

**FACTORS ASSOCIATED WITH DIETARY DIVERSITY AMONG
WOMEN OF REPRODUCTIVE AGE (15-49 YEARS)
IN AGAGO DISTRICT**

BY

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DECLARATION

I, **Oroma Ray**, hereby declare that the work submitted in this dissertation is original and a result of my own study except where otherwise acknowledged. This thesis has not been submitted for another degree award in this or any other University or institute.

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DEDICATION

I dedicate this piece of work to my dear parents, Mr. John Labeja and Juliana Akello for bringing me up and teaching me the best values of life.

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ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
BMI	Body Mass Index
CED	Chronic Energy Deficiency
CI	Confidence interval
DHT	District Health Team
ENA	Emergency Nutrition Assessment
FANTA	Food and Nutrition Technical Assistance
HIV	Human Immunodeficiency Virus
IRB	Institution Review Board
IUGR	Inter Uterine Growth Retardation
LRA	Lord Resistance Army
MoH	Ministry of Health
NUREP	Northern Uganda Rehabilitation Programme
SPSS	Statistical Package for Social Scientists
UBOS	Uganda National Bureau of Statistics
UDHS	Uganda Demographic Health Survey
UNICEF	United Nation International Child Education Fund
WHO	World Health Organization

OPERATIONAL DEFINITIONS

Dietary diversity refers to the consumption of a variety of food groups considered an indicator for dietary quality and general nutritional adequacy.

Dietary intake refers to food and drink taken for purposes of nourishment.

Malnutrition: is the condition that results from taking an unbalanced diet in which certain nutrients are lacking, in excess (too high an intake), or in the wrong proportions.

Meal refers to food served or eaten at a given time during the day such as breakfast, lunch, supper

Nutrition refers to the process by which food and drink eaten is digested and absorbed by the body to provide nourishment for normal growth, development and health.

Nutritional status is a measurement of the extent to which individuals' physiological needs are met.

Snack refers to foods usually eaten between meals.

Under nutrition is a condition in which a person continuously fails to get enough of the nutrients that the body needs to stay.

Underweight is the weight for age is below- 2sd of the medium reference value.

Wasted is the weight for height is below - 2SD of the medium reference value.

ABSTRACT

Introduction: Despite the internationally accepted recommendation that eating a diversity of foods leads to a healthy diet, and is associated with positive health outcomes such as reduced mortality (Michels et al, 2002), little information exists on what factors influence dietary diversity among women of reproductive age in Agago district.

Objective: To determine dietary diversity among women of reproductive age (15 to 49 years) in Agago district.

Methods: The study was cross sectional in design with a sample size of 280 women of reproductive age. The data were collected using an interviewer-administered questionnaire, 24 hour dietary recall and an individual dietary diversity score tool (FAO/Nutrition and Consumer Protection Division, version of May 2007) and focus group discussions. Descriptive statistics such as frequencies, proportions and cross tabulations followed by multiple logistic regressions were employed in data analysis.

Results: More than half of the respondents were less knowledgeable about dietary diversity compared to those who are knowledgeable; majority of the respondents had higher dietary diversity score with the most eaten foods being grains/staples foods with oil fats or butter beans, peas/legumes, other fruits and with dark green vegetables and the statistically significance factors associated with dietary diversity were observed on residence, types of family and source of food.

Conclusions: The women of reproductive age (15-49 years) in Agago district had low level of knowledge of dietary diversity but higher dietary diversity scores with statistical significance of factors associated with dietary diversity being types of family, residence and source of food.

Recommendations: There is need for nutrition education and counseling; need to increase availability of various food types for example by promoting keeping of cows, fish farming and poultry keeping; further research is needed to be done on the nutrition status of women of reproductive age (15-49 years) in Agago district in order to find out whether the higher dietary diversity translate to good nutrition status.

CHAPTER ONE

1.0 Introduction

Maternal nutrition is an important public health problem in low-income countries around the world. It is particularly evident in Africa, South/Southeast Asia, Latin America, and the Caribbean. Between 10 and 20% of women are undernourished in most countries surveyed by the Demographic and Health Surveys, and serious undernutrition is evident in most countries in sub-Saharan Africa and South/Southeast Asia (Mukuria *et al.*, 2005). The most frequent proximate causes of maternal malnutrition include inadequate food intake, poor nutritional quality of diets, frequent infections, and short inter-pregnancy intervals. These causes are recognized as stemming from wider contextual factors such as educational and socioeconomic status, ethnic and cultural beliefs, agricultural practices, national policies, and food insecurity.

Women of reproductive age are particularly vulnerable to food insecurity and associated nutrient inadequacy for two major reasons. First, physiological vulnerability comes with childbearing. Maternal nutrient needs increase during pregnancy and breastfeeding, and when these needs are not met, mothers may experience wasting and fatigue that may limit their ability to fully satisfy infant needs. These limitations may result in infants who are small for gestational age and children with stunted growth and slowed cognitive development, which may persist into adulthood and transmit to the next generation. Second, women have a sociological vulnerability. Food security research indicates that during periods of reduced food supply, women experience reduced intakes relative to men (DeRose *et al.*, 2000).

Mothers are likely to reduce their own intakes to secure those of infants and small children. Mothers are the first to sacrifice in times of distress and the last to experience improvements when supplies are replenished. A striking example of this occurred during a food crisis in Java (1997–1998): child weight-for-age remained constant while there was an increase in the prevalence of maternal wasting due to buffering children's energy intake. The vicious cycle of intergenerational growth failure, to which mothers have been called the key is reinforced by the sociological vulnerability of mothers, particularly in situations of food insecurity.

Women, especially mothers, are gatekeepers of the family diet, and have long been entrusted with the principal responsibility of selecting, preparing, and serving nutritious foods to support families and households. However, their diets are often overlooked, Ruel *et al.*, 2010) along with the potential impacts of poor diets on women and their families. A better understanding of women's diets patterns in the home and family is needed.

Dietary diversification is one of the four main strategies advocated internationally for the improvement of micronutrient intake and status, especially in undernourished individuals (Maunder *et al.*, 2001). Many studies in several age groups have shown that an increase in individual dietary diversity score is related to increased nutrient adequacy of the diet.

Several epidemiological studies from mainly developed countries have reported dietary patterns of different populations in relation to overweight and obesity (Okubo *et al.*, 2007). Across these studies, dietary patterns that were characterized by higher intake of fruits, vegetables, whole grains, fish and poultry were shown to be related to a lower degree of obesity (Togo *et al.*, 2001).

Among developing countries, (Esmailzadeh *et al.*, 2008) reported that Iranian women who adopted a healthier pattern of dietary intake was associated with smaller risks of general and central obesity compared to those with less healthy diets. Studies that aimed to investigate the dietary diversity against adequacy of nutrient in developing countries, found a good relationship with studies in developed countries (Ruel, 2003b). The lack of dietary diversity is a severe problem among poor people in the developing countries suggests that they feed mostly on starchy staples without or with minimal use of animal products, fresh fruits and vegetables (Popkin, 1994).

The household dietary diversity score (HDDS) is meant to reflect, in a snapshot form, the economic ability of a household to access a variety of foods. Studies have shown that an increase in dietary diversity is associated with socio-economic status and household food security (household energy availability) (Hoddinot and Yohannes, 2002; Hatloy *et al.*, 2000).

Individual dietary diversity scores aim to reflect nutrient adequacy. Studies in different age groups have shown that an increase in individual dietary diversity score is related to increased nutrient adequacy of the diet. Dietary diversity scores have been validated for several age/sex groups as proxy measures for macro and/or micronutrient adequacy of the diet (FANTA, 2006).

The association between dietary diversity and micronutrient adequacy of diets of women in reproductive age was assessed in five countries. Dietary diversity was significantly associated with micronutrient adequacy in all sites (Arimond *et al.*, 2010). Also the DDS was found to be a useful indicator of some specific nutrient adequacy in women from Tehran (Mirmiran, Azadbaht, & Azizi, 2006).

In Uganda, the percentage of women age 15-49 who consumed various food groups in the day or night preceding the survey were indicated as starch staples 91.2%, legumes and nuts 67.9%, dairy 23.8%, organs meat 1.2%, other meat 28.7%, eggs 3.6%, dark green leafy vegetables 41.6%, vitamin-A rich fruits and vegetables 19.6%, other fruits and vegetables 12.1%, respectively (DHS, 2005-2009). While percentage of Body Mass Index (BMI) among women age 15-49 were indicated as <18.5 is 12.1% (thinness), 18.5-24.9 is 71.3% (normal), 25.0-29.9 is 12.4% (overweight) and >30.0 is 4.1% (obese) respectively (UDHS, 2003-2009).

Seven in ten Ugandan women have a normal BMI (between 18.5 and 24.9 kg/m²). Overall, 12% of women are thin or undernourished (BMI less than 18.5 kg/m²): 9% mildly thin (BMI between 17.0-18.4 kg/m²) and 3% moderately and severely thin (BMI less than 17.0 kg/m²). Adolescents age 15-19 are somewhat more likely to be thin (14%) than older women. Rural women are more likely to be thin than urban women (13% versus 8%). Women residing in Karamoja are the most likely to be thin (33%), while women in Southwest are the least likely (5%). The percentage of women who are thin is inversely associated with education and wealth; uneducated women (20%) and those in the lowest wealth quintile (23%) are more likely to be thin than women with secondary or higher education or those in the highest wealth quintile (6%, each) (UDHS 2011). Overall the prevalence of Chronic Energy Deficiency (CED) has increased slightly over time, with CED highest for women 35 and older. This increasing prevalence among older women of childbearing age might be linked to the increasing prevalence of HIV (and its progression to AIDS with age) among women and/or the high fertility rate in this age group (Sanusi *et al.*, 2006). Rural women were more than twice as likely as urban women to be undernourished (14% of rural women vs. 6% in urban areas). Similarly, women from households in the lowest wealth

quintile were at highest risk of CED (23%). Among women with no education, CED was 18% compared with 5% for women with secondary or higher education.

1.2 Background

The prevalence of acute malnutrition among women of reproductive age in Agago district is 4.7, including 0.7 severe acute malnutrition and most women have high level of wasting. Severe acute malnutrition is defined by a very low weight for height (below -3z scores of the median WHO growth standards), by visible severe wasting. The causes of this could be due effect of the two decades Lord Resistance Army (LRA) insurgency, high work load, inadequate intake of food, diseases and poor balance diet among (GOAL, 2002/2004).

The basic infrastructure has been severely damaged by years of neglect, face serious constraints to resettlement and the revival of economically productive lives. Structures such as community roads, markets, shops, water points and storage facilities need to be rebuilt to allow production, processing and trading to resume. Many returnees have few productive assets and no start-up capital. They face labour constraints, partly because of the overgrown state of their land, and partly due to the fact that their primary means of opening up land for cultivation, Northern Uganda Rehabilitation Programme (NUREP, 2011).

According to the study conducted by Makerere University School of Public Health (MUSH) and Agribusiness Management Associates (U) Ltd (2008), there was poor dietary diversity score which is reflection of poor household dietary intake. The key factors leading to poor diet were poverty, inadequate nutritional knowledge, insecurity, lack of storage facility and variety of food crops, large families, prolonged droughts, congestion in the camps, decision making by men, and

low yields due to poor soils. The common food groups consumed by over 60% of the study households included fruits, roots and tubers, vegetables, pulses and nuts, as well as cereals. A wide variety of fruits were readily available to the populations. These comprised of oranges, mangoes, paw paws and jackfruits that are seasonal. Other wild fruits were also available such as guavas. Many of the vegetables consumed were wild, hence largely available and served as a good source of food to cope with food insecurity.

People in the region continue to face numerous challenges, including land related conflict, poverty leading to poor socio-economic indicators and outbreak of disease such as Nodding disease. According to a study conducted by Initiative for Vulnerable Populations at the University of California, Berkeley's Human Rights Center (April, 2010), average cash income for the population in northern Uganda was estimated at 7,700 Ugandan Shillings (approximately US\$ 3.50) per week which is lower than 1 US\$ dollar per day, a bench mark for poverty definition. Women have very limited information about dietary diversity. Majority of them do not know what type of food to eat at particular time and as a result, most of them do not meet their increased metabolic demands during adolescent, pregnancies and lactation which are likely to affect their nutritional status. It is against this background that this study was conducted to assess the dietary diversity among women of reproductive age (15-49 years) in Agago district in order to provide information that could be helpful to the government and all the stakeholders in designing interventions that can be use in the fight against malnutrition among women in Agago district and the country at large.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Nutrition is a main component of health and development. Healthy eating is related to the infant evolution, maternal and child health, healthier pregnancy and delivery, lower risk of chronic diseases and better academic achievement (World Health Organization, 2011). Dietary diversity (DD) and the amount of animal source foods that individual consumers are two commonly used measures for dietary quality. Healthy growth and development essentially need a balanced diet of nutrients and vitamins which includes a variety of foods from different food groups (vegetables, fruits, grains, and animal source foods) (Belachew *et al.*, 2004).

