frequently | <input type="checkbox"/> always |
| Crispbread, whole-grain | <input type="checkbox"/> never | <input type="checkbox"/> rarely | <input type="checkbox"/> sometimes | <input type="checkbox"/> frequently | <input type="checkbox"/> always |

Spreads

- | | | | | | |
|-----------------------|--------------------------------|---------------------------------|------------------------------------|-------------------------------------|---------------------------------|
| Butter on bread | <input type="checkbox"/> never | <input type="checkbox"/> rarely | <input type="checkbox"/> sometimes | <input type="checkbox"/> frequently | <input type="checkbox"/> always |
| Regular margarine | <input type="checkbox"/> never | <input type="checkbox"/> rarely | <input type="checkbox"/> sometimes | <input type="checkbox"/> frequently | <input type="checkbox"/> always |
| Fat-reduced margarine | <input type="checkbox"/> never | <input type="checkbox"/> rarely | <input type="checkbox"/> sometimes | <input type="checkbox"/> frequently | <input type="checkbox"/> always |
| Peanut butter | <input type="checkbox"/> never | <input type="checkbox"/> rarely | <input type="checkbox"/> sometimes | <input type="checkbox"/> frequently | <input type="checkbox"/> always |

- | | | |
|--|--|---|
| Marmalade, jam, jelly, honey
(1 teaspoon) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1-2 times a day |
| | <input type="checkbox"/> 1-2 times a week | <input type="checkbox"/> 3 times a day or more frequent |

Please indicate your average intake of the following food items during the past 12 months!

Bread and Milk Products**Bread and Cereals**

- | | | |
|---|--|---|
| Bread, rolls, buns (one slice or piece) | <input type="checkbox"/> never | <input type="checkbox"/> 5-6 times a day |
| | <input type="checkbox"/> 6 times per week or less frequent | <input type="checkbox"/> 7-8 times a day |
| | <input type="checkbox"/> 1-2 times a day | <input type="checkbox"/> 9 times a day or more frequent |
| | <input type="checkbox"/> 3-4 times a day | |
| Muesli, cereals, cornflakes
(3 soup spoons/1cup) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| | <input type="checkbox"/> 1-2 times a week | |
| Hot cereal, porridge, oats
(3 soup spoons/1cup) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| | <input type="checkbox"/> 1-2 times a week | |
-

Curd and Cheese

- | | | |
|---|--|--|
| Plain curd (quark), curd with herbs
(no fruit quark) (1 tablespoon) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| | <input type="checkbox"/> 1-2 times a week | |
| Cream cheese, sour cream (full fat)
(1 tablespoon) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| | <input type="checkbox"/> 1-2 times a week | |
| Soft cheese (e.g. Camembert, Brie,
Munster, Burgos type) (one portion) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| | <input type="checkbox"/> 1-2 times a week | |
-

Milk and Yoghurt

- | | | |
|--|--|---|
| Cocoa, chocolate milk, fruit milk (150 ml) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| | <input type="checkbox"/> 1-2 times a week | |
| Milk, powdered milk (150 ml) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1-2 times a day |
| | <input type="checkbox"/> 1-2 times a week | <input type="checkbox"/> 3 times a day or more frequent |
| Plain yoghurt, buttermilk (150 g) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| | <input type="checkbox"/> 1-2 times a week | |
| Sour milk, kefir, fermented milks (150 g) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| | <input type="checkbox"/> 1-2 times a week | |
| Flavoured yoghurt (150 g) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| | <input type="checkbox"/> 1-2 times a week | |
-

Curd and Cheese, continued

- Semi-soft and firm cheese (e.g. Gouda, swiss-style cheese like Emmental, Tilsiter cheese, Edam, Parmegiano, Idiazabal, Manchego) (one portion)
- never
 - once a month or less frequent
 - 2-3 times a month
 - 1-2 times a week
 - 3-4 times a week
 - 5-6 times a week
 - 1 time a day or more frequent

- Mozarella, Mascarpone, Feta (one portion)
- never
 - once a month or less frequent
 - 2-3 times a month
 - 1-2 times a week
 - 3-4 times a week
 - 5-6 times a week
 - 1 time a day or more frequent

Fruits and Vegetables

Fruits

- Apple, pear, fresh (whole)
- never
 - once a month or less frequent
 - 2-3 times a month
 - 1-2 times a week
 - 3-4 times a week
 - 5-6 times a week
 - 1-2 times a day
 - 3 times a day or more frequent
- Orange, mandarin orange, kiwi, fresh (whole)
- never
 - once a month or less frequent
 - 2-3 times a month
 - 1-2 times a week
 - 3-4 times a week
 - 5-6 times a week
 - 1-2 times a day
 - 3 times a day or more frequent
- Banana (whole)
- never
 - once a month or less frequent
 - 2-3 times a month
 - 1-2 times a week
 - 3-4 times a week
 - 5-6 times a week
 - 1-2 times a day
 - 3 times a day or more frequent
- Plum, peach, apricot, nectarine, flat peach, fresh (a handful)
- never
 - once a month or less frequent
 - 2-3 times a month
 - 1-2 times a week
 - 3-4 times a week
 - 5-6 times a week
 - 1-2 times a day
 - 3 times a day or more frequent
-

Fruits, continued

Red and black currants, blackberries, blueberries (a handful)

- never
- once a month or less frequent
- 2-3 times a month
- 1-2 times a week
- 3-4 times a week
- 5-6 times a week
- 1-2 times a day
- 3 times a day or more frequent

Grapes (a handful)

- never
- once a month or less frequent
- 2-3 times a month
- 1-2 times a week
- 3-4 times a week
- 5-6 times a week
- 1-2 times a day
- 3 times a day or more frequent

Stewed fruit, canned fruit (1 cup)

- never
- once a month or less frequent
- 2-3 times a month
- 1-2 times a week
- 3 times a week or more frequent

Fruits, continued

Strawberries, cherries (a handful)

- never
- once a month or less frequent
- 2-3 times a month
- 1-2 times a week
- 3-4 times a week
- 5-6 times a week
- 1-2 times a day
- 3 times a day or more frequent

Water melon, melon, cantaloupe (1 piece)

- never
- once a month or less frequent
- 2-3 times a month
- 1-2 times a week
- 3-4 times a week
- 5-6 times a week
- 1-2 times a day
- 3 times a day or more frequent

Mango, pawpaw, pineapple (1 piece)

- never
 - once a month or less frequent
 - 2-3 times a month
 - 1-2 times a week
 - 3-4 times a week
 - 5-6 times a week
 - 1-2 times a day
 - 3 times a day or more frequent
-

Dried Fruits and Nuts

- | | | |
|---|--|--|
| Dried fruit (e.g. prunes, figs, raisins, dates) (a handful) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 5 times a week or more frequent |
| Nuts (salted, fresh, e.g. peanuts, tiger nuts, hazelnuts, walnuts, almonds, pinenuts, cashew) (a handful) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| | <input type="checkbox"/> 1-2 times a week | |
| Seeds (e.g. agushie, flaxseed, sesame) (one tablespoon) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| | <input type="checkbox"/> 1-2 times a week | |
-

Plantain, Roots and Tubers

- | | | |
|---|--|---|
| Plantain (e.g. boiled, roasted, kelewele) (3 pieces, finger size) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1-2 times a day |
| | <input type="checkbox"/> 1-2 times a week | <input type="checkbox"/> 3 times a day or more frequent |
| Cassava (e.g. boiled, roasted, Gari etc.) (3 pieces/slizes) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1-2 times a day |
| | <input type="checkbox"/> 1-2 times a week | <input type="checkbox"/> 3 times a day or more frequent |
| Yam, cocoyam (e.g. boiled, roasted, Eto etc.) (3 pieces/slizes) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1-2 times a day |
| | <input type="checkbox"/> 1-2 times a week | <input type="checkbox"/> 3 times a day or more frequent |
-

Potatoes

Sweet potatoes (e.g. boiled, roasted)
(3 pieces)

- | | |
|--|---|
| <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1-2 times a day |
| <input type="checkbox"/> 1-2 times a week | <input type="checkbox"/> 3 times a day or more frequent |

Potatoes (e.g. boiled, mashed,
dumplings, oven baked etc.)
(3 pieces)

