Addis Ababa University

College of Natural and Computational Sciences

Center for Food Science and Nutrition

Association of Women Landownership with Child Feeding Practices and Nutrient Intakes Among children aged 6 to 59 months in Oromia, Ethiopia

A Thesis Submitted to College of Natural and Computational Sciences in Partial Fulfillment of the Requirements for the Degree of Masters of Science in Food Science and Nutrition

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Declaration

I, Geleta Dereje, do hereby declare to the College of Natural and Computational Sciences of Addis Ababa University that this thesis entitled *"*Association of Women Landownership with Child Feeding Practices and Nutrient Intakes Among children aged 6 to 59 months in Oromia, Ethiopia" is the product of my original research work, complies with the regulation of the University and meets the accepted standards with respect to originality and quality.

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Abbreviations and Acronyms

BMI: Body Mass Index

CDDS: Child Dietary Diversity Score

COMA: Committee on Medical Aspects of Food and Nutrition Policy

CRS: Catholic Relief Services

CSA: Central Statistical Agency

DDS: Dietary Diversity Score

DRVs: Dietary Reference Values

EAR: Estimated Average Requirement

EDHS: Ethiopian Demographic and Health Survey

FANTA:Food And Nutrtion Thecnical Assistance

FAO: Food and Agriculture Organization

GDP: Gross Domestic Product

HDR: Humanitarian Requirement Document

HIV: Human Immunodeficiency Virus

IDDS: Individual Dietary Diversity Score

IFPRI: International food policy research institute

IYCF Infant Young Child Feeding

RDA: Recommended Dietary Allowance

RNI: Reference Nutrient Intake

SIDA: Swedish international development corporation

SNNP: South Nation, Nationalities and People

SPSS: Statistical Package for Social Sciences

UNICEF: United Nations International Children's Emergency Fund

WHO: World Health Organization

Abstract

***Background and methods**; Nutrition-specific interventions alone will not help countries to end child malnutrition; nutrition sensitive interventions are also needed, such as women empowerment like women-land ownership. Therefore, this cross sectional study was proposed to assess the association of women-land ownership with child feeding practices and nutrient intakes among under five children in Oromia region, Ethiopia. Infant and young child feeding (IYCF) practices were assessed in addition to dietary assessment using a 24-hour recall. Descriptive statistics were presented in frequency and percentages and in the form of mean ± SD. Any difference in the variables was compared, based on women-land ownership, using Chi square test and Mann Whitney u test. Result show that early initiation of breastfeeding and exclusive breastfeeding were approximately 60%; the prevalence of continuous breastfeeding at 2 years was 64.5%; and timely introduction of complementary foods was 39.2%. Starchy staples were consumed by more than 90% of the children; close to ¾ of the children consumed legumes and nuts; animal source foods consumption was below 20% except dairy products (84%).The minimum dietary diversity score was achieved by 46% of the children. The median energy intakes for children aged above a year, the intakes of carbohydrate, protein and iron were more than 100% of the recommendation. Conversely, the intakes of energy, at the stage of the second 6 months, the fat, the calcium (those above one year) and the ascorbic acid intake were below the recommendation. However, there was statistical difference ($p<0.05$) in the proportion children of women with land and without landownership who consumed starchy staples, legumes and nuts, dairy products and ascorbic acid. In Conclusion, suboptimal IYCF practices were common. Energy and nutrient intakes were inadequate except for carbohydrates, proteins and iron. In addition, intakes of starchy staples, legumes and nut, dairy products and ascorbic acid was associated with women land ownership. Therefore, Optimal Infant and young child feeding should be addressed. In addition, it is necessary to strengthen women-land ownership in addition to implementing proven interventions.*

***Key words**: complementary feeding, women land ownership, nutrient intakes*

Chapter One: Introduction

1.1 Background

Malnutrition prevents infants and young children from growing to their full genetic potential and it remains a major problem in Sub-Saharan Africa (SSA) (FAO, 2010). Among children in Sub Saharan Africa, more than 38.5% (>56 million) suffer from chronic underweight, nearly 80% have iron deficiency anemia, 50% are at risk of blindness due to vitamin A deficiency, and more than 4 million babies are born underweight annually (FAO/WHO, 2013). Particularly in Ethiopia, underweight, stunting and anemia among children under 5 years are, 25%, 38% and 57%, respectively according to EDHS 2016. Amhara is the region with the highest rate of stunting in Ethiopia, (46% of under five children in the region are stunted), whereas only 15% of the children in Addis Ababa are stunted (CSA, 2016). In Oromia, the rate of stunting of under five children is 37% (EDHS, 2016). Stunting, underweight, and wasting prevalence is higher among children in rural areas than those in urban areas in Ethiopia (CSA, 2016).