With regard to dietary factors that are associated with increased risk of chronic diseases, nutritional advice promote dietary diversity and reduced intake of non-healthy food items such as fat, salt and refined sugars (Ruel, 2003). Monotonous diets based on starchy staples lack essential micronutrients and contribute to the burden of malnutrition and micronutrient deficiencies. Food-based strategies are prepared to meet micronutrient needs as a first priority (Allen, 2008).

In resource-poor environments across the globe, low-quality, monotonous diets are the norm and the risk for a variety of micronutrient deficiencies is high. Adolescent girls and women of reproductive age are among those most likely to suffer from deficiencies. The high nutrient demands of pregnancy and lactation put women in developing countries at high risk. HIV and other infections also play a role in elevating risk for some women (Kennedy, 2005).

2.2 Factors Associated with Dietary Diversity among Women of Reproductive Age

2.2.1 Socio-demographic Factors

It has been found that older adults in Botswana consume low food variety with inadequate dairy products, fruits, and vegetables, (35.2%, 59.3%, and 22.4%) respectively (Clausen et al, 2004). Another cross sectional study among elderly respondents in Sharpeville, South Africa comparing low mean dietary diversity score of (3.41 +/- 1.34) and food variety score (4.77 +/- 2.2) with poverty parameters confirmed household food insecurity in this community (Oldewage-Theron and Kruger, 2008). However an earlier study found that respondents in the older age group had a higher mean intake for all nutrients compared to their younger counterparts (Holcomb *et al.*, 1995).

A study in Boston and Rhode Island revealed that 25% -35% of the women had dietary intakes of less than 75% of the daily recommended intakes for vitamins A, C, E and B-6, and iron and zinc and male-headed households showed greater food security according to Sebastian *et al.*, 2005. In 1995 a study in Kansas by Holcomb also established that higher education is associated with the regular consumption of a wider variety of foods. In 2005 a study by Sebastian established that higher education is strongly associated with household food security. A cross sectional study in a semi-rural setting in Louisiana found that intake of cereals/breads, dairy products, fruits/100% fruit juices and vegetables was higher in subjects with more than 12 years of education (Deshmukh-Taskar, 2007).

A higher food variety score has been found associated with urban residence (Clausen *et al.*, 2004). Other studies have established that urban residents have higher consumption frequencies

for all food categories than rural residents (Holcomb *et al.*, 1995) and that urbanization is accompanied by an improvement in micronutrient intakes (Vorster *et al.*, 2005). Also a cross sectional study in a rural area of North-East Burkina Faso (West Africa) revealed an overall poor dietary quality with a mean DDS = 5.1 (1.7) food groups (Savy *et al.*, 2005).

There are other social factors associated to dietary intake that have been established. Married individuals have been found to consume more servings of snacks/desserts, but fewer servings of alcoholic beverages than those who were unmarried (Deshmukh-Taskar, 2007). There is also evidence of an obvious difference in the dietary scores between the ethnic groups and religion. Muslim women have been found to have the lowest scores whereas Christian women had the highest (Savy *et al.*, 2005). A large household size has been found to have a positive impact on food security and dietary quality (Toulmin, 1986). While there is indication from past studies that there is positive association between cigarette smoking and alcohol use, these show evidence of little relation between these habits and nutrient intake (Marian and Tavia, 1985).

2.2.2 Socio-economic Factors

A number of cross-sectional studies assessing determinants of dietary diversity in adult populations have found that dietary diversity is associated with socioeconomic status (Torheim *et al.*, 2004; Savy *et al.*, 2005; Hatloy *et al.*, 2000). Household income as a proxy indicator for socioeconomic status has been found to be strongly associated with access to adequate food intake/food security (Sanusi *et al.*, 2006). Food access that household members have is strongly associated with the control they have over household resources or income, particularly for women and their children (Linda, 2006). Quantitative results from a US survey to establish the

relationship between income and food insecurity indicated that lower income respondents were more likely to experience food insecurity (Nicholas *et al.*, 2003).

A study by Turrell *et al.*, (2002) on socioeconomic patterning of food purchasing showed that persons from disadvantaged socioeconomic backgrounds were less likely to purchase grocery foods that were comparatively high in fibre and low in fat, salt and sugar. Those employed in blue-collar (manual) occupations and residents of low income households purchased fewer types of fruit and vegetables, and less regularly, than their higher status counterparts.

Seasonality, location with its climate and agricultural practices are among factors that affect food availability in any locality (Hillbruner and Egan, 2008). Individual and household access to food has also been shown to be affected by demographic and socio-economic factors, accounting for variations in diet quality (Bernal *et al.*, 2003). Nutritional status is considered an outcome of biological processes that involve food utilization while dietary diversity ensures adequate nutrient intakes among groups (Styen *et al.*, 2006). Furthermore, while inverse relationships have been found between dietary diversity and chronic non-communicable diseases (Azadbakht *et al.*, 2006), it has a direct relationship with favorable nutritional status (Styen *et al.*, 2006). It is not surprising that, eating a large variety of foods, across and within major food groups has been recommended in most dietary guidelines (Jeanene *et al.*, 2006), since it is associated with a number of improved outcomes such as nutrient adequacy, anthropometric indices and improved hemoglobin concentrations (Swindale and Bilinsky, 2005).

2.2.3 Individual Health-related Factors

2.2.3.1 Health

Higher diet quality has been found to be less associated with barriers such as feeling sick and fewer problems related to illness or medications (Scott *et al.*, 1998). In Abidjan, a cross-sectional study with 100 HIV-infected respondents at different stages of the infection showed that dietary intakes of HIV-infected respondents are worsened by clinical events such as anorexia, catabolism, chronic infection, fever, nausea, vomiting, diarrhea, mal-absorption, metabolic disturbances, depression, and side effects of drugs and nutritional intakes are generally lower than recommended (Young, 1997).

A cross sectional study in Free State Region of South Africa identified a low micronutrient intake by all HIV/AIDS respondents, with a tendency towards a lower intake for those with a CD4+ count <200cells/mm³ possibly because of frequent occurrences of opportunistic infections (Casttebon *et al.*, 1995) . A prospective study carried out in Boston and Rhode Island area among 516 individuals with HIV found that macronutrient but not micronutrient intake was statistically and inversely associated with decreasing CD4+ cell counts. However a cross-sectional study in a South African Hospital with eighty-one HIV/AIDS respondents in different stages of disease, found that there was no association between disease stage and nutritional status or more advanced disease and micronutrient deficiencies (Dannhauser *et al.*, 1999) although it confirmed that HIV/AIDS respondents from this population were malnourished.

2.2.3.2 Nutritional Counselling and Education

The potential for malnutrition is exacerbated by a lack of basic nutrition knowledge. Research has shown that a higher level of nutrition knowledge is positively and significantly associated with better dietary quality (Boulanger *et al.*, 2000). A comparative study in Sudan illustrated the potential of a nutrition education program to creating more optimal nutrition. In a prospective study of 45 HIV infected adults on nutrition attitudes via questionnaires, self report of having a good diet and a belief in the importance of diet to one's health was found to be positively correlated with better dietary quality.

Along with a paucity of appropriate, accurate and useful information related to HIV and nutrition, a lot of myths and misconceptions also circulate in the community; however very little is documented about this.

Beals (2002) noted that female athletes often have inadequate diets due to lack of nutritional knowledge and nutritional misconceptions. Poor nutrition may lead to an increased chance of developing the Female Athlete Triad, a trio of low energy availability, menstrual dysfunction, and low bone mass. Physical therapists, as part of a healthcare team, must be prepared to address nutritional issues, recognize signs and symptoms of the female athlete triad, and make the appropriate intervention or referral.

2.3 Dietary Diversity

Information about the individual or household dietary diversity in populations can serve as a simple but effective indicator of various parameters that affect the nutrition of people in such groups. Food security entails three important aspects (availability, access and utilization) in the

relationship between man and food, necessary to ensure that nutrition plays its optimum role in human health. However, dietary diversity has been positively linked with these three pillars of food security (Hillbruner and Egan, 2008; Bernal *et al.*, 2003; Styen *et al.*, 2006).

Hoddinott and Yohannes (2002) studied the association between household dietary diversity scores (DDS) and dietary energy availability in ten countries. The study results suggest that the DDS has the potential for monitoring changes in dietary energy availability, particularly when resources are lacking quantitative measurements.

Nutritional problems are common in poor populations, since their diets are predominantly based on starchy staples (Styen *et al.*, 2006) and these plant-based diets are low in micronutrient contents, high in phytate and dietary fibre which inhibits the absorption of micronutrients (Lopez *et al.*, 2004). Protein-Energy Malnutrition and micronutrients deficiencies continue to be a significant public health problem in developed countries (NFCNS, 2001) among women of reproductive age, infants and children. Maternal malnutrition is a major predisposing factor for morbidity and mortality among African women (Lartey, 2008), some of the causative factors are inadequate food intake, poor diet quality and frequent infections.

The quality of diets has been shown to be directly related to dietary diversity and inversely related to malnutrition in terms of faltered growth in children, nutrient deficiencies and the risk of chronic diseases (Azadbakht *et al.*, 2006; Styen *et al.*, 2006). While a lot of studies have documented the prevalence of malnutrition in mothers and children and reported inadequate dietary intakes, very little information exists on the dietary quality and or diversity of the diets of

Nigerians. This study was therefore designed to assess the dietary diversity in six selected states in Nigeria.

Food consumption studies in Tanzania are scanty. The few surveys (Mazengo *et al.*, 1997; Rikimaru, 2000; Kinabo *et al.*, 2004) carried out to assess dietary intake among adults in Dar es Salaam, Morogoro and Iringa regions showed that diets lack diversity. Diets are composed mainly of high carbohydrate foods. The low economic status group in Dar es Salaam does not commonly consume milk and meat products, fruit and vegetables. However, in rural areas, vegetables are included in each meal but are consumed in small amounts.

The most recent food supply data confirm that a wide variety of foods are grown in Tanzania, ranging from tropical to temperate climate foods. However, the diet remains insufficiently diversified, as the major food crops are limited to starchy foods such as maize, rice and cassava (MAFC, 2006).

2.4 Risk Factors associated with Dietary Diversity

Proper nutrition is an asset to human life. Scientific evidence has shown that early nutrition affects key risk factors for developing chronic degenerative diseases during middle and late life (Dwyer 2006). Overall, good nutrition can reduce the risk of common diseases, including cancer, type II diabetes, and obesity. Through nutrition, management of symptoms for already existing health issues is possible (FDA, 2010). The direct influence of nutrition on health status and morbidity makes longer life feasible, while minimizing chronic disability. A more diverse diet is necessary to obtain suggested levels of micronutrients, rather than from a single food item. Zinc,

iron, calcium and folic acid, along with vitamins A, B6, B12 and C can be used as indicators of overall micronutrient intake (Daniels, 2009).

In recent years, the entire Latin American population has experienced an increasing prevalence of chronic diseases in association with changes made to the traditional diet, which consists of cereals, vegetables, legumes, roots, and grains. There has been a gradual transition from these foods to foods that are high in sugars and fats (Bermudez, 2003). Like many indigenous groups, the Ngöbe population of La Casona, in the Coto Brus *cantón* of Puntarenas, Costa Rica is isolated both physically and culturally from mainstream Latin American communities, limiting access to nutrient-rich and diverse foods (Hollowed, 2009). It has been shown that nutritional deficiencies tend to be more prevalent in rural and marginalized communities and populations with a lower socioeconomic status, such as La Casona (Bermudez, 2003). Thus, we expect to find a deficiency of one or more micronutrients in the Ngöbe diet according to internationally recommended intake values.

Over the past 15 years, there is increasing evidence that the structure of dietary intakes and the prevalence of obesity around the developing world have been changing at an increasingly rapid pace (Popkin, 2002b). While there is some evidence to link urbanization with these changes, even less is understood about the role of globalization. Urbanization is accompanied by shifts in a broad array of elements such as access to mass media, modern technologies related to work and leisure and transportation, and enhanced access to a variety of foods across all seasons of the year, inter alia. Many of these changes may be attributable as well to the increased flow of goods, services, and information associated with globalization. Increased globalization may

bring shifts in occupational structures as industries develop and expand in response to world markets; greater access to international mass media programming; and enhanced access to non-traditional foods as a result of changing prices and production practices as well as trade. Because of the multiple shared paths through which urbanization and globalization may influence food availability and choices in developing countries, it is difficult to unravel effects of the two sets of forces on diet and health.