- | | |
|--|--|
| <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| <input type="checkbox"/> 1-2 times a week | |

Pan-fried potatoes, french fries
(one portion)

- | | |
|--|--|
| <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| <input type="checkbox"/> 2-3 times a month | |

Fufu and Fermented Maize

Fufu (large orange size)

- | | |
|--|---|
| <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1-2 times a day |
| <input type="checkbox"/> 1-2 times a week | <input type="checkbox"/> 3 times a day or more frequent |

Banku (large orange size)

- | | |
|--|---|
| <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1-2 times a day |
| <input type="checkbox"/> 1-2 times a week | <input type="checkbox"/> 3 times a day or more frequent |

Kenkey (large orange size)

- | | |
|--|---|
| <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1-2 times a day |
| <input type="checkbox"/> 1-2 times a week | <input type="checkbox"/> 3 times a day or more frequent |
-

Raw Vegetables

Carrots, raw or cooked
(1 carrot or one portion)

- never
- once a month or less frequent
- 2-3 times a month
- 1-2 times a week
- 3-4 times a week
- 5-6 times a week
- 1 time a day or more frequent

Tomatoes, raw (whole)

- never
- once a month or less frequent
- 2-3 times a month
- 1-2 times a week
- 3-4 times a week
- 5-6 times a week
- 1 time a day or more frequent

Light and dark green lettuce, endive,
chicory, chinese cabbage, white
cabbage, raw (one portion)

- never
- once a month or less frequent
- 2-3 times a month
- 1-2 times a week
- 3-4 times a week
- 5-6 times a week
- 1 time a day or more frequent

Cucumber (one portion)

- never
- once a month or less frequent
- 2-3 times a month
- 1-2 times a week
- 3-4 times a week
- 5-6 times a week
- 1 time a day or more frequent

Raw Vegetables, continued

Peppers, raw (whole)

- never
- once a month or less frequent
- 2-3 times a month
- 1-2 times a week
- 3-4 times a week
- 5-6 times a week
- 1 time a day or more frequent

Do you eat garlic?

- Raw no sometimes yes

- Cooked, roasted, pickled no sometimes yes

Do you eat onions ?

- Raw no sometimes yes

- Cooked, roasted, pickled no sometimes yes
-

Vegetables Soups, Stews and Sauces

- | | | |
|---|--|--|
| Groundnut soup (3 soup laddles) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |
|
 | | |
| Palmnut soup (3 soup laddles) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |
|
 | | |
| Nkontomire stew, Palava sauce (3 soup spoons) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |
|
 | | |
| Okro stew (3 soup spoons) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |

Vegetables Soups, Stews and Sauces, continued

- | | | |
|---|--|--|
| Tomato sauce, tomato stew (including cannend/tinned tomato, crushed tomato) (one portion) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |
|
 | | |
| Ketchup (one tablespoon) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |
|
 | | |
| Lentil-, Pea-, bean soup (one portion) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |
|
 | | |
| Vegetable soup, light soup (3 soup laddles) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
-

Rice, Pasta and Egg

- | | | |
|---|--|--|
| Rice (e.g. plain rice, fried rice, waakye) (one portion) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| | <input type="checkbox"/> 1-2 times a week | |
| Other grains (millet, couscous, polenta, spelt, barley) (one portion) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| | <input type="checkbox"/> 1-2 times a week | |
| Pasta, noodles, macaroni (one portion) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 5 times a week or more frequent |
| Egg, cooked or fried, omelette (whole) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| | <input type="checkbox"/> 1-2 times a week | |

Meat and Fish

Meat and meat products

- | | | |
|---|--|--|
| Beef (one portion) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |
| Poultry (one portion) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |
| Goat (one portion) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |
| Pork (one portion) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |
| Bush meat (amoakoa, akrantie, kusie), vension (one portion) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |
-

Meat and meat products, continued

- | | | |
|--|--|--|
| Liver, giblets, intestine (one portion) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |
| Meatballs, Hamburger patties, meatloaf (whole or one slice) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |
| Fried sausage (e.g. kebab) (1 piece) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |
| Boiled sausage (e.g. Wiener, Frankfurters) (whole) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |
| Dry and cured meat (e.g. bacon, kassler, prosciutto, bresaola) (one portion) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| | <input type="checkbox"/> 1-2 times a week | |

Meat and meat products, continued

- | | | |
|--|--|--|
| Dry sausage (e.g. Salami, chorizo) (one portion) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| | <input type="checkbox"/> 1-2 times a week | |
| Jagdwurst, Bologna, Mortadella, Ham, Corned beef (one portion) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| | <input type="checkbox"/> 1-2 times a week | |
| Liverwurst, liver paté (one portion) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 5 times a week or more frequent |
-

Fish

- | | | |
|--|--|---|
| Fatty fish (e.g. sardines, anchovy, herring, tuna, mackerel, salmon, eel, trout) (one portion) | <input type="checkbox"/> never
<input type="checkbox"/> once a month or less frequent
<input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1-2 times a week
<input type="checkbox"/> 3 times a week or more frequent |
| Lean fish (e.g. cod, tilapia, catfish, pangasius, pollack, porgies, bass, barbell, pike) (one portion) | <input type="checkbox"/> never
<input type="checkbox"/> once a month or less frequent
<input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1-2 times a week
<input type="checkbox"/> 3 times a week or more frequent |
| Fish preparations (e. g. fish sticks, fishcake, preserved fish) (one portion) | <input type="checkbox"/> never
<input type="checkbox"/> once a month or less frequent
<input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1-2 times a week
<input type="checkbox"/> 3 times a week or more frequent |
| Shell fish (e.g. clams, mussels, oysters, scallops, shrimps, prawns, lobster, crayfish) (one portion) | <input type="checkbox"/> never
<input type="checkbox"/> once a month or less frequent
<input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1-2 times a week
<input type="checkbox"/> 3 times a week or more frequent |

Mixed Dishes

- | | | |
|---|--|---|
| Lasagna, ravioli, tortellini, pizza (one portion) | <input type="checkbox"/> never
<input type="checkbox"/> once a month or less frequent
<input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1-2 times a week
<input type="checkbox"/> 3 times a week or more frequent |
| Mixed dishes with meat (e.g. fufuo ne nkatenkwan) (one portion) | <input type="checkbox"/> never
<input type="checkbox"/> once a month or less frequent
<input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1-2 times a week
<input type="checkbox"/> 3 times a week or more frequent |
| Mixed dishes without meat (e.g. Red Red, Ampesie) (one portion) | <input type="checkbox"/> never
<input type="checkbox"/> once a month or less frequent
<input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1-2 times a week
<input type="checkbox"/> 3 times a week or more frequent |
| Tofu (soy protein, soy flour, meat-substitutes) (one portion) | <input type="checkbox"/> never
<input type="checkbox"/> once a month or less frequent
<input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1-2 times a week
<input type="checkbox"/> 3 times a week or more frequent |
-

Cakes and Sweets

Cakes

- | | | |
|--|--|--|
| Tart, Pie (e.g. with apple, plums etc.)
(1 piece) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 5 times a week or more frequent |
| Yeast cake, pastry, cake without filling
(meat pie, rock buns, donut) (1 piece) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 5 times a week or more frequent |
| Sponge cake, cake with cream or
custard filling, cream pie, cheesecake
(1 piece) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 5 times a week or more frequent |
| Whipped cream (1 tablespoon) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 5 times a week or more frequent |

Sweets

- | | | |
|--|--|--|
| Cookies, biscuits (e.g. nkate cake,
poloo, atsome) (3 pieces) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 5 times a week or more frequent |
| Chocolate and chocolate candy
(50g, 2 pieces) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| | <input type="checkbox"/> 1-2 times a week | |
| Sweets, candy, toffee (1 handful) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a week |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 1 time a day or more frequent |
| | <input type="checkbox"/> 1-2 times a week | |
-