Diet is one of the prime determinants of health and nutritional status. An inadequate diet, poor in both quality and quantity have been one of the reasons for high levels of malnutrition in children (WHO, 2004). Adequacy implies that the food must satisfy the dietary needs of every individual, taking into account age, gender, body size, and physical activity level. To define quantitatively, nutrient adequacy is the level of intake of an essential nutrient in relation to the nutrient requirement for adequate health, which is expressed as the percentage of recommended dietary allowance (RDA)(Sharmistha, 2016). In Ethiopia, the diet of infants and young children are predominantly cereals and legume-based with limited consumption of nutrient-dense animal source food, fruits, and vegetables (CSA, 2016). Because of the different bioactive anti-nutrient factors such as phytates, oxalates, and the forms of the nutrients in plant-based diets, the bioavailability of nutrients like zinc (Zn) and iron (Fe) is low (WHO/FAO, 2004). Thus, energy and micronutrient such as vitamin A, C, and zinc density in food were inadequate for children in Ethiopia (Baye *et al*., 2015; Gibson *et al*., 2009).

In Ethiopia, efforts are being made in implementing a multi-sectoral plan of nutrition intervention (as prescribed in ***Sekota*** Declaration and National Nutrition Program) to end the high burden of undernutrition in Ethiopia by 2030 (FDRE, 2020). However, the country is still experiencing one of the worst scenarios in Children feeding practices. The most recent national survey indicates that nearly half of all infants < 6 months of age are not exclusively breastfed. More than one in four

children still received pre-lacteal feeds that may predispose the child for infectious diseases and risk of diarrhea (Temesgen, 2018). In addition, one in two children was not put to breast within one hour after birth. Only 42% of children receive the minimum number of meals, less than 10% of children < 24 months achieve minimum dietary diversity (i.e consumption of at least 4 food groups), and only 6% get nutritionally adequate diet (CSA, 2016). Studies conducted in different parts of the country also confirmed that the majority of children were improperly fed (i.e., not exclusively breastfed, used pre-lacteal food, were bottle fed, and had inadequate intake of micronutrients) (Roba, 2016). Only 60% of the women practice exclusive breastfeeding during the first six months (Temesgen, 2018).

Agriculture is the backbone of the Ethiopian economy. This particular sector determines the growth of all other sectors and consequently the whole national economy where access to land is the key for the agricultural activities. Land is not just a physical entity but also an important source of livelihood in agriculturally dependent economies. Ownership of land is also viewed as a symbol of power and status (Agarwal & Bina, 1994). Furthermore, control of land, entitles women to control other productive resources that also leads to the wellbeing of their households, more than when men control resources (Doss, 2014), poverty alleviation and food and nutritional security (Quisumbing & Maluccio, 2003). However, there is a significant gender gap when it comes to land access, because women own only 1–2% of land worldwide (FAO, 2019) which is very serious problem for women whose economy depends on agriculture (Crowley, 1998). Most African customary practices do not take gender equality seriously regarding access to and control of productive resources, land management and decision making on household agricultural products (Husen, 2014). Globally, women comprise the largest percentage of the workforce in the agricultural sector, but they do not have access and control over all land and productive resources. About 70% of the agricultural workers, 80% of food producers, and 10% of those who process basic foodstuffs are women and they also undertake 60 to 90% of the rural marketing; thus making up more than two-third of the workforce in agricultural production (FAO, 2010). Particularly, in Ethiopia, studies conducted by many authors on rural women revealed that, women represent approximately 50 % of the total population and account for 70 % of the household food production. Their share in the total agricultural labor force is considerable where about 48 % of the agricultural

labor force is driven from female family members (Teshale, 2014). Similarly, the power of decision making over assets such as land is lower for women than men in Ethiopia. Yet, research shows that equal access to resource for agricultural production among men and women could increase yields on their farms by 20 to 30% and in turn reduce the number of undernourished people in the world by 12 to 17 % (FAO, 2014). Accordingly, this research aimed at assessing the impact of women land ownership on under-five children's feeding practices and nutrient adequacy in selected rural districts of Oromia.