The clustering of populations in urban centers affects dietary patterns by changing the way people interact with their environments, as well as by changing the environments themselves in ways that transform food production and distribution systems. For example, urban living is associated with occupational patterns less compatible with home food production and consumption, and often with limited land availability for cultivation. Urbanization brings infrastructure and resources such as improved transportation and refrigeration systems. Today, in developing countries undergoing rapid urbanization combined with globalization and urbanization, the process includes changes in the socio-cultural environment such as mass media marketing and the widespread availability of less traditional foods, which play an important role in influencing tastes and preferences (Chopra, Galbraith and Darnton-Hill 2002; Lang 1999; Evans *et al.*, 2001).

Growing foreign investment has contributed to the rise of fast food restaurants and western-style supermarkets, which may also influence consumer food choices by offering greater variety, quality, convenience and competitive prices in high-value added foods, in addition to perceived higher social desirability (Regmi and Gehlar, 2001; Reardon, Timmer and Berdegue (2003). These changes in the food environment are occurring at a rapid pace. As developing countries

become more urbanized, these changes are expanding beyond large urban centers and into smaller cities and towns, mirroring the pattern that occurred over time in industrialized countries. For example in China, western-style supermarkets are now found in smaller cities and towns along the Eastern coast and in the interior (Reardon and Berdegue, 2003).

Several studies in developing countries have shown in the past that compared with rural diets, urban diets tended to include higher levels of milled and polished grains (for example rice or wheat, rather than corn or millet), foods higher in fat (more animal products), sugar, food prepared away from the home, and processed foods (Popkin and Bisgrove, 1988). Over time, migrants to urban areas tend to adopt urban dietary patterns, though the timing of such changes has not been studied (Popkin and Bisgrove, 1988). However, as infrastructure and resources typical of urban areas become more widespread, the extent to which "urban" dietary patterns are being adopted in rural towns is not known

2.3 Measurement of Dietary Diversity

Dietary diversity can be measured at the household or individual level through use of a questionnaire. Most often it is measured by counting the number of food groups rather than the food items consumed. At the household level, dietary diversity is usually considered as a measure of access to food (for example households' capacity to access costly food groups); while at the individual level it reflects dietary quality, mainly the micronutrient adequacy of the diet. Although the reference period can vary, it is most often the previous day or week (Food and Agriculture Organization, 2011).

Dietary diversity instruments have recently become the preferred method for studying dietary adequacy in developing countries. These score points are based on different food items or food groups in a certain given period ranged from 1 to 15 days (Administrative Committee on Coordination/Subcommittee on Nutrition, 2005).

Obtaining detailed data on household food access or individual consumption can be time consuming, expensive, and requires a high level of technical skill both in data collection and analysis. The dietary diversity questionnaire is a tool that provides a more rapid, user-friendly and cost-effective approach to measure changes in dietary quality at the household and individual level. Administration and scoring/analysis of the tools are straightforward and quick. Dietary diversity is a qualitative measure of food consumption that reflects household access to a wide variety of foods, and is also a proxy of the nutrient adequacy of the diet for individuals.

Dietary diversity score is created by summing either the number of individual foods or food groups consumed over a reference period. This may constitute a simple count of food groups that a household or an individual has consumed over the past 24 hours. Calculation is slightly different if used at household or individual level and carries different meanings. Household dietary diversity score (HDDS) reflects, in a snapshot form, the economic ability of a household to consume a variety of foods and its increase is associated with socio-economic status and household food security (Hoddinot & Yohannes, 2002). Individual dietary diversity score (IDDS) aims to capture nutrient adequacy. Many studies in several different age groups have shown that an increase in individual dietary diversity score is related to increased nutrient adequacy of the diet.

CHAPTER THREE

3.0 Problem Statement

Eating a diversity of foods leads to a healthy diet, and is associated with positive health outcomes such as reduced mortality (Michels *et al.*, 2002). However, there is inadequate information on dietary diversity among women of reproductive age in Agago district. In addition little information exists on what factors influence dietary diversity among this group. Inadequate dietary intake to meet the increased metabolic demands among adolescent girls, pregnant and lactating mothers is likely to affect their nutritional status. Girls need adequate nutrition for growth and development of pelvis, foetus, health maternal weight gain, proper immunity and to reduce maternal and infant morbidity and mortality (UDHS, 2006).

Agago District Health Authority has implemented some interventions to improve dietary diversity of women such as provided training to the health workers; harmonized nutrition communication and messaging campaigns targeting local behavior change needs; setting up of Village Health Team (VHT) to sensitize and report malnutrition cases; scaling up community assessment of undernutrition; nutrition counseling and education, and use of food supplements for pregnant mothers receiving antenatal care at health centres among others. However, it is not clear whether the effort made by the Agago District Health Authority has impacted much on the dietary diversity of women. This study therefore described the dietary diversity among women of reproductive age in Agago district. The study also determined risk factors associated poor dietary diversity and nutritional knowledge among women of reproductive age in Agago district.

3.1 Justification of the Study

The information generated from this study will provide program managers and policy makers at national level with a foundation for appropriate nutritional interventions and useful information to improve on nutritional care programs particularly among women of reproductive age.

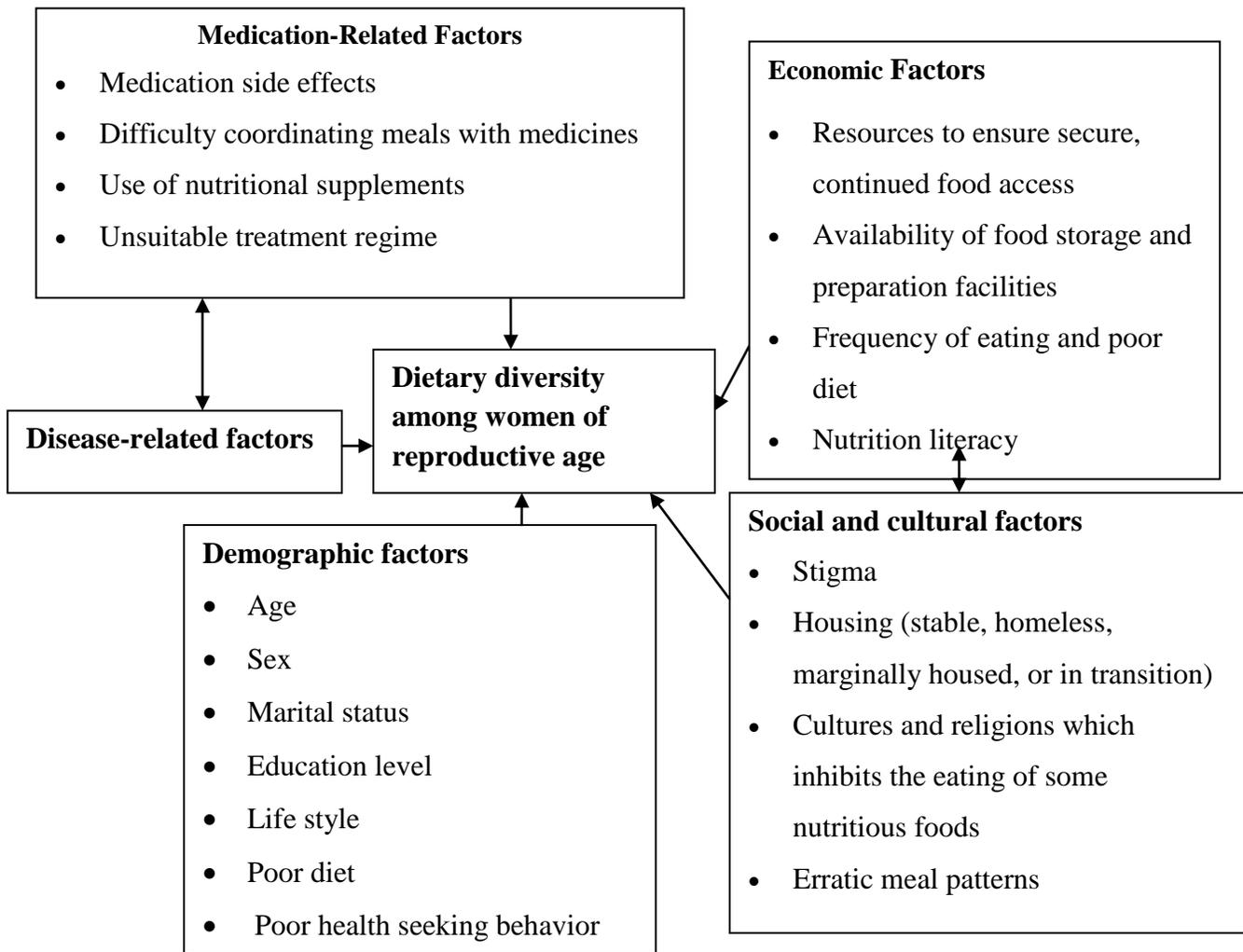
The study will help the government and the development partners in designing appropriate nutrition interventions among women of reproductive age in Agago district.

The study will help the district leaders especially the nutrition department in the planning of the nutritional programme.

The study will help in creating awareness about dietary diversity, nutrition status, counseling and nutrition education among women of reproductive age.

The study will also act as a basis for future research for those who may want to do a similar research in that area.

3.2 Conceptual Framework showing the relationship between factors associated with dietary diversity among women



Dietary diversity among women of reproductive age may be influenced by economic, social, cultural, medical and disease related factors. However, it may also be affected by both individual factors such as age, gender and education and social factors such as marital status, nature of residence, ethnicity, and religion, taking of alcohol, smoking and number of people in household. Also individual health related factors like ill health or being unwell.

3.3 Research Questions

1. What is the level of knowledge of dietary diversity among women of reproductive age (15-49 years) in Agago district?
2. What is the dietary diversity of women of reproductive age (15-49 years) in Agago district?
3. What are the factors associated with dietary diversity among women of reproductive age (15-49 years) in Agago district?

3.4 General Objective

The general objective of this study was to assess factors associated with dietary diversity among women of reproductive age (15-49 years) in Agago district so as to provide information that will help the central/local government and all the stakeholders in addressing factors influencing dietary diversity among women of reproductive age in Agago district and the country at large.

3.5 Specific Objectives

The specific objectives of this study were

1. To assess the level of knowledge of dietary diversity among women of reproductive age (15-49 years) in Agago district?
2. To determine the dietary diversity of women of reproductive age (15-49 years) in Agago district.
3. To identify factors associated with dietary diversity among women of reproductive age (15-49 years) in Agago district.

CHAPTER FOUR

METHODOLOGY

4.1 Study Site/Setting

The study was conducted in Agago district in Northern Uganda. It is one of the newest districts in Uganda. It was established by Act of Parliament and began functioning on 1st July, 2010. Previously, it was part of Pader district. The district is part of the Acholi sub-region. It is bordered by Kitgum district to the north, Kotido district to the northeast, Abim district to the east, Otuke district, to the south, and Pader district to the west. The location of the district headquarters is located approximately 80 kilometres by road, southeast of Kitgum town and approximately 510 kilometres from Kampala. The coordinates of the district are: 02 50N, 33 20E. It has population 299,700 people (UBOS, 2012). The land is generally flat with isolated hills and has fairly fertile soil which receives an average of 1,500mm of rainfall. The major agricultural practices in this zone are crop cultivation consisting of sorghum, millet, sesame, ground nuts, pulses and some rearing of cattle and small ruminant. Maize and upland rice production is also taking root in this zone.

HIV prevalence rates is high (8.2%) comparable to those of urbanized Kampala and the central region (8.5). This could be due to the linkages of culture, insecurity and poverty (MOH, 2004/5).

4.2 The study Population

The study population comprised of women of reproductive age (15-49 years) found in Agago district during the study period.

4.3 Eligibility Criteria

4.3.1 Inclusion Criteria

All women of reproductive age (15 – 49 years) resident in Agago district during the study period.

4.3.2 Exclusion Criteria

All women of reproductive age (15-49 years) who were too sick and un-able to get through the interview.

Women of reproductive age (15-49 years) who were visitors or who had stayed in Agago district for less than 6 months.

Women of reproductive age (15-49 years) who had un-usual dietary intake in previous 24 hours such as feasts at functions and celebrations.

4.4 Study Design

The study was a cross-sectional study employing both quantitative and qualitative methods of data collection.