Beverages

Water and Soda

- | | | |
|--|--|--|
| (Mineral) water or tap water (200ml) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a day |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a day |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 7-8 times a day |
| | <input type="checkbox"/> 1-3 times a week | <input type="checkbox"/> 9-10 times a day |
| | <input type="checkbox"/> 4-6 times a week | <input type="checkbox"/> 11 times a day or more frequent |
| | <input type="checkbox"/> 1-2 times a day | |
| Regular sodas, minerals, soft drinks (200ml) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a day |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a day |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 7-8 times a day |
| | <input type="checkbox"/> 1-3 times a week | <input type="checkbox"/> 9-10 times a day |
| | <input type="checkbox"/> 4-6 times a week | <input type="checkbox"/> 11 times a day or more frequent |
| | <input type="checkbox"/> 1-2 times a day | |
| 'Light' soft-drinks (200ml) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a day |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a day |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 7-8 times a day |
| | <input type="checkbox"/> 1-3 times a week | <input type="checkbox"/> 9-10 times a day |
| | <input type="checkbox"/> 4-6 times a week | <input type="checkbox"/> 11 times a day or more frequent |
| | <input type="checkbox"/> 1-2 times a day | |

Juices

- | | | |
|---|--|--|
| 100 % Fruit juice (200ml) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a day |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a day |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 7-8 times a day |
| | <input type="checkbox"/> 1-3 times a week | <input type="checkbox"/> 9-10 times a day |
| | <input type="checkbox"/> 4-6 times a week | <input type="checkbox"/> 11 times a day or more frequent |
| | <input type="checkbox"/> 1-2 times a day | |
| Fruit nectar and mixtures (e.g. tampico) (200ml) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a day |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a day |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 7-8 times a day |
| | <input type="checkbox"/> 1-3 times a week | <input type="checkbox"/> 9-10 times a day |
| | <input type="checkbox"/> 4-6 times a week | <input type="checkbox"/> 11 times a day or more frequent |
| | <input type="checkbox"/> 1-2 times a day | |
| Vegetable juice (e.g. carrot juice, tomato juice) (200ml) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a day |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a day |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 7-8 times a day |
| | <input type="checkbox"/> 1-3 times a week | <input type="checkbox"/> 9-10 times a day |
| | <input type="checkbox"/> 4-6 times a week | <input type="checkbox"/> 11 times a day or more frequent |
| | <input type="checkbox"/> 1-2 times a day | |
-

Coffee and Tea

- | | | |
|------------------------------|--|--|
| Regular coffee (1 cup) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a day |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a day |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 7-8 times a day |
| | <input type="checkbox"/> 1-3 times a week | <input type="checkbox"/> 9-10 times a day |
| | <input type="checkbox"/> 4-6 times a week | <input type="checkbox"/> 11 times a day or more frequent |
| | <input type="checkbox"/> 1-2 times a day | |
| Decaffeinated coffee (1 cup) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a day |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a day |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 7-8 times a day |
| | <input type="checkbox"/> 1-3 times a week | <input type="checkbox"/> 9-10 times a day |
| | <input type="checkbox"/> 4-6 times a week | <input type="checkbox"/> 11 times a day or more frequent |
| | <input type="checkbox"/> 1-2 times a day | |
| Tea, black or green (1 cup) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a day |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a day |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 7-8 times a day |
| | <input type="checkbox"/> 1-3 times a week | <input type="checkbox"/> 9-10 times a day |
| | <input type="checkbox"/> 4-6 times a week | <input type="checkbox"/> 11 times a day or more frequent |
| | <input type="checkbox"/> 1-2 times a day | |

Coffee and Tea, continued

- | | | |
|----------------------------|--|--|
| Fruit-, herbal tea (1 cup) | <input type="checkbox"/> never | <input type="checkbox"/> 3-4 times a day |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 5-6 times a day |
| | <input type="checkbox"/> 2-3 times a month | <input type="checkbox"/> 7-8 times a day |
| | <input type="checkbox"/> 1-3 times a week | <input type="checkbox"/> 9-10 times a day |
| | <input type="checkbox"/> 4-6 times a week | <input type="checkbox"/> 11 times a day or more frequent |
| | <input type="checkbox"/> 1-2 times a day | |

How did you usually drink your coffee or tea? Multiple answers are possible!

- | | | | |
|--------------------|---|-------------------------------------|---|
| Coffee | <input type="checkbox"/> don't drink coffee | <input type="checkbox"/> plain | <input type="checkbox"/> with milk |
| | <input type="checkbox"/> with dairy creamer | <input type="checkbox"/> with sugar | <input type="checkbox"/> with sweetener |
| Tea, black, green | <input type="checkbox"/> don't drink tea | <input type="checkbox"/> plain | <input type="checkbox"/> with milk |
| | <input type="checkbox"/> with honey | <input type="checkbox"/> with sugar | <input type="checkbox"/> with sweetener |
| Fruit-, herbal tea | <input type="checkbox"/> don't drink tea | <input type="checkbox"/> plain | <input type="checkbox"/> with sweetener |
| | <input type="checkbox"/> with honey | <input type="checkbox"/> with sugar | |
-

Alcoholic beverages

During the last 12 months, how often did you drink any of the following alcoholic beverages? Please mark your usual amount (serving size), too! Please consider the alcohol consumption on particular days (holidays, festivities), too

Beer (e.g. regular beer, stark beer)

<input type="checkbox"/> never	<input type="checkbox"/> 2-3 times a week
<input type="checkbox"/> once a month or less frequent	<input type="checkbox"/> 4-6 times a week
<input type="checkbox"/> 2-3 times a month	<input type="checkbox"/> once a day
<input type="checkbox"/> once a week	<input type="checkbox"/> twice a day or more often

Portion size: ½ 1 2 3 bottle 0.5 L

Non-alcoholic beer, light beer, ginger beer

<input type="checkbox"/> never	<input type="checkbox"/> 2-3 times a week
<input type="checkbox"/> once a month or less frequent	<input type="checkbox"/> 4-6 times a week
<input type="checkbox"/> 2-3 times a month	<input type="checkbox"/> once a day
<input type="checkbox"/> once a week	<input type="checkbox"/> twice a day or more often

Portion size: ½ 1 2 3 bottle 0.5 L

Alcoholic beverages, continued

Wine (white wine, red wine, sparkling wine, palm wine)

<input type="checkbox"/> never	<input type="checkbox"/> 2-3 times a week
<input type="checkbox"/> once a month or less frequent	<input type="checkbox"/> 4-6 times a week
<input type="checkbox"/> 2-3 times a month	<input type="checkbox"/> once a day
<input type="checkbox"/> once a week	<input type="checkbox"/> twice a day or more often

Portion size: ½ 1 2 3 glass 0.25 L

Liquor/Aperitif/Spirits (e.g. sherry, port wine, cognac, brandy, vodka, gin, brukutu, pito, akpeteshie)

<input type="checkbox"/> never	<input type="checkbox"/> 2-3 times a week
<input type="checkbox"/> once a month or less frequent	<input type="checkbox"/> 4-6 times a week
<input type="checkbox"/> 2-3 times a month	<input type="checkbox"/> once a day
<input type="checkbox"/> once a week	<input type="checkbox"/> twice a day or more often

Portion size: ½ 1 2 3 glass 8 cL

Fats

Fat content

Milk	<input type="checkbox"/> don't drink milk			
	<input type="checkbox"/> very low fat (0.1%)			
	<input type="checkbox"/> skim (0.3%)			
	<input type="checkbox"/> low fat (1.5%)			
	<input type="checkbox"/> whole (3.5%)			
	<input type="checkbox"/> don't know/it varies			
Yoghurt	<input type="checkbox"/> don't eat yoghurt			
	<input type="checkbox"/> very low fat (0.1%)			
	<input type="checkbox"/> skim (0.3%)			
	<input type="checkbox"/> low fat (1.5%)			
	<input type="checkbox"/> whole (3.5%)			
	<input type="checkbox"/> don't know/it varies			
Soft cheese	<input type="checkbox"/> don't eat soft cheese	<input type="checkbox"/> regular	<input type="checkbox"/> low fat	<input type="checkbox"/> don't know/it varies
Semi-soft and firm cheese	<input type="checkbox"/> don't eat semi-soft and firm cheese	<input type="checkbox"/> regular	<input type="checkbox"/> low fat	<input type="checkbox"/> don't know/it varies
Meat	<input type="checkbox"/> don't eat meat	<input type="checkbox"/> regular	<input type="checkbox"/> low fat	<input type="checkbox"/> don't know/it varies
Meat products	<input type="checkbox"/> don't eat meat products	<input type="checkbox"/> regular	<input type="checkbox"/> low fat	<input type="checkbox"/> don't know/it varies

Fats and Oils

How often did you prepare or eat meat and fish with any of the following fats?