1.2 Problem Statement

In Ethiopia, child-feeding practices are poor as indicated in different previous studies (Temesgen, 2018; Mekbib, 2014; Beshadu, 2020). This poor feeding practices of children result in high rate of children malnutrition, which negatively affect development of the country by increasing health costs, reducing productivity, and slowing economic growth wich can perpetuate a cycle of poverty and ill health (WHO, 2012). In Ethiopia studies showed that nearly half of the children start complementary food before 6 months, more than 25% of the children receive pre lacteal feed and many children are inappropriately fed (Agize, 2017).

There are also studies that are related with women-land ownership in Ethiopia (Alemayehu, 2021; Mesfin, 2016; Husen, 2014). These studies found that women are the most marginalized group of the society in relation to accessing and controlling land in Ethiopia (Husen, 2014) which exposes them to a systematic poverty, chronic hunger and malnutrition to the whole family (UNECA, 2004). Women's land ownership is related to their decision-making power within household on healthcare, social interaction, investment, family planning and household expenditure (Swaminathan *et al*, 2012; Deere & Twyman, 2012). Contrary to the significant importance of women's land ownership there is limited study that is conducted on association of women-land ownership with under five children feeding practices and nutrients intake in Ethiopia. Therefore, more research is needed to understand the link between children feeding practices with women's land ownership and the current study is intended to find their association.

1.3 Research Objectives

1.3.1 General objectives

To study association of women landownership with child feeding practices and nutrient intakes among children aged 6 to 59 months in Adea, Girar Jarso and Sebeta Hawas *woredas* in Oromia, Ethiopia.

1.3.2 Specific objectives of the study

- To assess feeding practices and nutrient intakes of children aged 6 to 59 months in Adea, Girar Jarso and Sebeta Hawas *woredas* in Oromia
- To investigate the association of women landownership with child feeding practices and nutrient intakes among children aged 6 to 59 months

1.4 Significance of the study

This study may have multiple significances for academicians and policy makers interested in nutrition. The data are also important to design appropriate interventions to enhance the quality of appropriate children feeding practice starting from the time of vulnerable period of transition from breastfeeding to the family diet. It helps to understand the specific nutrient gap in young children's diets that is essential to understand how to improve their diets, which can affect child growth and development. The data can also be used to determine level of intake the nutrients assessed and applicable to reduce the risk associated with it. It may provide baseline information regarding association of women women-land ownership with feeding practices and nutrient intake of the children. Similarly, the society residing in the area can have evidence-based information about the impact of women women-land ownership on nutrient intake of under-five children.

Chapter Two: Literature review

2.1 Infant and Children Feeding Practices

Malnutrition is a significant health problem for infants and young children in Ethiopia. Evidence suggests that suboptimal child feeding practices are the main culprit and one of the leading causes of child undernutrition (Black *et al* ,2013). The World Health Organization (WHO) recommended exclusively breastfeeding up to 6 months after birth, along with continued breastfeeding up to 2 years or beyond (WHO, 2003). From the age of 6 months, breastfeeding is no longer able to meet all nutritional requirements of a growing child, and therefore, the consumption of adequate, diversified food is necessary (Dewey, 2003). For proper growth of children, a set of WHO validated core indicators of good Infant Young Child Feeding (IYCF) practices that are recommended during the first 24 months of life (WHO, 2008). The core indicators include exclusive breastfeeding, Diet Diversity and adequacy, and Minimum Feeding Frequency. Appropriate complementary feeding of children has been promoted as one of the strategies to combat growth faltering and associated ill-health consequences in young children according to WHO 2003. However, there is strong evidence that the promotion of appropriate feeding practices reduces the incidence of malnutrition and leads to better health and growth outcome (Black *et al*, 2013). Appropriate complementary feeding is an important determinant for the achievement of healthy growth and survival of young children in their early years of life. It has been established that appropriate Complementary Feeding has the potential to prevent 6% of all under-five deaths, particularly in the developing world (Lutter, 2011).