4.5 The Sample Size Estimation

The Kish-Leslie formula was used to determine the required sample size.

$$n = \frac{Z_{\alpha/2}^2 PQ}{\delta^2}$$

Where n = required sample size, $Z_{\alpha/2} = 1.96$ (Critical value of the standard normal distribution corresponding to error rate $\alpha/2$ at the level of significance $\sigma = 0.04$ (4%), P = representing the prevalence malnutrition among women of reproductive age in Uganda = 12.1% (UDHS 2003-2009). The principle investigator used the prevalence of malnutrition among women of

reproductive age because he did not find any study on dietary diversity in the region. Malnutrition was used as a proxy for poor dietary diversity and $Q = (1-P)$, which represents the estimated proportion of the population with adequate dietary intake.

Using the formula above

$$n = \frac{1.96^2 \times 0.121 \times 0.879}{0.04^2} = 255$$

10% of the original sample size was added to cater for non-response

$$\text{Therefore } \frac{255 \times 10}{100} = 255$$

$$n = 22 + 255 = 280.$$

4.6 Sampling Procedure

All women of reproductive age (15-49 years) during the study period who fulfill the inclusion criteria were selected for the study in a way that all of them had equal opportunity of being selected to participate in the study. The principal investigator and the two research assistants were responsible for client recruitment and enrolment. Respondents were interviewed using a semi structured questionnaire. A pre-tested, pre-coded, standardized questionnaire was used to capture quantitative data.

4.7 Qualitative Data Collection

Focus group discussion was used to collect data on the level of knowledge of dietary diversity. Participants for focus group discussions (FGD's) were purposively selected. The participants were contacted and given an appointment to participate in the FGD's. FGDs were held for young

women (15–35 years) and older women (36 years and above). Each focus group comprised of six purposively selected respondents. These groups were chosen because they were more likely to have similar characteristics in relation to dietary diversity and lifestyles and therefore easier for them to respond to questions while in these respective groups. There was a time keeper, note taker and interviewer and a tape recorder which was used. At the end of the exercise transcription was done by interviewer. This exercise lasted for two days where by each interviewer carried out two FGD per day and each lasting for 50 minutes. The overall is exercise lasted for two weeks.

4.7.1 Sampling Method

The principal investigator obtained the list of all the sub-counties, parishes and village within Agago district from the Agago District Local Government headquarter. Purposive sampling method was used to selected 5 sub-counties out of 14, these included Paimol, Omiya, Wol, Kalongo Town Council and Patongo Town Council. From each Sub-county, 2 parishes were selected simple random sampling making a total of 10 parishes. From each Parish 4 villages were selected using simple random sampling and from each village 7 respondents were selected using systematic sampling from each household after certain intervals until the required number of respondents (280 responds) were obtained.

4.8 Study Variables

4.8.1. Dependent Variable

The dependent variables was

Dietary diversity among women of reproductive age.

4.8.2. Independent Variables

Independent variables included:

Age, gender, education status, nature of residence, marital status, region of origin, religion, number of people in household, state of health and nutritional counselling and level of knowledge among others.

4.9 Data Collection Procedure

4.9.1 Quantitative Data

Respondents were interviewed using a semi-structured questionnaire to capture their socio-demographic, socio-economic and individual health related factors among women of reproductive age (**Appendix III**).

To determine the type of foods eaten in the previous 24 hours, respondents were asked to tell the interviewer what they had eaten or drunk at specific time periods to represent the different meal types such as breakfast, lunch, supper and snacks times. The food and drinks mentioned were recorded on a 24 hour dietary recall tool in the respective time periods of the day (**Appendix IV**).

4.9.2 Qualitative Data

Focus group discussion was used to generate information about knowledge, beliefs and practices on dietary diversity among the respondents. Four FGDs, each group comprised of 6 purposively selected respondents. They were divided into two groups (15-35 years) and (36-49 years) respectively. This is because the two age groups were expected to differ in dietary diversity and

life styles due to their physiological activity (**Appendix V**). Data from focus group discussions were tape recorded in addition to note taking.

4.10 Quality Control

4.10.1 Training of Research Assistants

Two research assistants were recruited and trained to assist the principal investigator in the data collection exercise. Their role was to seek consent from selected respondents and proceed to carry out individual interviews. Their training included revision of all study tools to ensure common understanding of all questions, questioning and probing techniques to help minimize loss of the intended meaning and how to fill in the questionnaires.

4.10.2 Tools

Two data collection tools, namely the semi-structured questionnaire and FGD guide were used. The study tools were in both English and Luo, the most common local language. Those translated into Luo were used during interview with respondents who do not speak English.

4.10.3 Pre-testing of Study Tools

After obtaining the permission from the Agago District Health Officer, the questionnaire was pre tested at Kalongo Town Council on five women of reproductive age for relevancy, ease of understanding and appropriateness on dietary diversity of women of reproductive age during the training of research assistants. Thereafter adjustments and corrections were effected to the tools after review following the pretest.

4.10.4 Field Editing of Data

Interviewers were supervised and the interview process was monitored by the principal investigator. The principal investigator had to check for data accuracy, consistency and completeness on a daily basis. Anomalies that aroused were corrected appropriately by contacting respondents by telephone and numbering and coding the questionnaires properly.

4.10.5 Data Entry

The data entry clerk was employed to enter the data to ensure accuracy and consistency of data in Epi Data software, version 3.1. Validation checks were applied to check if the responses and codes entered were consistent and within permissible range by running frequency tables and some fields were edited to create the correct files. Data files were then created and further checking was done to ensure consistency and completeness. The FGD data were recorded and transcribed from the tapes and compared with the written notes to check for consistency, completeness and anomalies in the notes.

4.11 Data Management and Analysis

4.11.1 Data Management

4.11.1.1 Quantitative Data

To determine the dietary diversity score of the respondents; the number of food groups eaten by respondents were determined by a count of a set food groups (Cereals, Vitamin A Rich vegetables and Tubers, White tubers and roots, Dark green leafy vegetables, Other vegetables, Vitamin A Rich fruits, Other fruits, Organ meat (iron rich), Flesh meats, Eggs, Fish, Legumes, nuts and seeds, Milk and milk products, Oils and fats). For example breakfast was considered to

have been eaten between 6:00 and 10:00 am while snacks was considered to have been eaten before or after the major meal times of breakfast, lunch (12:00-4:00 pm) and supper (8:00pm-12:00 am) (**Appendix IV**).

Using the FAO/Nutrition and Consumer Protection Division recommended questionnaire for data collected on individual Dietary Diversity Score (IDDS) (FAO, 2010), a record of the 24 hour recall of all foods eaten by the respondents were taken and classified into the 12 food groups, namely; Cereals, Vitamin A Rich vegetables and Tubers, White tubers and roots, Dark green leafy vegetables, Other vegetables, Vitamin A Rich fruits, Other fruits, Organ meat (iron rich), Flesh meats, Eggs, Fish, Legumes, nuts and seeds, Milk and milk products, Oils and fats. Each food group eaten by a respondent was given a score of 1 and the total individual scores were computed. The total individual food scores were first categorized into terciles, namely Low IDDS terciles was equivalent to low dietary diversity (0 to 3 food groups); Medium IDDS terciles equivalent 4 to 5 food groups and High IDDS terciles means 6 or more food groups. For further analysis these groups were dichotomized into two categories: where 0 to 5 was considered low dietary diversity score and 6 and above groups were considered high dietary diversity score.

The factors associated with dietary diversity were classified into socio-demographic, socio-economic, knowledge and individual health and related factors. The data was entered into a data entry screen using Epi Data software, version 3.1. It was then exported to STATA version 10 for analysis.

4.11.1.2 Qualitative Data

The recorded audiotapes from the group discussions were transcribed and from the transcribed conversations, patterns of opinions and beliefs were listed using direct quotes and paraphrasing common ideas. All data that related to the already classified patterns were identified and expounded on. Related patterns were combined into sub-themes thus creating meaningful categories to which codes were assigned. Themes were identified by bringing together components or fragments/subthemes of ideas or experiences, which seemed meaningless when viewed alone.

4.11.2 Data Analysis

4.11.2.1 Quantitative Analysis

Percentages of respondents with respect to food groups as per (**Appendix IV**) and number of meals eaten by each respondent in a 24 hour recall period were computed. Cross tabulations was carried out to test for association between respondent characteristics and dietary diversity score which was represented by the total number of food groups eaten by each respondent in the respective categories of low (0-5) and high (6-12). The strengths of associations between respondent characteristics and individual dietary diversity scores (IDDS) was determined using odds ratios and confidence intervals.

A correlation coefficient test was run for all the independent variables. To control for possible confounders and effect modification, variables which were found to be significant in the bi-variant analysis together with those known to be associated with dietary diversity from previous studies were run in the logistic regression model excluding those which were strongly correlated.

The variables that were put in the model included age, education level, marital status, nutrition knowledge, occupation, residence and source of food among others.

Most of the variables that were put in the logistic model were coded in a binary format. Each variable likely to be associated with dietary diversity was coded one and the other in comparison zero. Using forward step wise elimination method a final model with predictors of dietary diversity was obtained.

4.12 Ethical Considerations

Permission was sought from the Higher Degrees Research and Ethics Committee of Makerere University prior to implementation of the research study.

Oral consent was obtained from Agago district Local Government Authority. A Written consent was obtained from the participants prior to inclusion in the study. Only eligible individuals that were consented to participate were included in the study. The information obtained in this research remains confidential and was only used by the principal investigator.

There was no risk for the clients involved in the research.

The research findings aimed at improving the dietary diversity of women of reproductive age.

4.13 Dissemination of the Results

This will be done through submission to graduate school in fulfillment for the award of Master of Public Health Nutrition, dissemination of the findings of the study to the DHT through meeting or grand round and through publication of the study in peer reviewed journals.

CHAPTER FIVE

RESULTS

5.1 Introduction

A total of 280 respondents were interviewed during the period of data collection and provided data on their 24 hour recall of food groups consumed in the previous 24 hours. These respondents were also asked questions on their level of knowledge of dietary diversity, socio-demographic, economic and health related factors associated with their dietary diversity. In addition focus group discussions covering the following age groups: younger (15 to 35 years) and older (36-49 years) women were conducted. Results of the analysis of both quantitative and qualitative data are hereby presented in text format, figures and charts.

5.2 Background characteristics of the respondents

The findings in table 1 shows that 42.1% of the respondents were in the age brackets of (20-29 years) and 78.9% of them being catholic. More than two-thirds (85.6%) of the respondents belong to Acholi tribe and only 38.6% had no formal education. Nearly sixty percent (58.6%) of the respondents lived in rural areas with more than half (57.9%) of them being a farmer compared to (8.9%) of them who were in regular salaried employment. More than fifty percent (57.5%) of the respondents obtained their food from household farms with close to fifty percent (49.3%) having extended. More than half of the respondents do not drink alcohol (54.3%).

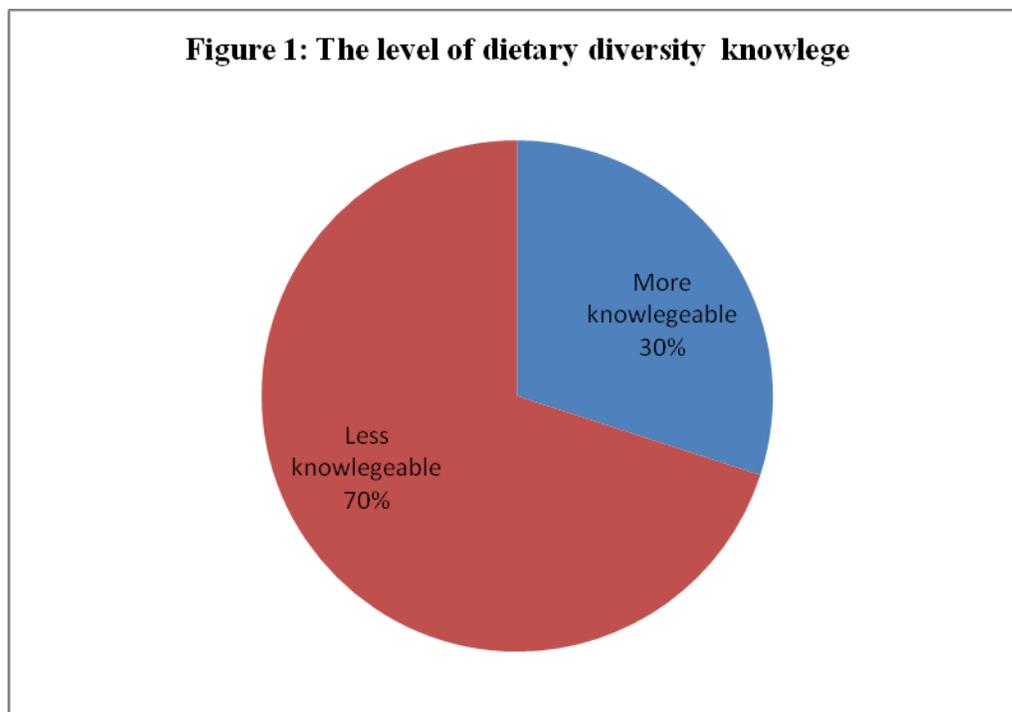
Table 1: Characteristics of respondents

Characteristics	Frequency (n = 280)	Percentage (%)
Age (Year)		
15-19	40	14.3
20-29	118	42.1
30-39	85	30.4
40-49	37	13.2
Religion		
Protestant	42	15.0
Catholic	221	78.9
Moslem	7	2.5
Others	10	3.6
Marital status		
Single	58	20.7
Married /cohabiting	178	63.6
Divorce/Separated	26	9.3
Widow	18	6.4
Tribe		
Acholi	240	85.7
Langi	26	9.3
Karamojong	12	4.3
Kumam	2	.7
Highest level of education attained		
None	108	38.6
Primary	99	35.4
Secondary	47	16.8
Diploma	18	6.4
Degree	8	2.8
Residents		
Rural	164	58.6
Urban	116	41.4
Occupation		
Famers	162	57.9
Business/self employed	63	22.5
Formal employed	28	10.0
Unemployed	27	9.6
Main source of food		
Purchase /markets	55	19.6
Household farm	161	57.5
Welfare/NGOs	2	.7
Relatives and friends	5	1.8
Both market and garden	57	20.4
Types of family		
Nuclear	113	40.4
Polygamous	29	10.3
Extended	138	49.3
Drink alcohol		
Yes	128	45.7
No	152	54.3