Palmnut oil, palm kernel oil	<input type="checkbox"/> never	<input type="checkbox"/> rarely	<input type="checkbox"/> frequently	<input type="checkbox"/> always	<input type="checkbox"/> don't know
Groundnut paste, peanut butter	<input type="checkbox"/> never	<input type="checkbox"/> rarely	<input type="checkbox"/> frequently	<input type="checkbox"/> always	<input type="checkbox"/> don't know
Butter	<input type="checkbox"/> never	<input type="checkbox"/> rarely	<input type="checkbox"/> frequently	<input type="checkbox"/> always	<input type="checkbox"/> don't know
Margarine	<input type="checkbox"/> never	<input type="checkbox"/> rarely	<input type="checkbox"/> frequently	<input type="checkbox"/> always	<input type="checkbox"/> don't know
Cooking fat (e.g. animal fats like lard or speck)	<input type="checkbox"/> never	<input type="checkbox"/> rarely	<input type="checkbox"/> frequently	<input type="checkbox"/> always	<input type="checkbox"/> don't know
Olive oil	<input type="checkbox"/> never	<input type="checkbox"/> rarely	<input type="checkbox"/> frequently	<input type="checkbox"/> always	<input type="checkbox"/> don't know
Other oils (e.g. vegetable oil, sunflower oil, canola oil)	<input type="checkbox"/> never	<input type="checkbox"/> rarely	<input type="checkbox"/> frequently	<input type="checkbox"/> always	<input type="checkbox"/> don't know

How often did you eat or cook vegetables with any of the following fats?

Palmnut oil, palm kernel oil	<input type="checkbox"/> never	<input type="checkbox"/> rarely	<input type="checkbox"/> frequently	<input type="checkbox"/> always	<input type="checkbox"/> don't know
Groundnut paste, peanut butter	<input type="checkbox"/> never	<input type="checkbox"/> rarely	<input type="checkbox"/> frequently	<input type="checkbox"/> always	<input type="checkbox"/> don't know
Butter	<input type="checkbox"/> never	<input type="checkbox"/> rarely	<input type="checkbox"/> frequently	<input type="checkbox"/> always	<input type="checkbox"/> don't know
Margarine	<input type="checkbox"/> never	<input type="checkbox"/> rarely	<input type="checkbox"/> frequently	<input type="checkbox"/> always	<input type="checkbox"/> don't know
Cooking fat (e.g. animal fats like lard or speck)	<input type="checkbox"/> never	<input type="checkbox"/> rarely	<input type="checkbox"/> frequently	<input type="checkbox"/> always	<input type="checkbox"/> don't know
Olive oil	<input type="checkbox"/> never	<input type="checkbox"/> rarely	<input type="checkbox"/> frequently	<input type="checkbox"/> always	<input type="checkbox"/> don't know
Other oils (e.g. vegetable oil, sunflower oil, canola oil)	<input type="checkbox"/> never	<input type="checkbox"/> rarely	<input type="checkbox"/> frequently	<input type="checkbox"/> always	<input type="checkbox"/> don't know

Vegetables Soups, Stews and Sauces

- | | | |
|--|--|--|
| Groundnut soup (3 soup laddles) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |
|
 | | |
| Palmnut soup (3 soup laddles) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |
|
 | | |
| Nkontomire stew, Palava sauce
(3 soup spoons) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |
|
 | | |
| Okro stew (3 soup spoons) | <input type="checkbox"/> never | <input type="checkbox"/> 1-2 times a week |
| | <input type="checkbox"/> once a month or less frequent | <input type="checkbox"/> 3 times a week or more frequent |
| | <input type="checkbox"/> 2-3 times a month | |

Sauce**How often did you eat the following foods with sauce?**

- | | | | | | |
|----------------------------|--------------------------------|---------------------------------|-------------------------------------|---------------------------------|-------------------------------------|
| Sauce to meat or fish | <input type="checkbox"/> never | <input type="checkbox"/> rarely | <input type="checkbox"/> frequently | <input type="checkbox"/> always | <input type="checkbox"/> don't know |
| Sauce to cooked vegetables | <input type="checkbox"/> never | <input type="checkbox"/> rarely | <input type="checkbox"/> frequently | <input type="checkbox"/> always | <input type="checkbox"/> don't know |
| Sauce to pasta or rice | <input type="checkbox"/> never | <input type="checkbox"/> rarely | <input type="checkbox"/> frequently | <input type="checkbox"/> always | <input type="checkbox"/> don't know |

Salad Dressing**How often did you eat salad with any of the following ingredients?**

- | | | | | | |
|---|--------------------------------|---------------------------------|-------------------------------------|---------------------------------|-------------------------------------|
| Olive oil | <input type="checkbox"/> never | <input type="checkbox"/> rarely | <input type="checkbox"/> frequently | <input type="checkbox"/> always | <input type="checkbox"/> don't know |
| Other oils (e.g. vegetable oil, linseed oil,
sunflower oil, canola oil, safflower oil, germ oil) | <input type="checkbox"/> never | <input type="checkbox"/> rarely | <input type="checkbox"/> frequently | <input type="checkbox"/> always | <input type="checkbox"/> don't know |
| Mayonnaise | <input type="checkbox"/> never | <input type="checkbox"/> rarely | <input type="checkbox"/> frequently | <input type="checkbox"/> always | <input type="checkbox"/> don't know |
| Crème fraîche, cream, sour cream, remoulade | <input type="checkbox"/> never | <input type="checkbox"/> rarely | <input type="checkbox"/> frequently | <input type="checkbox"/> always | <input type="checkbox"/> don't know |
| Yoghurt | <input type="checkbox"/> never | <input type="checkbox"/> rarely | <input type="checkbox"/> frequently | <input type="checkbox"/> always | <input type="checkbox"/> don't know |
| Fresh herbs | <input type="checkbox"/> never | <input type="checkbox"/> rarely | <input type="checkbox"/> frequently | <input type="checkbox"/> always | <input type="checkbox"/> don't know |
| Vinegar | <input type="checkbox"/> never | <input type="checkbox"/> rarely | <input type="checkbox"/> frequently | <input type="checkbox"/> always | <input type="checkbox"/> don't know |

End time (hh:mm)

Thank you for your time and your cooperation!

C. 5: Syntax for analyses in SPSS

Syntax for recoding

*recoding of ethnic identity variable

DATASET ACTIVATE original.

RECODE CultFeel (1 thru 2=0) (3 thru 5=1) (ELSE=SYSMIS) INTO feelenglish.

VALUE LABELS feelenglish '1' "Yes" '2' "No".

EXECUTE.

RECODE CultFeelGha (1 thru 2=0) (3 thru 5=1) (ELSE=SYSMIS) INTO feelGhanian.

VALUE LABELS feelGhanian '1' "Yes" '2' "No".

IF (feelenglish=1 & feelGhanian=1) acculturation1=1.

IF (feelenglish=1 & feelGhanian=0) acculturation1=2.

IF (feelenglish=0 & feelGhanian=1) acculturation1=3.

IF (feelenglish=0 & feelGhanian=0) acculturation1=4.

VALUE LABELS acculturation1 '1' "integration" '2' "assimilation" '3' "separation" '4' "marginalization".

EXECUTE.

variable labels acculturation 'acculturation for feeling'.

*recoding socia network variable Acculturation 2

COMPUTE meanfriends=MEAN(CultOtherFriends,CultTimeOther).

EXECUTE.

COMPUTE meanGhanaianfriends=MEAN(CultGhaFriends,CultTimeGha).

EXECUTE.

RECODE meanfriends (1 thru 2=0) (3 thru 5=1) (ELSE=SYSMIS) INTO dutchsocia network.

VALUE LABELS dutchsocia network '1' "Yes" '2' "No".

COMPUTE meanGhanafriends=MEAN(CultGhaFriends,CultTimeGha).

EXECUTE.

RECODE meanGhanafriends (1 thru 2=0) (3 thru 5=1) (ELSE=SYSMIS) INTO ghanasocia network.