Attempts of establishing some association between dietary diversity score and nutritional quality have been known since 1960s, and recoded evidences exist starting early 1980s (Daniel, 2006). Several trials are conducted to qualify appropriate feeding practices of the population in developing countries since the Global Consultation on Complementary Feeding convened by WHO identified lack of indicators as one of the constraints of improving young child feeding (WHO, 2002). Evidences indicate that Dietary Diversity Score and nutritional status can both correlate or interact (Kennedy, 2007). Dietary diversity may increase nutrient density of the complementary foods, which promote optimal child growth and development. Different studies

have shown that consumption of a diverse diet is associated with a reduction in nutrient deficiency among children (Ahmed *et al*, 2019).

Globally, the complementary feeding practice is far from WHO recommendation, and only 28.9% of children aged 6-23 months fulfill WHO criteria for minimum acceptable diet (Micha, 2020). Despite increased efforts, many low- and middle-income countries do not adhere to this (WHO, 2003). For instance, only one in three or one in six 6–23- months-old children in sub-Saharan Africa were fed adequately diverse or overall acceptable diets, respectively (Lutter, 2011). Diet of the population including the diet of infant and young children in sub-Saharan African countries are frequently deficient in energy and micronutrient leading to micronutrient deficiency disorders like anemia, iodine deficiency disorder (IDD), zinc deficiency, and vitamin A deficiency (Müller & Krawinkel, 2005). The World Health Organization has recommended that an infant and children should receive the MDD of at least four food groups out of seven in order to maintain proper growth and development (WHO, 2008), but many children cannot meet these criteria. In Tanzania for example, only 35.1% of children aged 6 to 23 months had received the MDD (Ministry of Health. C.D, 2016) and only 23.3% in Ethiopia (Temesgen, 2018)

In Ethiopia, efforts are being made in implementing a multi-sectoral plan of nutrition to end the high burden of undernutrition by 2030 (FDRE-Ethiopia, 2020). However, the country is still experiencing one of the worst scenarios in IYCF practices. The most recent national survey indicates that nearly half of all infants < 6 months of age were not exclusively breastfed. More than one in four infants still received pre-lacteal feeds that may predispose the child for infectious diseases and risk of diarrhea (CSA & ICF, 2016). In addition, one in two children was not put to breast within one hour after birth. Only 42% of children receive the minimum number of meals, less than 10% of children < 24 months achieve minimum dietary diversity (i.e consumption of at least 4 food groups) (CSA & ICF, 2016). Studies conducted in different parts of the country also confirmed that the majority of children in the 6–23-month age group were improperly fed (i.e., not exclusively breastfed used pre-lacteal food, were bottle fed, and had inadequate intake of micronutrients (Agize, 2017). Similarly, concerning child feeding practices in Ethiopia, the study conducted in Butajira District of Gurage zone found that about 68.20% of children aged less than 5 years are at risk of protein inadequacy. Similarly, about 84.40%, 33.80%, 27%, and 70.70% of

these children are at risk of inadequacy for vitamin B1, B2, B6, and folate, respectively. The prevalence of inadequacy of calcium and zinc is 76.80% and 67.30%, respectively. Nevertheless, the study also found that all the sampled children have adequate intake for vitamin A (Beshadu, 2020). According to this study, cereals, roots, and tubers are the dominant food group consumed and the median energy and most nutrient intake are low in the study site (Beshadu, 2020).