6.3 The level of knowledge of dietary diversity among women of reproductive age

In order to assess the level of knowledge about dietary diversity knowledge among women of reproductive age, respondents were asked to respond to questions concerning dietary diversity. Those respondents who answered more three questions correctly were considered to be more knowledgeable while those who answered only three questions and below correctly were considered to be less knowledgeable as presented in figure 1.

According to the finding in Figure 1, only 30% of the respondents were more knowledgeable about dietary diversity.

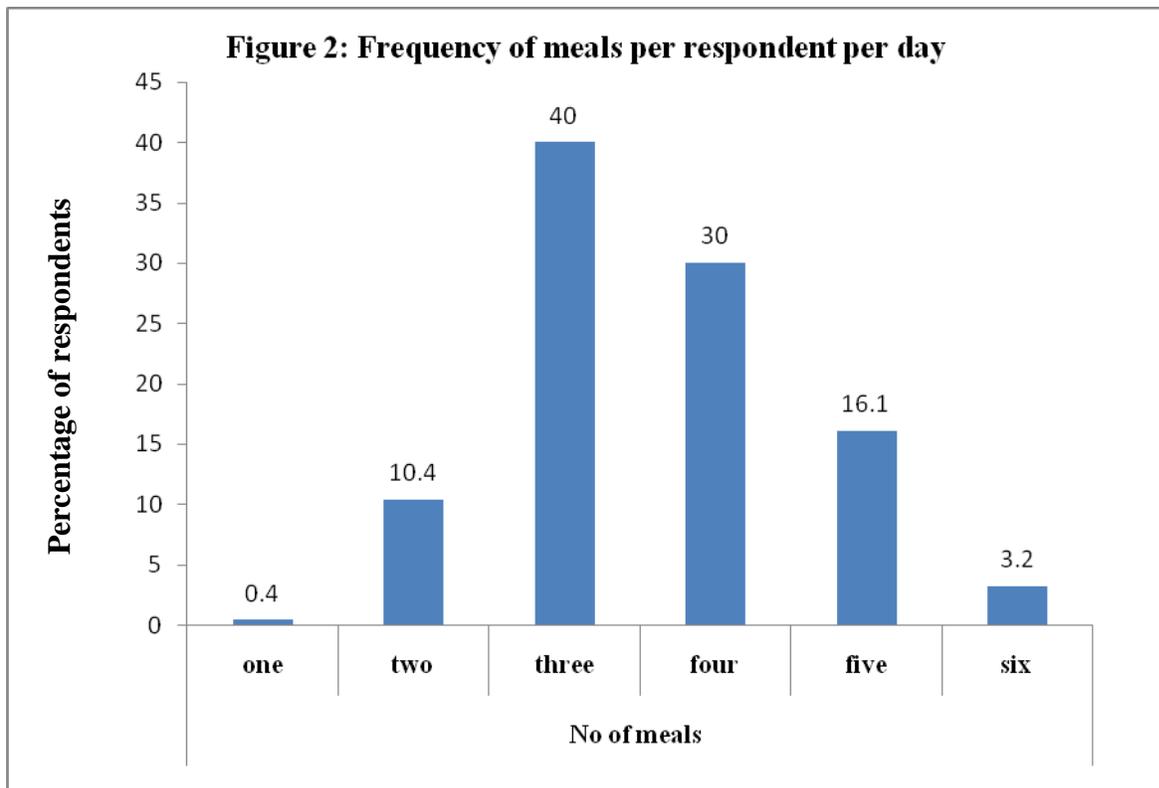


6.3 Dietary diversity scores of the respondents

6.3.1 Number of meals eaten by respondents per day

Figure 2 shows that more than half of respondents (70%) had 3-4 meals per day with only 3.2% have 6 meals per day.

Respondents in all the FGD's noted that while it would have been desirable for them to have at least 6 meals a day including the three main meals and snacks in between but they were not able to do these due to limited funds. *“Although I would have loved to eat as many snacks between meals as possible, it is not easy, so I ensure that I eat breakfast, lunch and supper at the minimum to stay healthy”*, FGD participant (35-49 years).

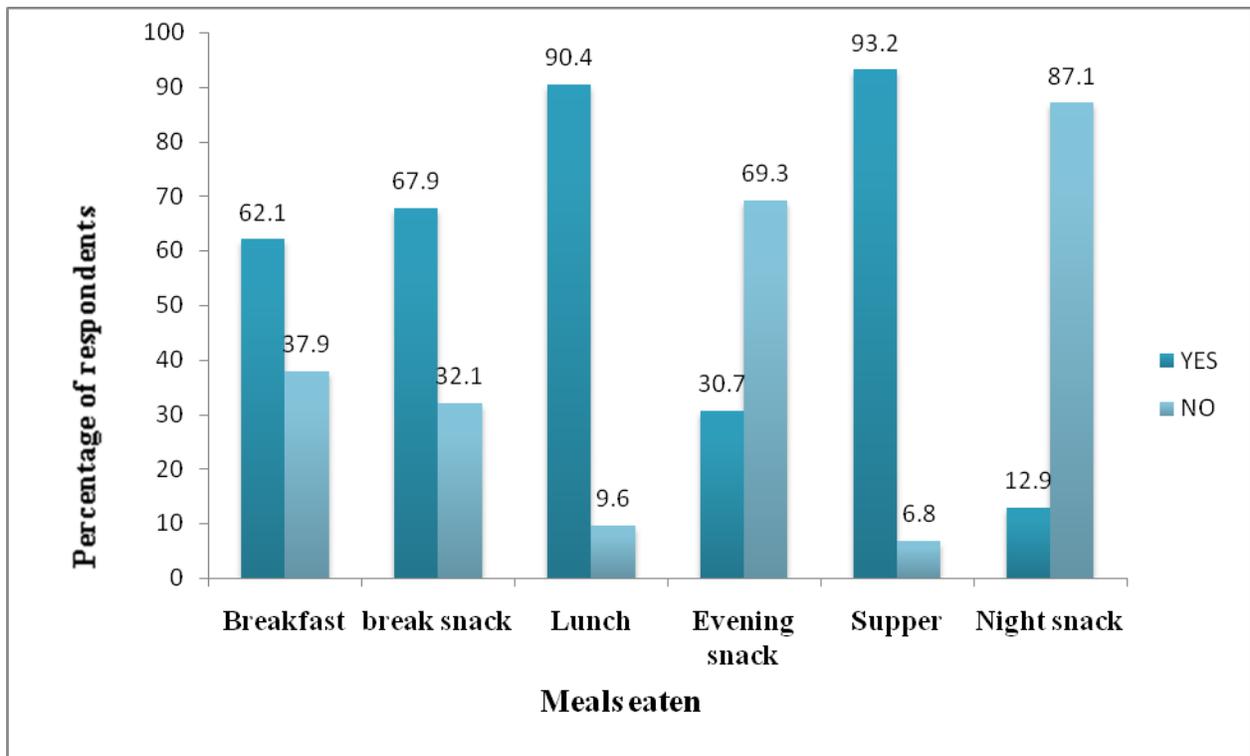


6.3.2 Meals eaten within 24 hours

According to the finding in Figure 3, only 12.9% of the respondents took a snack in the night. As evidenced by the following statement made by one participant. *“After supper, I just go straight to bed. I therefore do not need to have a snack in the night. It would also be difficult for me to keep awake just to be able to eat a snack at night”*, FGD participant (15-35 years)

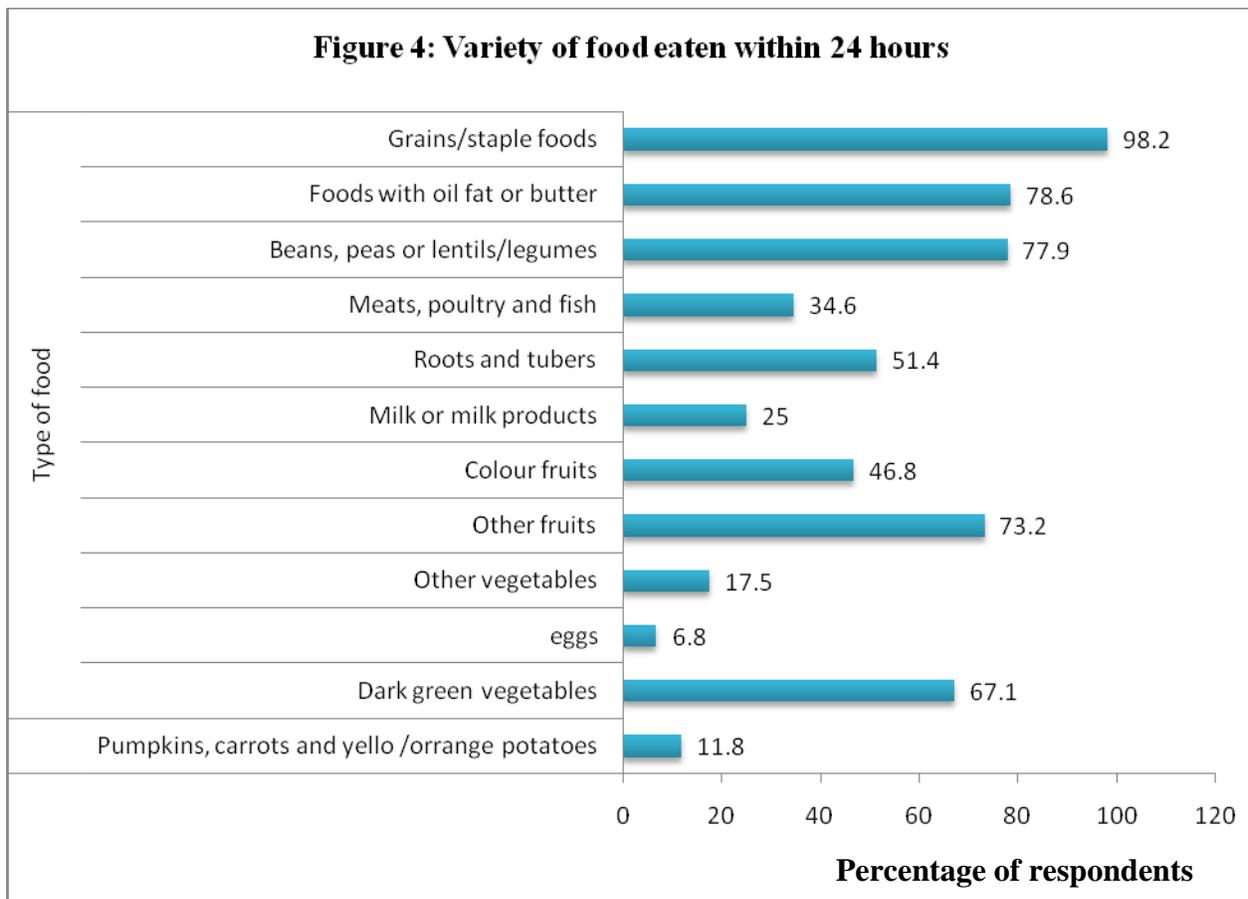
More than half of the respondents ate breakfast, break snack, lunch and supper within 24 hours with majority taking lunch and super as indicated in figure 3.