VALUE LABELS ghanasocia network '1' "Yes" '2' "No".

IF (dutchsocialnetwork=1 & ghanasocialnetwork=1) acculturation2=1.

IF (dutchsocialnetwork=1 & ghanasocialnetwork=0) acculturation2=2.

IF (dutchsocialnetwork=0 & ghanasocialnetwork=1) acculturation2=3.

IF (dutchsocialnetwork=0 & ghanasocialnetwork=0) acculturation2=4.

VALUE LABELS acculturation2 '1' "integration" '2' "assimilation" '3' "separation" '4'
"marginalization".

EXECUTE.

*cultural orientation Acculturation 3

RECODE Cult Orient host mean (1 thru 2=0) (3 thru 5=1) (ELSE=SYSMIS) INTO
meanculturalorientation.

RECODE Cult Orient Gha mean (1 thru 2=0) (3 thru 5=1) (ELSE=SYSMIS) INTO
GHmeanculturalorientation.

SYNTAX FOR REGRESSION

DATASET ACTIVATE DataSet1.

REGRESSION

/MISSING LISTWISE

/STATISTICS COEFF OUTS CI(95) R ANOVA

/CRITERIA=PIN(.05) POUT(.10)

/NOORIGIN

/DEPENDENT weightedintakeofbread

/METHOD=ENTER Integrated Seperated Marginalized

/METHOD=ENTER Age education2 Sex2

/METHOD=ENTER Amsterdam1 Berlin1

/METHOD=ENTER IntergratedxAmsterdam IntergratedxBerlin SeparatedXamsterdam
SeparatedXBerlin

marginalizedxAmsterdam marginalizedxBerlin.

REGRESSION

/MISSING LISTWISE

/STATISTICS COEFF OUTS CI(95) R ANOVA

/CRITERIA=PIN(.05) POUT(.10)

/NOORIGIN

/DEPENDENT weightedintakeofplantain

/METHOD=ENTER Integrated Seperated Marginalized

/METHOD=ENTER Age education2 Sex2

/METHOD=ENTER Amsterdam1 Berlin1

/METHOD=ENTER IntergratedxAmsterdam IntergratedxBerlin SeparatedXamsterdam

SeparatedXBerlin

marginalizedxAmsterdam marginalizedxBerlin.

REGRESSION

/MISSING LISTWISE

/STATISTICS COEFF OUTS CI(95) R ANOVA

/CRITERIA=PIN(.05) POUT(.10)

/NOORIGIN

/DEPENDENT weightedintakeofrice

/METHOD=ENTER Integrated Seperated Marginalized

/METHOD=ENTER Age education2 Sex2

/METHOD=ENTER Amsterdam1 Berlin1

/METHOD=ENTER IntergratedxAmsterdam IntergratedxBerlin SeparatedXamsterdam

SeparatedXBerlin

marginalizedxAmsterdam marginalizedxBerlin.

C.6: Example of regression outputs

DATASET ACTIVATE DataSet1.								
REGRESSION								
/MISSING LISTWISE								
/STATISTICS COEFF OUTS CI(95) R ANOVA								
/CRITERIA=PIN(.05) POUT(.10)								
/NOORIGIN								
/DEPENDENT weightedintakeofbread								

/METHOD=ENTER Integrated Seperated Marginalized									
/METHOD=ENTER Age education2 Sex2									
/METHOD=ENTER Amsterdam1 Berlin1									
/METHOD=ENTER IntergratedxAmsterdam IntergratedxBerlin SeparatedXamsterdam SeparatedXBerlin									
marginalizedxAmsterdam marginalizedxBerlin.									
Regression									
Notes									
Output Created		22-FEB-2017 13:34:43							
Comments									
Input	Data	\\stfdata06\home\CM\Cmp13has\ManW7\Desktop\RODAM\completed reduced new spss data.sav							
	Active Dataset	DataSet1							
	Filter	<none>							
	Weight	<none>							
	Split File	<none>							
	N of Rows in Working Data File	1806							

Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.							
	Cases Used	Statistics are based on cases with no missing values for any variable used.							
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT weightedintakeofbread /METHOD=ENTER Integrated Seperated Marginalized /METHOD=ENTER Age education2 Sex2 /METHOD=ENTER Amsterdam1 Berlin1 /METHOD=ENTER IntergratedxAmsterdam IntergratedxBerlin SeparatedXamsterdam SeparatedXBerlin marginalizedxAmsterdam marginalizedxBerlin.							
Resources	Processor Time	00:00:00.06							
	Elapsed Time	00:00:00.05							
	Memory Required	13148 bytes							

	Additional Memory Required for Residual Plots	0 bytes							
Variables Entered/Removed^a									
Model	Variables Entered	Variables Removed	Method						
1	Marginalized, Seperated, Integrated ^b		Enter						
2	sex2, age, education2 ^b		Enter						
3	Berlin1, Amsterdam1 ^b		Enter						
4	marginalized xBerlin, SeparatedXAmsterdam, IntergratedxBerlin, marginalized xAmsterdam, SeparatedXBerlin, IntergratedxAmsterdam ^b		Enter						

a. Dependent Variable: weightedintakeofbread									
b. All requested variables entered.									
Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate					
1	.040 ^a	.002	.000	.16571					
2	.122 ^b	.015	.012	.16474					
3	.168 ^c	.028	.024	.16373					
4	.179 ^d	.032	.024	.16368					
a. Predictors: (Constant), Marginalized, Seperated, Integrated									
b. Predictors: (Constant), Marginalized, Seperated, Integrated, sex2, age, education2									
c. Predictors: (Constant), Marginalized, Seperated, Integrated, sex2, age, education2, Berlin1, Amsterdam1									
d. Predictors: (Constant), Marginalized, Seperated, Integrated, sex2, age, education2, Berlin1, Amsterdam1, marginalizedxBerlin, SeperatedXamsterdam, IntergratedxBerlin, marginalizedxAmsterdam, SeperatedXBerlin, IntergratedxAmsterdam									
ANOVA^a									

Model		Sum of Squares	df	Mean Square	F	Sig.		
1	Regression	.079	3	.026	.953	.414 ^b		
	Residual	49.127	1789	.027				
	Total	49.206	1792					
2	Regression	.736	6	.123	4.521	.000 ^c		
	Residual	48.469	1786	.027				
	Total	49.206	1792					
3	Regression	1.384	8	.173	6.452	.000 ^d		
	Residual	47.822	1784	.027				
	Total	49.206	1792					
4	Regression	1.571	14	.112	4.189	.000 ^e		
	Residual	47.634	1778	.027				
	Total	49.206	1792					
a. Dependent Variable: weightedintakeofbread								
b. Predictors: (Constant), Marginalized, Seperated, Integrated								
c. Predictors: (Constant), Marginalized, Seperated, Integrated, sex2, age, education2								
d. Predictors: (Constant), Marginalized, Seperated, Integrated, sex2, age, education2, Berlin1, Amsterdam1								

e. Predictors: (Constant), Marginalized, Seperated, Integrated, sex2, age, education2, Berlin1, Amsterdam1, marginalizedxBerlin, SeparatedXamsterdam, IntergratedxBerlin, marginalizedxAmsterdam, SeparatedXBerlin, IntergratedxAmsterdam										
Coefficients^a										
Model		Unstandardized Coefficients			Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		
		B	Std. Error	Beta				Lower Bound	Upper Bound	
1	(Constant)	.435	.035		12.603	.000	.368	.503		
	Integrated	-.010	.035	-.030	-.290	.772	-.079	.058		
	Seperated	-.020	.035	-.059	-.569	.570	-.089	.049		
	Marginalized	.043	.063	.019	.689	.491	-.080	.166		
2	(Constant)	.345	.040		8.712	.000	.267	.422		
	Integrated	-.008	.035	-.023	-.218	.827	-.076	.061		
	Seperated	-.019	.035	-.055	-.531	.595	-.087	.050		
	Marginalized	.038	.062	.017	.602	.547	-.085	.160		