Particularly, in Oromia, Adugna *et al* (2021) found that in Adama city, at the age of 6 months, 86.1% of the children started complementary food. According to the study, majority (84.0%) of children were introduced to solid, semi-solid, or liquid forms of complementary food, on an average at 6 months of age and few children (3.5%) were introduced to complementary food before 6 months of age (Adugna *et al*, 2021). Similarly, Mekonnen *et al* (2021) found that, in North Shew of Oromia, nearly two-thirds of mothers (65.8%) practice appropriate children feeding practice. According to this study, the majority of mothers (70.5%) started breastfeeding within one hour of birth, and about 62% exclusively breastfed their children. At six months, over two thirds of the mothers (69.2%) started complementary feeding timely and only 19.2% of the respondents met the minimum dietary diversity requirements. Similarly, the majority of mothers (79.5%), continued breastfeeding up to two years of age (Mekonnen *et al*, 2021). Another study conducted in Sashamane by Fanos, (2015) found that, among children age 6 - 23 months, 65.7% started complementary food between 6 - 8 months age and 39.1% of children met the requirements for minimum dietary diversity. In Sashamene, the primarily food source (99.4%) of children are grains and tubers whereas very smallest number (4.3%) of children consume meat products (Fanos, 2015).

2.2 Factors associated with child feeding practices

While economic and contextual factors are strong determinants of child nutritional status, immediate causes such as feeding practices are associated with nutritional outcomes, independent of socio-economic determinants (Ruel, 2004). Child feeding practices are associated with better nutritional status after controlling for potentially confounding sociodemographic factors (Menon, 2006).

Maternal education has been found to be associated with timely introduction of complementary feeding. Study conducted approved that, mothers who are at primary and secondary schools and above are more likely to practice appropriate complementary feeding compared with those mothers

who have no formal education (Nira, 2012). Another important determinant factor associated with appropriate complementary feeding practices is family size in that those mothers having lower family size (1–3 persons/head) are more practicing it as compared to those mothers having higher family size (> = 7 persons/ head). This is due to inadequacy of food (insecurity) in those households having more family size; and mothers having too little time to prepare food or to feed their children (Tigist, 2015).

Women's work is another determinant factor for children feeding practices. Women's employment outside the home does not appear to be a primary determinant of early discontinuation of breastfeeding, but rather the conditions under which women work may be influential (Laukaran, 1991). Important aspects of the potential impact of employment on infant feeding decisions include duration of maternity leave, which affects whether the mother has sufficient time with her child during the initial postpartum period to successfully establish lactation before enduring prolonged intervals of separation from her infant during the work day, the proximity of the work site, which affects the length of intervals of separation between mother and infant; and the frequency and duration of break times during working hours, which determine the number of occasions during the day that a mother is able to breastfeed her child (Popkin, 1999). But in Ethiopia, where about 85% of the women reside in rural area and mostly practice agriculture (Teshale, 2014), the time that mother's will have with their children is not problem, because they are free to feed their children whenever they want as they will not go far away from their children.

Another determinant factor is health Services and Personnel. A number of aspects of modern systems of maternity and newborn care are associated with decreased rates of breastfeeding initiation and poor rates of continuation among those who do initiate it (Winikoff, 2006). The features of modern health care found to be associated with lower rates of breastfeeding include delays or interruptions of nursing, routine use of supplemental formula in the hospital and its distribution to the mother at discharge, fixed feeding schedules, lack of knowledge about breastfeeding technique and management among medical and nursing practitioners or a lack of initiative to modify standing procedures to better assist the new mother (Lawrence, 2000).

Cultural practice is also another factor. There are some cultures in which colostrum is discarded and pre-lacteal feeding is common (Agize, 2017). Among most of the women little is known about the biological or social impact of these practices. In some areas, colostrum is regarded as a harmful

substance that is capable of causing diarrhea, pneumonia or other illness (Harfouche, 2001). In other societies, colostrum may be viewed as simply inadequate and is withheld until the point at which the mother judges her milk is mature (Mata, 2003). In Ethiopia, studies show that more than 25% of the mothers were giving the pre-lacteal feeding instead of colostrum to their newborn and nearly 40% of mothers did not initiate colostrum within one hour of birth (Temesgen, 2018). This poor feeding practice of infants leads to adverse health effect on the child himself.