Figure 3: Meals eaten within 24 hours



5.2.3 Variety of foods eaten by respondents

The finding in figure 4 shows that the most commonly eaten foods were grains/staple foods (98.2%), foods with oil fats or butter (78.6%), beans, peas/legumes (77.9%), other fruits (73.2%) and with dark green vegetables (67.1%) and the least eaten foods were eggs (less than 10 %), milk or milk products (25%) and meat, poultry and fish (34.6%) as evidenced in the FGD response. *“It is very difficult for us to get milk since we do not have the cows, the grains, vegetables and fruits we eat are from our garden. “Buying things like meat, fish and liver is too expensive for us. It is only rich people who eat such expensive foods”*, noted by FGD participants (36-49 years).



5.2.5 Dietary diversity of food eaten within 24 hours

The data was further summarized to obtain two categories of individual dietary diversity scores (low and high IDDS), where 118 (42.1%) individuals were found with a low IDDS (0 to 5 food groups) category while 162 (57.9%) individuals had a high IDDS (6 and more food groups). Respondents reported that it was customary that different types of food stuffs would be eaten at different meals as stated below. “*What I eat for breakfast or a snack is usually different from what I eat for lunch or supper*, FGD participant (36-49 years).

Table 2: Dietary Diversity Score (DDS)

Level of Dietary Diversity	Frequency	Percentage
Low dietary diversity (0-5)	118	42.1
High dietary diversity (≥ 6)	162	57.9
Total	280	100

5.3 Factors associated with dietary diversity of respondents

According to the finding in table 3, age, education level, residence, types of family, number of people in a household, occupation, main source of food and nutrition education were found to have statistically significance association on the low dietary diversity on the respondents with $P < 0.05$ (0.037, 0.001, 0.000, 0.036, 0.001, 0.000 and 0.048)) respectively. While marital status and taking alcohol and being unwell in the last two weeks were found to have no statistical significance association on dietary diversity of respondents with $P > 0.05$ (0.211, 0.637 and 0.269) respectively as shown in table 3.

Table 3: Factors associated with low dietary diversity

Characteristics	Total N= 280 (%)		Crude Odds ratio (95% CI)	P-Value
	Frequency	Percentage		
Age				
15-29	158	56.4	0.599 (0.371-0.969)	0.037*
30-49	122	43.6		
Marital status				
Married	178	63.6	1.375 (0.835-2.263)	P = 0.211
Others	102	26.4		
Education level				
Non & primary	207	73.9	2.856 (1.570-5.193)	P = 0.001*
Secondary +	73	26.1		
Residence				
Rural	116	41.4	0.243 (0.143-0.413)	P = 0.000*
Urban	164	58.6		
Types of family				
Immediate	112	40.0	0.497 (0.302-0.818)	P = 0.006*
Extended	168	60.0		
No. of people in a household				
Less than 5 people	88	31.4	0.569 (0.336-0.964)	P = 0.036*
More than 5 people	192	68.6		
Taking alcohol				
Yes	152	54.3	1.123 (0.993-1.807)	P= 0.637
No	128	45.7		
Occupations				
Famers	226	80.7	0.323 (0.162-0.647)	0.001*
Other occupations	54	19.3		
Main source of food				
Household farm	223	79.6	0.226 (0.109-0.471)	0.000*
Others sources of food	57	20.4		
Unwell in the last 2 weeks				
Yes	53	81.0	0.713 (0.391-1.300)	P = 0.269
No	226	19.0		
Nutrition knowledge				
Yes	195	69.9	1.714 (1.005-2.924)	P= 0.048*
No	84	29.1		

5.4 Multivariate Analysis

Table 4 shows that types of family, residence and source of food were the factors which were statistically significance association with dietary diversity after the adjusting odd ratios and P-values. While age, education level, number of people in a household, occupation and nutrition knowledge were not found to have no statically significance association on low dietary diversity after the adjustment.

Table 4: Factors associated with low dietary diversity (logistic regression model)

Characteristics	COR	P-Value	AOR	P-Value
Types of family				
Immediate				
Extended	0.497 (0.302-0.818)	0.006*	0.52(0.30-0.88)	0.015#
Residents				
Rural				
Urban	0.243 (0.143-0.413)	0.000*	0.37(0.20-0.67)	0.001#
Source of food				
Household farms				
Other sources of food	0.226 (0.109-0.471)	0.000*	2.70(1.18-6.15)	0.018#

COR indicates Crude Odds ratio, AOR Adjusted Odds Ratio.

** Significant findings before adjustment at $p = 0.05$*

Significant findings after adjustment at $p = 0.05$

CHAPTER SIX

DISCUSSION

6.1 Introduction

This chapter presents the discussion of the findings of the study which was conducted to determine dietary diversity of women of reproductive age (15-49 years) in Agago district. The findings of other scholars who did similar studies elsewhere were also compared with this study.

6.2 Level of knowledge of dietary diversity among women of reproductive age (15-49 years)

This study shows that most of the respondents were less knowledgeable about dietary diversity. This could be due to limited programmes on dietary diversity that target women of reproductive age in the district. However, the level of knowledge of dietary diversity was found to have no statistically significant association with dietary diversity. This finding is in disagreement with the observations from Beals, (2002) who noted that females often have inadequate diets due to lack of nutritional knowledge and nutritional misconceptions. Poor nutrition may lead to an increased chance of developing low energy availability, menstrual dysfunction, and low bone mass.

Statistical significance association was observed between the level of dietary diversity knowledge and dietary diversity (OR: 1.714, 95% CI 1.005-2.924, P = 0.047) whereby those respondents who were knowledgeable had higher dietary diversity score and lower risk compared to those ones who were less knowledgeable with higher risk of having lower dietary diversity scores. This finding is supported by Boulanger *et al.*, (2000) research which showed

that a higher level of nutrition knowledge is positively and significantly associated with better dietary quality.

6.3 Dietary diversity of women of reproductive age (15-49 years)

It was established that the majority of the respondents had a high dietary diversity score (6 or more food groups) and most of them had more than 3-4 meals per day. This study was conducted in the months of April and May, which is a season of fruits and vegetables therefore the increased number of meals was not surprising. The most commonly consumed foods were staple foods/grains (like, sorghum, millet and posho), fats and oils, peas, beans or lentils/legumes. These is supported by the fact that millet, sorghum, maize and other grains are Uganda's staple foods and are consumed by many respondents. They are also locally grown in the northern region. This is slightly contrasting to findings from a survey carried out in Tanzania (Kinabo *et al*, 2006), which found that the frequency of consumption of meals was two to three meals per day during the wet and dry seasons respectively and the most commonly consumed foods were legumes and vegetables. The findings at Agago district are similar to findings from a Kenyan study which found the most commonly eaten foods were grains at 95.5% and Oils and fats at 96.8% (Karanja *et al*, 2008). This similarity could be explained by the possibility that study respondents mostly grow the same foods that are influenced by the same East-African geographical location.

This is also further supported by the fact that in the northern region, most of the households usually use oils/fats during food preparation to fry their food especially from sunflower where most of them extract the oil using machines from the Kalongo Mission in Agago district while others get from Mukwano factory in Lira district.

This study found that consumption of legumes which are locally grown in the area was higher than animal products such as meat and fish. Dietary intake of milk and milk products was poor with only a small proportion of respondents (25%) taking milk in the 24 hours prior to the study. This was stated by one of the FGD participants as *“It is easier for us to eat grains, fruits and vegetable, legumes and nuts for most of our meals because we locally grow them. “Buying things like meat, fish and milk is too expensive for us”*, noted by female FGD participants (15-35 years)

This finding is also in agreement with (Mazengo *et al.*, 1997; Rikimaru, 2000; Kinabo *et al.*, 2004) surveys which were carried out to assess dietary intake among adults in Dar es Salaam, Morogoro and Iringa showed diets were composed mainly of high carbohydrate foods. The low economic status group in Dar es Salaam does not commonly consume milk and meat products, fruit and vegetables. However, in rural areas, vegetables are included in each meal but are consumed in small amounts.

In this study a large proportion of the respondents (57.9%) had a higher dietary diversity score of 6 or more food groups consumed in the previous 24 hours. *“Because we leave in our own homes, we are able to grow some of our food. So we are able to prepare diverse meals including cassava and tea for breakfast, for lunch we often have groundnut sauce, fruits and vegetables and when we can buy some cooking oil for frying. In between, we tend to eat fruits and the like”*, a FGD participant (36-49 years).

6.4 Factors associated with dietary diversity

The study finding showed that residents were found to have statistically significance association with low dietary diversity of respondents (OR: 0.243 95% CI 0.143-0.413 and P = 0.000) whereby those respondents who were residing in urban had higher dietary diversity compared to those ones who were residing in the rural. This could be due to the fact that those respondents who reside in urban have smaller family size and better source of food compared to their rural counter parts. This finding is supported by Some studies report that urban residents have higher consumption frequencies for all food categories than rural residents (Holcomb et al, 1995) and urbanization is accompanied by an improvement in micronutrient intakes (Vorster *et al*, 2005).

The study also found that family type had statistically significance association with low dietary diversity (OR: 0.497 95% CI 0.302-0.818, P = 0.006). Respondents with immediate family were found to have higher dietary diversity compared to those ones with extended family. This is because higher number of people in a household required more food to feed them compared fewer number of people in a household. This finding is supported by FGD whereby one respondent stated that *“I have ten people in this house and we cannot afford to eat food like meat, eggs and milk frequently because it will not be enough for the family. We mostly cook beans, peas, vegetables and other foods which we grow in our farm”*. FGD participant (36-49 years).

Further finding of study revealed that source of food had statistically significance association with low dietary diversity (OR: 0.226, 95% CI 0.109-0.471, P = 0.000). Respondents who had household farms as their main source of food had higher dietary diversity compared to those

ones with other sources of food. This could be that household farms as a main source of food guarantee better food security and diet diversity. This finding is supported by FGD whereby one respondent stated that *“I always get the most of the foods (vegetables, fruits, bean, maize, legumes, cassava, sweet potatoes and yams among others) from my own farms which makes it easier to diversify on my diet”*. FGD participant (36-49 years).

6.7 Study Limitations

Using 24 hours recall was a problem to some respondents as some of them forget to recall the food they ate in the last 24hours. The principal investigator guided the respondent on how to recall the foods they ate in a simple way and also the study subjects were not too young and too old to recall the foods they ate.

One of the assumptions in this study was that the 24 hour recall period provided an indication of an individual’s habitual diet. This was prevented by excluding respondents that had had un-usual dietary intake in previous 24 hours such as feasts at functions and celebrations.

The study used dietary diversity as a proxy measure for dietary quality which does not specifically measure the recommended nutrient intake. However, this has been proven by previously done dietary studies to adequately reflect nutrient adequacy.

Some respondents were not willing to give information because of fear and some were expecting to be paid for the information they gave. The principal investigator presented to them an introductory letter to assure them that this study is for academic purpose only and the result from this could be use by the responsible stakeholders to address the problems.

CHAPTER SEVEN

CONCLUSION AND RECOMMENDATIONS

7.1 Conclusions

Basing of the findings of the study, it can be concluded that:

The level of knowledge of dietary diversity among women of reproductive age (15-49 years) in Agago district was very low (30%). However, the level of knowledge of dietary diversity was found to have no statistically significance association with dietary diversity.

Most of the women of reproductive age (15-49 years) in Agago district have higher dietary diversity (57.9%). This is due to availability of foods such as fruits and vegetables which were both grown and wild ones which were collected from the bush.

Factors associated with low dietary diversity among women of reproductive age (15-49 years) in Agago district with were types of family, residents and source of food. This is because the smaller the family size, the higher the dietary diversity, urbanization improve on micronutrient and household farms improved guarantee food security hence dietary diversity.

All in all, despite low level of knowledge of dietary diversity among the women of reproductive age (15-49 years) in Agago district, their dietary diversity was relatively high. This is due availability various types of food such as staples, fruits and vegetables among others.

7.2 Recommendations

From the findings of the study, it was recommended that:

The government and other stakeholders need to increase on the intake of a variety of recommended food groups including vitamin A rich foods, fruits and vegetables. This can be guided by development and use of job aids during nutritional counseling.

There is need for the government and development partners to increase availability of various food types for example by promoting keeping of cows, fish farming and poultry keeping among others to provide women with proteins and vitamins which are good for their health and the health of their babies.

There is need for the government and other stakeholders to support women by introducing projects which could help in increasing their household income hence widening their dietary choice and diversity as well.

Further research need to be done on the nutrition status of women of reproductive age (15-49 years) in Agago district in order to find out whether the higher dietary diversity translate to good nutrition status.