	age	.002	.000	.097	4.102	.000	.001	.002
	education2	.008	.008	.023	.977	.329	-.008	.024
	sex2	.024	.008	.072	3.030	.002	.008	.040
3	(Constant)	.321	.041		7.814	.000	.241	.402
	Integrated	-.007	.035	-.021	-.202	.840	-.075	.061
	Seperated	-.007	.035	-.022	-.211	.833	-.075	.061
	Marginalized	.037	.062	.017	.593	.553	-.085	.159
	age	.001	.000	.092	3.871	.000	.001	.002
	education2	.017	.008	.050	2.029	.043	.001	.033
	sex2	.022	.008	.065	2.721	.007	.006	.037
	Amsterdam1	.041	.011	.124	3.865	.000	.020	.062
	Berlin1	.001	.011	.003	.082	.934	-.021	.023
4	(Constant)	.433	.098		4.409	.000	.240	.626
	Integrated	-.107	.096	-.319	-1.116	.265	-.294	.081
	Seperated	-.129	.095	-.382	-1.348	.178	-.316	.059
	Marginalized	.106	.150	.048	.711	.477	-.187	.400
	age	.001	.000	.090	3.763	.000	.001	.002

	education2	.016	.008	.048	1.969	.049	.000	.033
	sex2	.022	.008	.065	2.728	.006	.006	.037
	Amsterdam1	-.078	.104	-.235	-.744	.457	-.283	.127
	Berlin1	-.143	.116	-.397	-1.233	.218	-.371	.084
	IntergratedxA msterdam	.107	.105	.304	1.014	.311	-.100	.314
	IntergratedxB erlin	.131	.117	.275	1.115	.265	-.099	.360
	SeparatedXA msterdam	.136	.106	.279	1.290	.197	-.071	.343
	SeparatedXB erlin	.159	.117	.350	1.359	.174	-.070	.388
	marginalized xAmsterdam	-.110	.168	-.041	-.657	.512	-.439	.219
	marginalized xBerlin	-.049	.232	-.007	-.212	.832	-.503	.405
a. Dependent Variable: weightedintakeofbread								
Excluded Variables^a								
	Model	Beta In	t	Sig.	Parti al Corre lation	Collin earity Statis tics		
						Toler ance		
1	age	.090 ^b	3.826	.000	.090	.998		
	education2	.011 ^b	.452	.651	.011	.998		

	sex2	.061 ^b	2.59 5	.010	.061	.999		
	Amsterdam1	.121 ^b	4.96 5	.000	.117	.934		
	Berlin1	-.093 ^b	- 3.90 9	.000	-.092	.978		
	IntergratedxA msterdam	.104 ^b	3.50 3	.000	.083	.625		
	IntergratedxB erlin	-.086 ^b	- 3.42 9	.001	-.081	.876		
	SeparatedXA msterdam	.099 ^b	3.73 0	.000	.088	.780		
	SeparatedXB erlin	-.053 ^b	- 1.90 1	.058	-.045	.730		
	marginalized xAmsterdam	-.054 ^b	- 1.26 4	.207	-.030	.301		
	marginalized xBerlin	-.008 ^b	-.30 2	.763	-.007	.901		
2	Amsterdam1	.122 ^c	4.91 5	.000	.116	.880		
	Berlin1	-.073 ^c	- 3.02 4	.003	-.071	.937		
	IntergratedxA msterdam	.101 ^c	3.33 3	.001	.079	.595		
	IntergratedxB erlin	-.072 ^c	- 2.84 7	.004	-.067	.854		
	SeparatedXA msterdam	.099 ^c	3.71 5	.000	.088	.769		

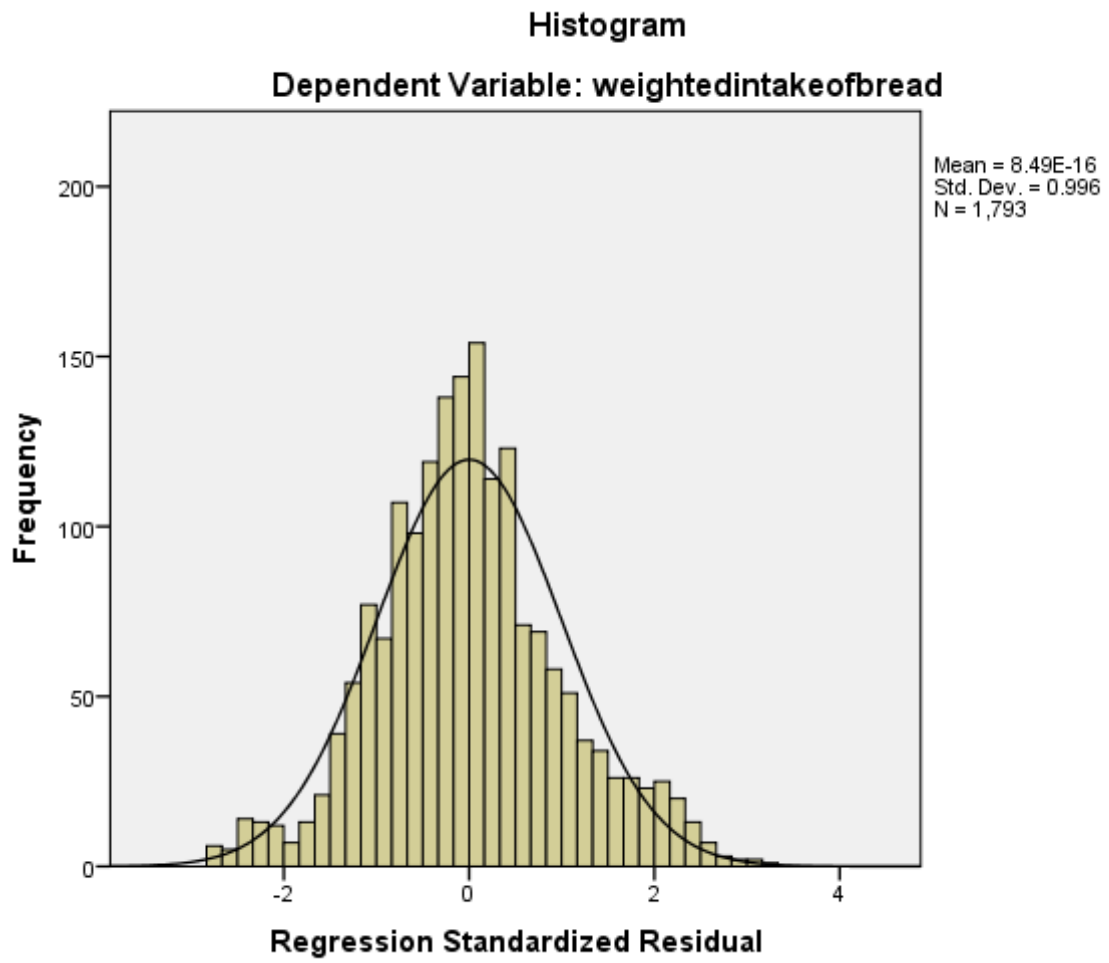
	SeparatedXBerlin	-.033 ^c	-1.201	.230	-.028	.714		
	marginalizedxAmsterdam	-.047 ^c	-1.105	.269	-.026	.301		
	marginalizedxBerlin	-.007 ^c	-.266	.790	-.006	.899		
3	IntergratedxAmsterdam	-.028 ^d	-.592	.554	-.014	.252		
	IntergratedxBerlin	-.018 ^d	-.507	.612	-.012	.415		
	SeparatedxAmsterdam	.030 ^d	.884	.377	.021	.477		
	SeparatedXBerlin	.025 ^d	.648	.517	.015	.378		
	marginalizedxAmsterdam	-.062 ^d	-1.457	.145	-.034	.299		
	marginalizedxBerlin	-.002 ^d	-.089	.929	-.002	.897		
a. Dependent Variable: weightedintakeofbread								
b. Predictors in the Model: (Constant), Marginalized, Seperated, Integrated								
c. Predictors in the Model: (Constant), Marginalized, Seperated, Integrated, sex2, age, education2								
d. Predictors in the Model: (Constant), Marginalized, Seperated, Integrated, sex2, age, education2, Berlin1, Amsterdam1								
REGRESSION								
/MISSING LISTWISE								