Study found that the economic conditions of households are a primary determinant of household food availability. The role of economic conditions can be partitioned into two basic sectors: direct food production by the household and household economic resources (especially cash income) that can be allocated to food purchases (WHO, 2004). Among land-owning farmers in rural areas, the size and nature of holdings, ecological conditions, and the types of crops and animals raised, greatly influence food availability (Serra-Majem, 2002). The significance of cash income for food availability is readily apparent among rural families who purchase substantial portions of their food. There is linear relationship between proportion of income spent on food and total income. Household demographic characteristics influence the amount of food available to the household as a unit. The number of wage earners is a significant factor in household income, and household labor availability often affects food production directly. High-quality processed foods are available in the markets, but they are expensive and the vast majority of the low-income population cannot afford these foods (Waman, 2005). Ethiopia is one of developing countries in which economic condition really matters, as poverty is high and therefore, financial constraints might be the limiting factor for poor people to adequately secure nutritious foods for their children on daily basis economic conditions in Ethiopia (Agize, 2017).

Studies proved that exposure to media of the mothers showed positive association with good feeding practices (Nira, 2012). According to this study , the risk of inappropriate feeding practices are three times higher for mothers who did not have access to media than those who have access daily. Seasonal variation of food availability may influence daily availability of variety of quality raw foods among low-income households that depend on their own agricultural produce as the main source of food health (Wamani, 2005).

Maternal age is another determinant of appropriate child feeding as the youngest mother whose age are less than 18 and older mother whose age are more than 38 less likely take care of their children appropriately (Menon, 2006). Other factors associated with children feeding practices are utilization of antenatal and postnatal visits, employment status, institutional delivery, low parity, knowledge & frequency of complementary feeding and receiving feeding advice.

2.4 Land Ownership and Women's Autonomy

Women's autonomy refers to the ability and freedom of women to choose and act independently. It includes the ability of women to make strategic choices, acquire and control resources, and participate in decision-making. Some direct measures of women's autonomy include women's access to and control over resources, participation in economic decision-making, self-esteem and mobility (Kishor & Subaiya, 2008). The land is an important economic resource, especially in agrarian economies, so it may be an indicator of women's autonomy. There is positive relationship between women's land ownership and their decision-making power within household. One study from Karnataka, India, found that if a woman owns a house or land, she enjoys higher autonomy related to her own work, healthcare, mobility and household expenditures (Swaminathan *et al*, 2012). In addition, Han Zhang, & Zhang (2019) empirically demonstrated, using the data of 28 provinces in rural China, that land tenure security promotes women decision-making autonomy in areas such as household purchases, daily necessities purchases, and choice in fertility, medical care, job, and social interaction. Therefore, women's land ownership leads to more empowerment in the areas of her decision-making power about her own healthcare, large household purchases (Zhang, 2019).

It is suggested that, in countries where the economy is largely dependent on agriculture, the provision of land rights to women may lead to higher status and associated welfare effects for women. research in Ecuador, also reported that if a woman owns a bigger share of household wealth, or if a husband and wife jointly own real estate, then this leads to better decision-making about work and income spending by the couple (Deere & Twyman, 2012). In rural Ethiopia, one study demonstrated that a woman with more surface area of land correlates positively with her overall well-being of the family (Kumar & Quisumbing, 2012).

Decision making on land empowers women in two specific ways:- (1) It gives her financial security by opening up opportunities for collateral to obtain loans and to expand job opportunities, which in turn increase her financial resources to invest in entrepreneurial activities (Menon, 2014); (2) A woman's land ownership also increases her autonomy in the household, which leads to better utilization of income in the form of food and healthcare (Deere & Twyman, 2012). It has been cited many times that if a woman has higher decision-making power related to household expenditure and her own healthcare, or if she can enjoy higher mobility outside the home, then she can better take care of herself and others in her home (Smith, 2003).