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APPENDIX I

TIME FRAME

S/n	Activity description	Timeline (months 2012-2013)														Person responsible	
		O	N	D	J	F	M	A	M	J	J	A	S	O	N		D
1	Proposal writing	X	X	X	X	X	X										Investigator
2	Proposal submission				X	X											Investigator
3	Proposal viva voice				X	X											Investigator
4	Data collection						X	X									Investigator Research assistants
5	Data entry						X	X									Investigator & statistician
6	Data analysis						X	X	X								Investigator & statistician
7	Writing dissertation report							X	X	X	X						Investigator
8	Submission of dissertation								X	X	X	X					Investigator
9	Viva voice												X	X	X	X	Investigator

APPENDIX II

BUDGET

S/no	Items bought	Justifications	No Require	Unit Cost (Ush)	Day	Total Cost (Ush)
1	Computer	For typing the research work	1	1,000,000	-----	1,000,000
2	Printer	For printing the research work	1	350,000	----	350,000
3	Printer ink	For printing research work	1	120,000	----	80,000
4	Modern	For research work	1	100,000	----	100,000
5	Modern air time	For buying internet services	1	25,000	-----	200,000
6	Flash disk	For storing research data	1	70,000	----	70,000
7	Reams of papers	For printing and the research work	4	15,000	-----	60,000
8	Questioners	Photocopying questionnaire	280	2,000	-----	560,000
9	Transport and feeding	Investigator transport from Kampala to Agago district	2	75,000	2	130,000
10	Accommodation	Accommodations for investigator during data collection	1	30,000	20	600,000
11	Investigator feeding	Feeding while in the field	1	10,000	20	200,000
12	Hiring research assistants	For data collection	10	30,000	5	1,500,000
13	Hiring motor cycles	For transporting the research assistants	5	30,000	5	750,000
14	Training materials	For training research assistants	-	150,000	2	150,000
15	Bags	For carrying questionnaires	10	20,000	5	200,000
16	Mineral water	For research assistants	3x10	30,000	5	150,000
17	Transport and communication	For the investigator during data collection	1	50,000	5	1,400,000
18	Pens	For recording the respondents responses	20	500	-----	10,000
19	Stapling machine	For stapling the questionnaires	1	20,000	-----	20,000
20	Stapling wire	For stapling questionnaires	3	2,000	-----	6,000
21	Statistician	For data analysis			-----	700,000
19	Data entry	Entering raw data			-----	150,000
22	Consultation	During data collection and analysis			-----	200,000
23	Binding	Spiral binding	6	5,000	----	30,000
		Hard cover binding	6	20,000	-----	120,000
	Total					8,736,000
	Miscellaneous	For any eventuality	-----	-----	-----	264,000
GRANT TOTAL						9,000,000

APPENDIX III

QUESTIONNAIRE FOR RESPONDENTS

Dear respondents, I am Oroma Ray a student of Makerere University conducting a research on factors associated with dietary diversity among women of reproductive age (15-49 years) in Agago district as part of the requirements for the award of a Masters of Public Health Nutrition Degree of Makerere University. I am requesting you to participate in this study by answering the questions provided. The information given will be use for academic purpose only and will be treated with highest level of confidentiality.

Date.....Sub-county.....Parish.....Village.....

Instruction:

Please tick the option(s) in the box or write the appropriate answer in the space provided.

1. Socio-demographic, socioeconomic and health related factors

1.1 Demographic factors

1.1.1 Which age bracket do you belong?

(1) (15-19) (2) (20-29) (3) (30-39) (4) (40-49)

1.1.2 Please state your tribe?

(1) Acholi (2) Lango (3) Karamojong (4) Others (Specify).....

1.1.3 Please state your religion?

(1) Protestant (2) Catholic (3) Muslim (4) Other (Specify).....

1.1.4 What is your current marital status?

(1)Single (2) Married/cohabiting (3) Separated/divorced (4) Widow/widower

1.1.5 What is your highest level of education attained?

(1) Uneducated (2) Primary (3) Secondary (4) Diploma (5) Degree

(6) Others (Specify).....

1.2 Social factors

1.2.1 Please describe your current residence.

(1) Urban (2) Rural

1.2.2 What family type do you have?

(1) Monogamous (2) Polygamous (3) Extended family (4) Other (Specify).....

1.2.3 How many people are living in your household?

1.2.3.1 Total number ofpeople.

1.2.3.2 Total number of children of the mother (respondent).....

1.2.4 Do you smoke cigarettes?

(1) No (2) Yes

1.2.5 Do you drink alcohol?

(1) No (2) Yes

2. Socio-economic information

2.1 What is your main occupation?

(1) Student (2) Casual worker/part-time (3) Employed (4) Farmer

(5) Business (Self employed) (6) Unemployed (7) Other (Specify)

2.2 Are you the head of your household?

(1) No (2) Yes

2.3 If no, what is the occupation of the head of the household?

(1) Employed (4) Farmer (2) Business (Self employed)

(5) Unemployed (3) Casual worker/part-time (6) Other (Specify)

2.4 What is the main source of food for your household?

- (1) Purchase (Markets) (2) Household farm (3) Welfare/NGO support
(4) Relatives and friends (5) Other (Specify)

3.0 Nutrition Knowledge

3.1 What is the true meaning of the term “nutrition”? (Choose one)

- (1) Good foods of varying types (2) Relationship between food eating and body health
(3) Condition of being fat (4) Ability to be able to select foods
(5) I don't really know (6) Others (specify).....

3.2 Have you ever been exposed to any nutritional education? (1) YES (2) NO

3.3 Which of the following is the best method for acquiring good nutrition? (**Tick one**)

- (1) To eat sufficient and varying types of foods
(2) Only eating of foods rich in vitamins
(3) Selecting foods that are rich in protein
(4) Taking tablets as supplements
(5) Others (specify).....

3.4 Is there a relationship between the foods that we eat and some health disorders that we get?

- (1) Yes (2) No (3) I don't know

3.5 IF the answer to 3.4 above is yes, can you name at least one example of such health disorder?

- (1) (02)..... (3).....

3.6 What do you understand by the term malnutrition?

.....

3.7 What are the causes of malnutrition?

.....

4. Health and Risk Factors associated with Poor Dietary Diversity

4.1 Have you been unwell in the last 2 weeks?

(1) Yes (2) No

4.2 If yes, have you been taking any drugs?

(1) Yes (2) No

4.3 If yes, have you had any side effects?

(1) Yes (2) No

4.4 If yes, please specify what side effect(s).

.....

4.5 Do you have diet complication problem?

(1) Yes (2) No

4.6 If yes, what are the complications?

.....

4.7 Which of the diseases (s) are you suffering from?

(1) Cancer (2) Diabetes (3) Hypertension (4) Heart diseases

(5) None

Thanks for your cooperation

APPENDIX IV

DIETARY DIVERSITY QUESTIONNAIRE

Please describe the foods (meals and snacks) that you ate or drank yesterday during the day and night, whether at home or outside the home. Start with the first food or drink of the morning.

(Write down all foods and drinks mentioned. When composite dishes are mentioned, ask for the list of ingredients. When the respondent has finished, probe for meals and snacks not mentioned).

Breakfast	Snack	Lunch	Snack	Supper	Snack

Source: Nutrition & Consumer Protection Division, Food & Agriculture Organization

(2010).

(When the respondent recall is complete, fill in the food groups based on the information recorded above. For any food groups not mentioned, ask the respondent if a food item from this group was consumed).

Question Number	Food group	Examples	YES=1 NO= 0
1	CEREAL S	corn/maize, rice, wheat, sorghum, millet or any other grains or foods made from these (e.g. bread, noodles, porridge or other grain products) + <i>insert local foods e.g. ugali, nshima, porridge or paste</i>	
2	WHITE ROOTS AND TUBERS	white potatoes, white yam, white cassava, or other foods made from roots	
3	VITAMIN A RICH VEGETABLES	pumpkin, carrot, squash, or sweet potato that are orange inside + <i>other locally available vitamin A rich vegetables (e.g. red sweet pepper)</i>	

	AND TUBERS		
4	DARK GREEN LEAFY VEGETABLES	dark green leafy vegetables, including wild forms + <i>locally available vitamin A rich leaves such as amaranth, cassava leaves, kale, spinach</i>	
5	OTHER VEGETABLES	other vegetables (e.g. tomato, onion, eggplant) + <i>other locally available vegetables</i>	
6	VITAMIN A RICH FRUITS	ripe mango, cantaloupe, apricot (fresh or dried), ripe papaya, dried peach, and 100% fruit juice made from these + <i>other locally available vitamin A rich fruits</i>	
7	OTHER FRUITS	other fruits, including wild fruits and 100% fruit juice made from these	
8	ORGAN MEAT	liver, kidney, heart or other organ meats or blood-based foods	
9	FLESH MEATS	beef, pork, lamb, goat, rabbit, game, chicken, duck, other birds, insects	
10	EGGS	eggs from chicken, duck, guinea fowl or any other egg	
11	FISH AND SEAFOOD	fresh or dried fish or shellfish	
12	LEGUMES, NUTS AND SEEDS	dried beans, dried peas, lentils, nuts, seeds or foods made from these (eg. hummus, peanut butter)	
13	MILK AND MILK PRODUCTS	milk, cheese, yogurt or other milk products	
14	OILS AND FATS	oil, fats or butter added to food or used for cooking	
15	SWEETS	sugar, honey, sweetened soda or sweetened juice drinks, sugary foods such as chocolates, candies, cookies and cakes	
16	SPICES, CONDIMENTS, BEVERAGES	spices (black pepper, salt), condiments (soy sauce, hot sauce), coffee, tea, alcoholic beverages	
Household level only	Did you or anyone in your household eat anything (meal or snack) OUTSIDE the home yesterday?		
Individual Level	Did you eat anything (meal or snack) OUTSIDE the home yesterday?		

Source: Nutrition & Consumer Protection Division, Food & Agriculture Organization

(2010).

Thanks for your cooperation

APPENDIX V

FOCUS GROUP DISCUSSION GUIDE

Perceptions, beliefs and attitude about feeding among women of reproductive age

1. What do you understand by healthy feeding?
2. Should women of reproductive age pay much attention to their feeding habits? (Why?)
3. In your opinion, what would you regard as the important foods that women of reproductive age should feed on?
4. Do you take extra effort to think about what you eat?
5. Give a reason for your answer.
6. What type of foods do you consider to make up a good quality diet?
7. How many main meals do you think should a good quality diet have in a day (24 hr period)?
8. How many snacks times should a good quality diet have in a day (24 hr period)?
9. Do you think women of reproductive age should have a special diet?
10. Give a reason for your answer.
11. What is the source of the information from 6.3 above?
e.g Formal education , Media, From the community, From the health workers
12. Which of these sources would you consider reliable? (Why?)
13. How else would you have liked to get information about how to feed well?
14. What are the major influences on what you eat?
15. What is your general view about the nutritional services in Agago district?
16. What do you think should be done to improve nutritional services in Agago district?

APPENDIX VI: PARTICIPANTS' CONSENT FORM

The District Local Government, Agago District

Research Participant Information and Consent Form

DESCRIPTION OF THE RESEARCH

You are invited to participate in a research study about factors associated with dietary diversity among women of reproductive age (15-49) years in Agago district.

WHAT WILL MY PARTICIPATION INVOLVE?

If you decide to participate in this research you will be asked to fill in a questionnaire about yourself and the foods you will have eaten in the previous 24 hours or take part in a focus group discussion about general views of feeding among women of reproductive age on feeding. Radio tape recording for those who will have accepted to take part in the group discussions will be done and will only be listened to by the researcher. Your participation will last approximately 30 minutes.

ARE THERE ANY RISKS TO ME OR BENEFITS FOR ME?

We do not anticipate any risks or expect any direct benefits to you from participation in this study.

HOW WILL MY CONFIDENTIALITY BE PROTECTED?

While there will probably be publications as a result of this study, your name will not be used. Only group characteristics will be published.

WHOM SHOULD I CONTACT IF I HAVE QUESTIONS?

You may contact Mr. Oroma Ray, the student researcher, on telephone number 0772-916644 to ask any questions about the research at any time and if you have any questions about your rights as a research subject, contact The Agago District Local Government. Your participation is completely voluntary. If you decide not to participate or to withdraw from the study it will have no effect on any services or treatment you are currently receiving.

Your signature indicates that you have read this consent form, had an opportunity to ask any questions about your participation in this research and voluntarily consented to participate. You will receive a copy of this form for your records.

Name of Participant (please print):.....

Signature: Date:.....