/STATISTICS COEFF OUTS CI(95) R ANOVA									
/CRITERIA=PIN(.05) POUT(.10)									
/NOORIGIN									
/DEPENDENT weightedintakeofplantain									
/METHOD=ENTER Integrated Seperated Marginalized									
/METHOD=ENTER Age education2 Sex2									
/METHOD=ENTER Amsterdam1 Berlin1									
/METHOD=ENTER IntergratedxAmsterdam IntergratedxBerlin SeparatedXamsterdam SeparatedXBerlin									
marginalizedxAmsterdam marginalizedxBerlin.									
Regression									
Notes									
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Comments									
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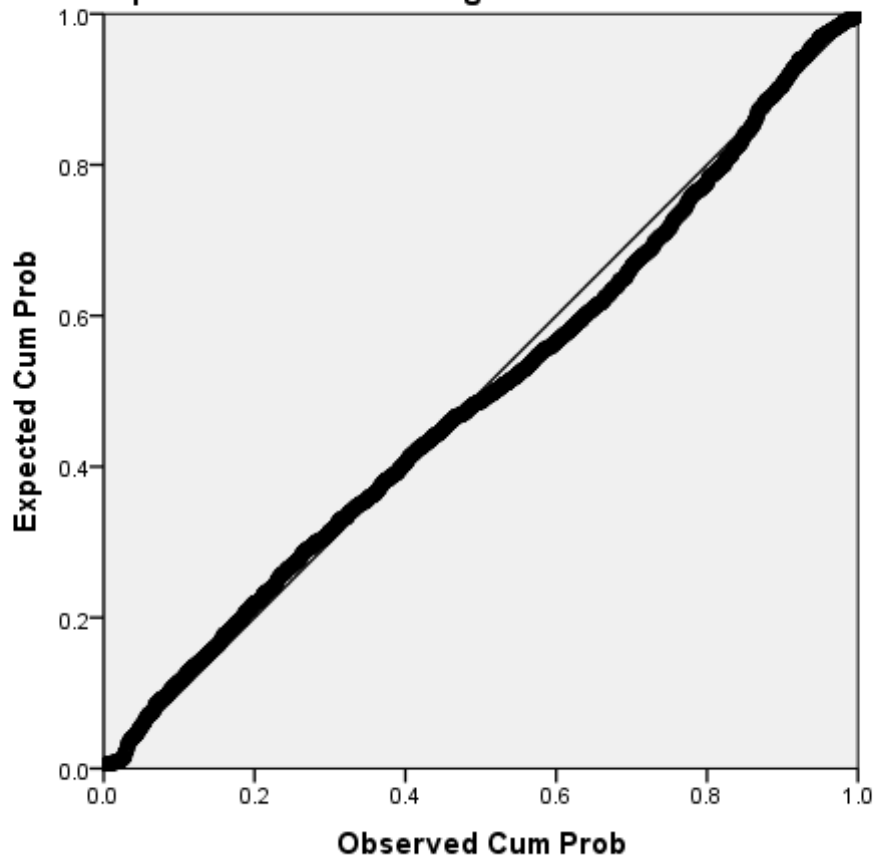
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	Cases Used	Statistics are based on cases with no missing values for any variable used.							
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT weightedintakeofplantain /METHOD=ENTER Integrated Seperated Marginalized /METHOD=ENTER Age education2 Sex2 /METHOD=ENTER Amsterdam1 Berlin1 /METHOD=ENTER IntergratedxAmsterdam IntergratedxBerlin SeperatedXamsterdam SeperatedXBerlin marginalizedxAmsterdam marginalizedxBerlin.							
Resources	Processor Time	00:00:00.05							

	Elapsed Time	00:00:00.05						
	Memory Required	13148 bytes						
	Additional Memory Required for Residual Plots	0 bytes						
Variables Entered/Removed^a								