APPENDIX VII: TRANSLATED TOOLS

LAPENY PA MON MATYE IMWAKA MENYWAL GI (15-49 MWAKI)

Apwoyo un weng, an nyinga Oroma Ray abedo latin kwan me Makerere University a tye ka kwedo lok ikom wit cam ma mon ma tye imwaka me nywal gi (15-49 mwaki) camo iyi Agago district ma lube ki cik me miyo Maters Degree iyi Public Health Nutrition me Makerere University. A lego un me miyo kare u wek ogam lapeny magi. Lagam ma megii obekonyo pi lok me kwan keken.

Ninodwe.....Gombolola.....muluka.....Adwol.....

CIK:

GWET LAGAM MATYE I BOX NI ONYO COO KAKA MATWOLO NI.

1. Lok kit me medo kidano, kit me tiyo cente ki lok me yot kom

1.1 Lok ma mako kom ngat acel acel

1.1.1 *Mwaka ni tye ikin dul mene ma piny ni?*

(1) (15-19) (2) (20-29) (3) (30-39) (4) (40-49)

1.1.2 *Wac kaka ni?*

(1) Acholi (2) Lango (3) Karamojong (4) Mukene (kana mene).....

1.1.3 *Wac dini ni?*

(1) Protestant (2) Catholic (3) Muslim (4) Mukene (Waci).....

1.1.4 *Rwom me nyom mamegi tye ningning?*

(1) Pe anyome (2) Anyome (3) Kinwa opoke (4) Cwara otto

1.1.5 *Rwom me kwan ni tye ningning?*

- (1) *Pe akwano* (2) *Atyeko Primary* (3) *Atyeko Senior* (4) *Atyeko Diploma*
 (5) *Atyeko Degree* (6) *Mukeni (Waci)*.....

1.2 Kit me bedo kidano

1.2.1 *Ibedo kwene?*

- (1) *Itaun* (2) *Icaro*

1.2.2 *Otye madwong igang ma meg gu?*

- (1) *An ki lutino mega* (2) *An ki nyeka* (3) *Atye ki dano palo ma agwoko*
 (4) *Mukene (waci)*.....

1.2.3 *Otye unadi igangu?*

1.2.3.1 *Weldano matye igang kany*

1.2.3.2 *Lutino mamegi tye adi (lagampenyman)*.....

1.2.4 *Imatu taa?*

- (1) *Pe amato* (2) *Amato*

1.2.5 *Imato kongo?*

- (1) *Pe amato* (2) *Amato*

2. Kit me tiyo cente

2.1 *Itiyo tic ango?*

- (1) *Latin Kwan* (2) *Tiyo lagalag* (3) *Agama mucara* (4) *Lapur*
 (5) *Atiyo biacara* (6) *Ape ki tic* (7) *Mukene (Waci)*.....

2.2 *In aye iloyo gangman?*

- (1) *Pe an* (2) *An aye aloyo*

2.3 *Ka in aye pe waongang, ci wongangi tiyo tic ango?*

- (1) *Gamo mucara* (4) *Lapur* (2) *timo biacara* (5) *Pe ki tic*

(3) Tico lagalaga (6) Mukene (Waci)

2.4 Cam ma ocamu ni unongo ki kwene?

(1) Wawilo ki icuk (2) Wa puru apura (3) Kipoko bot wa

(4) Wagamo ki bot wadi ki lurem (5) Mukene (waci)

3.0 Ngec ikom cam

3.1 Cam maber obedo ginanago? (Kwany acel)

(1) Camo wit cam madwong (2) Camo cam ma kelo yot kom

(3) Cam ma cweyo dano (4) Ngec me yero wit cam mabeco

(5) Pe angeyo (6) Mukene (waci).....

3.2 Inongo pwonye ikit me cam? (1) Anongo (2) Pe anongo

3.3 Yoo mene maber camo cam maber? (**Get acel**)

(1) Cam wit cam madwong

(2) Cam cam magengo two keken

(3) Cam cam ma yubukom keken

(4) Mwony yat ma gengo two

(5) Mukene (waci).....

3.4 Cam ma obedo ka camoneni okelo kit two mo?

(1) Okelo (2) Pe okelo (3) Pe angeyo

3.5 Ka lagam 3.4 mamalo ni kakare, ci wac kit two ma?

(1) (2)..... (3).....

3.6 Camo cam marac obedo gin ango?

.....

3.7 Ngo ma weko dano camo cam marac?

.....

.....

4.0 Yot kom kit twoo ma bino pi camo cam pe rwate

4.1 Komi obedo lit icabit aryo anged?

(1) Obedo lit (2) Pe obedo lit

4.2 Ka komi onedo lit, ci ibedo ka mwonyo yat?

(1) Abedo ka mwonyo yat (2) Pe abedo ka mwonyo yat

4.3 Ka imwonyo yat, ci adwoki ne obedo nining?

(1) Obedo maber (2) Obedo marac

4.4 Wac kit ma yat otiyo kwede ikomi

.....

4.5 Itye ki two ma obino pi camo cam?

(1) Tye (2) Petye

4.6 Ka tye, ci wac two ne?

.....

4.7 I tye ki two mene, ikin two magi?

(1) Twoo cancer (2) Twoo cukari (3) Twoo pressure (4) Twoo aduni

(5) Apeke ki kit twoo magi

Apwoyo matek

LAPENY MALUBE KI CAMO WIT CAM

Wac wit cam ma icamo (dek ki cam mugu matino tino) ma icamo onyo imato idye ceng ki idye wor, kede icamo kiwoko onyo iacamo ki gangi. Cak ki cam ma icamo kudiki onyo imato.

(Wac cam weng ma icamo onyo imato. Ka icamo cam ma coko wit cam madwong ci wac , wac gami ma itedo kwedi. Wac cam matino tino ma icamo onyo imato ikin dek).

<i>Cam me odiki</i>	<i>Cam mationo tinno</i>	<i>Dek me dye ceng</i>	<i>Cam mationo tinno</i>	<i>Dek me otyeno</i>	<i>Cam mationo tinno</i>

Source: Nutrition & Consumer Protection Division, Food & Agriculture Organization (2010).

(ka gam peny man otyeko gamo lapeny ma malo ni, ci peny ka ocamo wit cam ma piny ni).

<i>Numa pa lapeny</i>	<i>WIT CAM</i>	<i>LAPOR</i>	<i>Acamo = 1 Pe acamo = 0</i>
1	<i>CAM MA NYIGE</i>	<i>Anywagi, mucele, ngano, kabir, kal onyo cam ma mokomoko (e.g. mugati, nyuka) + kwon</i>	
2	<i>CAM MA LWITW KI KOR YEN</i>	<i>layata, layata munu, gwana, obato onyo cam ma kinongo kit ikom lwit yen</i>	
3	<i>POT DEK KI LWIT YEN</i>	<i>Ukono, carrot, onyo layata ma iye yelo + pot dek</i>	
4	<i>POT DEK MA COL KI MA GREEN</i>	<i>pot gwana, poropot, booo, pot okono, malakwang, akeo, ocobo ki oyado</i>	

5	<i>POT DEK MUKENE</i>	<i>Pot dek mukene (la pore nyanya, tungulu, ocok munu) + ki pot dek mukene manonge kany</i>	
6	<i>NYIG YEN</i>	<i>Muyembe mucek, papai, juice</i>	
7	<i>NYIG YEN MUKENE</i>	<i>Nyig yen mukene, nyig yem ma ilum (acuga, amwony kwo, alilimo, oywelo)</i>	
8	<i>RINGO KOM LEE</i>	<i>acwiny, anyir, adunu, oboo</i>	
9	<i>RINGO LEE KI WINYO</i>	<i>Ringo dyang, ringo opego, ringo romo, ringo dyel, ringo apwoyo, otwoo, ringo gweno, ringo atudu, winyo ki otwongo</i>	
10	<i>TONG</i>	<i>tong gweno, tong atudu, tong aweno onyo tong winyo mo</i>	
11	<i>REC KI LEE MA IPII</i>	<i>Rec ma dyak onyo rec ma otwo</i>	
12	<i>LEGUMES, NUTS AND SEEDS</i>	<i>Murana mu two, ngoo onyo lapena mutwo, pul, nyig yen</i>	
13	<i>CAK KI CAM MA AA KI IKOM CAK</i>	<i>cak, moo dyang, cak lukulu</i>	
14	<i>MOO YAT ONYO MOO LEE</i>	<i>Moo ma aa ki ikom yat, moo lee, moo me tedo dek</i>	
15	<i>JAMI MALIM</i>	<i>cukari, moo kic, soda onyo juice malim, dek malim, cwit ki mugati</i>	
16	<i>GAMI MA YUBO NGWEC DEK KI GI AMATA</i>	<i>Kado, kalara, mwany, majan, cocoa, kongo</i>	
	<i>KIT ME CAM I GANG MAN</i>	<i>Icamo dek onyo ngat moo igang kany ocamu dek onyo ocamo cam matino tino igang pa gant moo?</i>	
	<i>KIT CAM PA NGAT ACEL ACEL</i>	<i>Icamo dek mo onyo icamo kit cam moo igang pa ngat moo?</i>	

Source: Nutrition & Consumer Protection Division, Food & Agriculture Organization (2010).

Apwoyo matek

FOCUS GROUP DISCUSSION GUIDE

Perceptions, beliefs and attitude about feeding among women of reproductive age

1. *Cam maber obedo ginango?*
2. *Itamo ni mon matye imwaka me nywal gi omyero gu yer cam ma gicamu (Pingo?)*
3. *Itam ma kamegi, cam ango ma itamo ni ber pi mon matye imwaka me nywal mengi?*
4. *Imiyo kare me tamu kit cam ma icamo ni?*
5. *Pingo imiyo kare onyo pe imiyo kare ka tamu cam ma icamu ni?*
6. *Kit cam ango ma itamo ni ocuko moc cam weng ma ber pi acama?*
7. *Itamo ni omyero icam dek tyen adi ma lube ki cik me yot kom (Icawa 24)?*
8. *Itamo ni omyero icam cam matino tino tyen adi ma lube ki cik me yot kom (Icawa 24)?*
9. *Itamo ni mon matye imwaka me nywal gi omyero gu cam cam ma pat ki pa dano mukene?*
10. *Pingo mon ma tye imwaka me nywal gi omyero gu cam cam pat ki pa dano mukene?*
11. *Inongo pwonye pi lok kom cam ma ber ki kwene?*
12. *Itamo ni gi miyo pwony maber? (Pingo?)*
13. *Kwene ma dok itamo ni unongo iromo nongo pwony baber ma lube ki lok kom cam maber?*
14. *Pwony enoni okelo aloka loka i kit me cam ma kakmegi?*
15. *Itamo ni Agago district tye ka miyo pwony ma lube ki lok kom cam maber bot?*
16. *Itamo ni ngo ma myero ki tim wek oyub kit me pwonye malube ki lok kom cam iyi Agago district?*

KARATAC MENONGO TWERO KI BOT LUGAM PENY KI BOT LUTELA

LOK MA KIBE KWEDO TYENE NI

Walegi ni omyero ikony wan kwedo lok ikom cam pa mon ma tye ikare me nywal ma kamegi (15-49 mwaki) iyi Agago district.

GIN MA IBETIMO

Ka iye me tic kwedwa ci ibe gamo lapeny ma lube ki ma icamo pi cawa 24 nagec, pi dye wor kidye ceng. Ibe bedo idul ma obe nyamo lok man. Ki be makako dwon ma ka megu bene. Nyamu lok man obebe cwalo dakika pyera adek kene.

ABENONGO PEKO ONYO KONY MO KA AGAMU LAPENY MAN?

Pe ibi nongo peko mo ka igamo lapeny man. Adwogi pa lapeny man pe obebino pi oyot oyot.

MUNG MA KAKAMEGA KI BI GRWOKO NINGNING?

Pe wa be coyo nyingi i karetac ma wa bi coyo malube ki adwogi me kwedo kop man.

ANGA MA OMYERO ALOK KWEDE KA ATYE KI LAPENY?

I romo penyo Oroma Ray, ladit me maloyo kwedo kop man, nama cime tye 0772-916644 to icawa mo keken, iromo penyo lapeny ma lube ki twereo ma kakamegi ma lube ki kwedo kop man. Iromo bene penyo luditu me Agago District Local Government. Kit cul mo obi bedo pe pi gamu lapeny magi. Ka itamo me kwero gamu lapeny magi, pe obe juko onyo balo kwedo kop man iyo mo keken.

Ketu cingi ikaratac man nyutu ni in iye gamu lapeny ma lube ki lok kom kwedo kop man. Wa be miyo bot in kare tac man menyutu ni igamu lapeny magi.

Nying lagam peny (pe ico nyigi):.....

Ka keto cing: nino dwe:.....