C.7: Outputs for checking regression assumptions

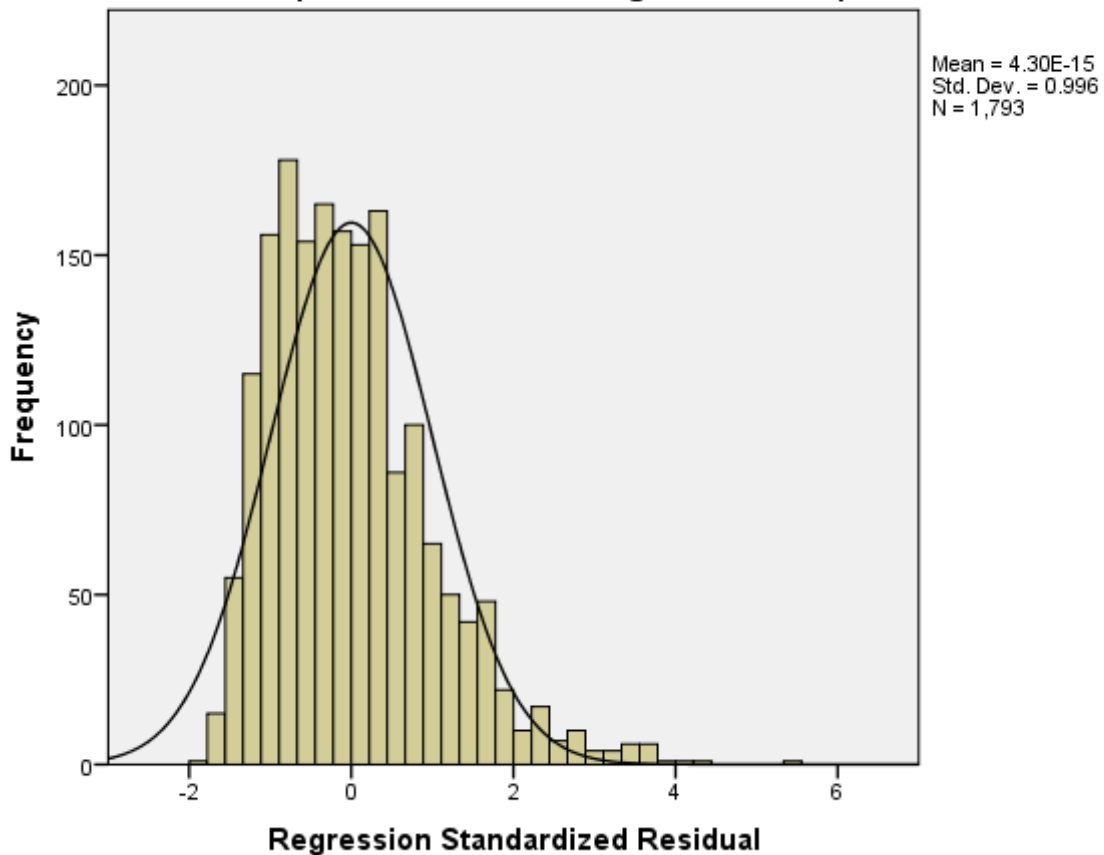


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: weightedintakeofbread



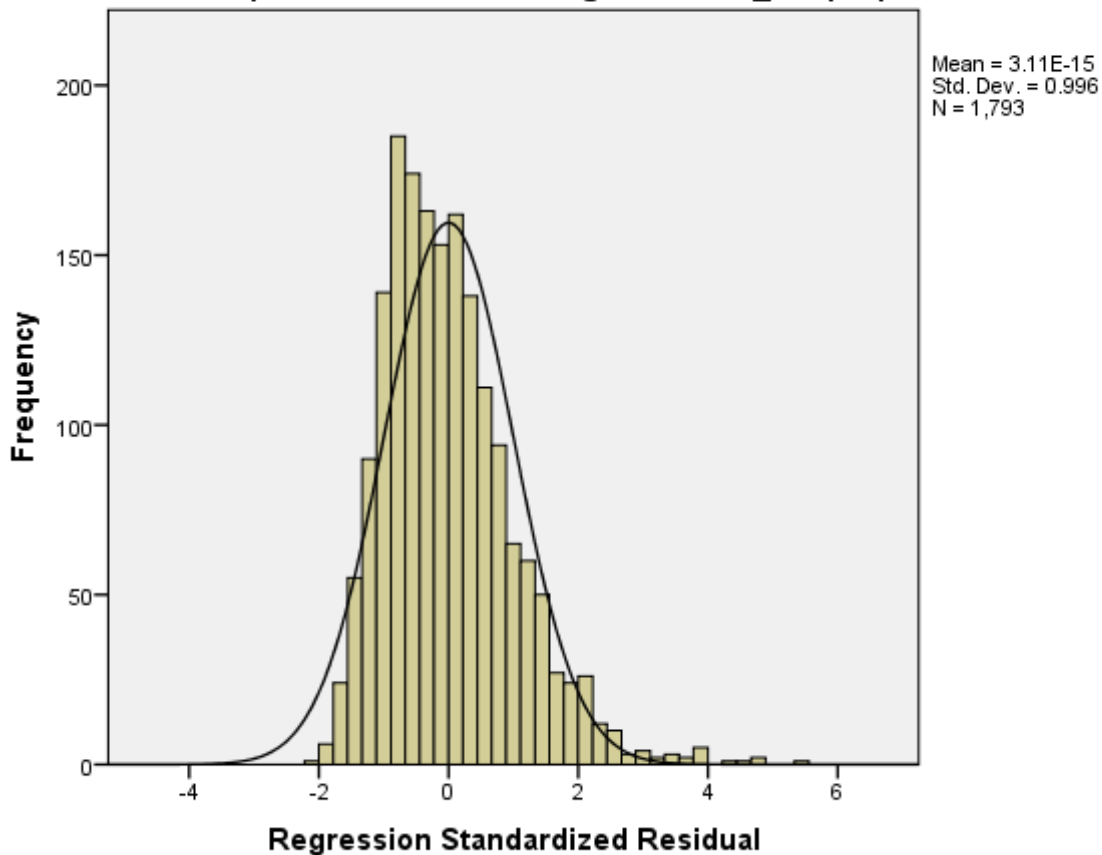
Histogram

Dependent Variable: weightedintakeofplantain



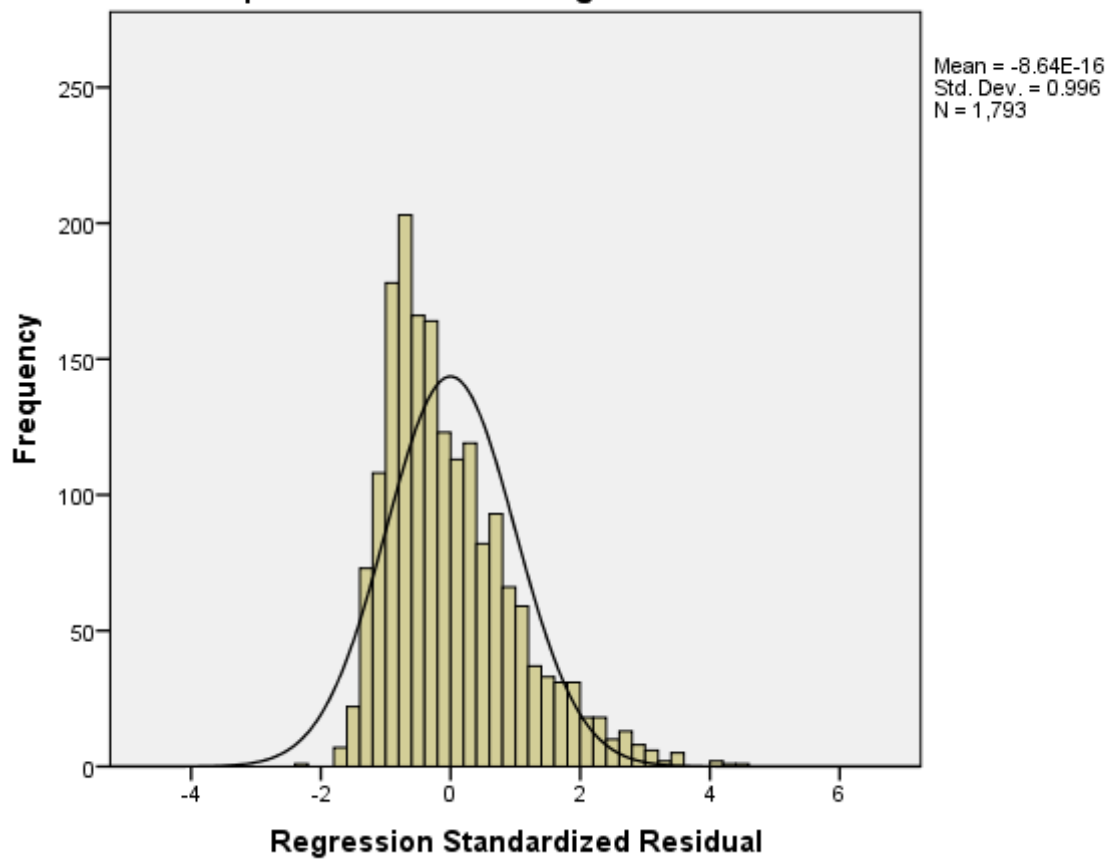
Histogram

Dependent Variable: weightintakeof_fishpreparation



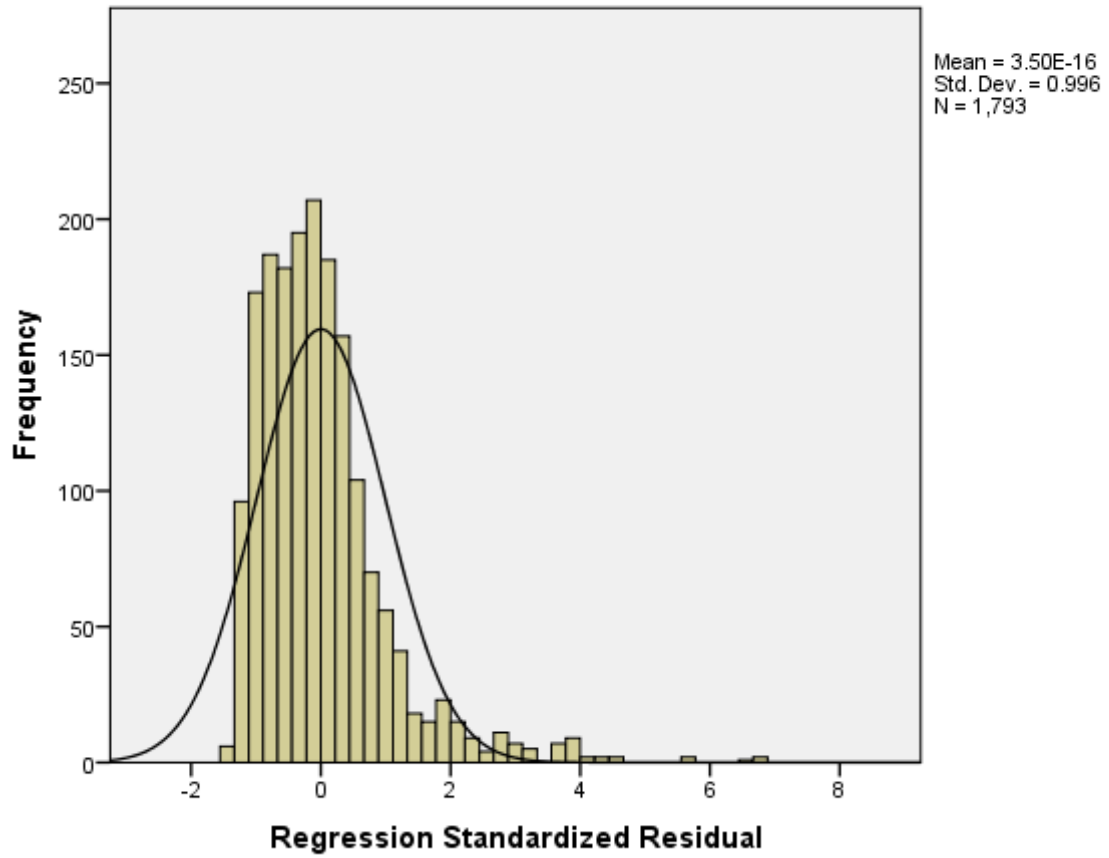
Histogram

Dependent Variable: weightintakeofnonanimalsource



Histogram

Dependent Variable: weightofcakes_sweets_spread



Histogram

Dependent Variable: weightofsugarsweeteneddrinks