2.6 Food and nutrition security and Gender

In Ethiopia, food availability is seasonal. The major planting seasons - April to October - before the harvests are major slack months, particularly in rural areas. Rural households tend to be the most affected by seasonal food shortage. The CSA-LSMS finds that town households consume less diverse food items for more number of days than rural one. Hence, malnutrition rates are higher in rural than in urban areas (SIDA, 2015). Based on WHO data the proportion of the population whose food intake falls below the minimum level of dietary energy requirements, and who therefore are undernourished or food-deprived was 32% during 2014-2016 (WHO, 2016). The National Nutrition Program (2013-2015) which has primary aim of reducing the prevalence of chronic under-nutrition in women of reproductive age from 27% to 19% in 2015, underweight prevalence from 41% in 1996 to 21% by 2015, and reducing the prevalence of stunting from 46% in 1996 to 38 % in 2015 is implementing in Ethiopia (FAO, 2014).

UNICEF and FAO have been working in collaboration since 2009 in strengthening the nutrition situation of the country. The two agencies are working collaboratively on planning and executing specific joint food security and nutrition interventions. Furthermore, the research conducted by Catholic Relief Services (CRS) revealed that women and children, particularly Female Headed Households, the elderly, and pregnant and lactating women, are identified as the most vulnerable to malnutrition due to heavy workloads and lack of sufficient access to food. Pregnant and lactating women's poor and inadequate diets and ill health increase their risk of childbirth complications. As mothers, they may have an insufficient supply of breast milk to feed their infants. Furthermore,

low educational status, culturally defined food taboos that restrict pregnant and lactating women and children from eating certain nutritious foods like vegetables and eggs, or priority given to selling these products. In some communities, there are culturally defined feeding practices dictating that men eat first, then children, then women and girls. In most communities in the country, there are socially defined gender roles in which men are not responsible or engaged in reproductive works such as domestic work and childcare. These were found to contribute to female malnutrition.

2.7 Crop production and Gender

In Ethiopia, about 12 million smallholder farmers produce around 95% agriculture production, with more than half of them holding 1 hectare or less of land. The main crops include coffee, cereals, maize, sorghum, wheat, barley and millet. According to the FAO, cereals production accounts for about 70% of the agricultural GDP (FAO, 2014). Cereals account for 71% of the total area cultivated and 66% of the total crop production during the 2012/13 *meher*[1] season (CSA, 2013). The CSA data shows that in Ethiopia mainly five major cereal crops are produced, 55-77 % are used for household's consumption but they sell between 7-22 % of crop produced. This composition varies by crop type. Farmer households tend to sell more of high value crops such as teff, and consume more of low value cereal crops such as sorghum and maize (CSA, 2015). Both male and female holders participate in cereals production. However, the percentage share of female holders who participated in cereal production is, on average, lower than the percentage of male holders who engage in this activity. In general, cereals are mostly field crops unlike other crops grown on homesteads; as a result, cultivating cereal crops by female holders may not be convenient because they are busy working domestic work (Kasa, 2015).

Vegetables cover 1.4 % of the total cultivated area and accounted for 3 % of the total crop output value in the country in the 2012/13 *meher* season. This reflects that vegetable production is not common among most rural farm households. Most of the vegetables are produced in peri-urban areas. Green and red peppers, Ethiopian cabbage, and tomatoes are the dominant vegetables grown

[1]*Meher* is an A*maharic* equivalent fora harvesting season that falls between October and January in the study areas.

in the country. Like in the case of other crops, the percentage share of male holders who participate in the production of vegetables is relatively higher than the share of female holders. However, the gender gap in this case is much narrower than in other crops, with an average female to male ratio of 0.77. This is mainly because most vegetables produced by the smallholders are cultivated at the homesteads. It is also in conformity with several other studies that label vegetables as female friendly crops. Fruit production accounted for 0.5 % of total farmland and 1.6 % share of the total crop production (CSA, 2015). The proportion of female holders who produce fruit is lower, on average, than the share of male holders producing fruits. However, the gender gap in this case is even narrower than in the case of vegetables, with a female to male average ratio of 0.91. Female heads are significantly more likely to grow crops mostly used for households' consumption such as maize, enset, potatoes and fruits; while male heads are more likely to grow mostly cash crops like teff and pulses for sales which is evidence for women empowerment improves the wellbeing of the households (IFPRI, 2014).

2.9 Nutrient Recommendations: Dietary Reference Intakes (DRI)

A balanced diet is one that provides adequate amounts of various nutrients to maintain health and well-being. Protein, carbohydrate, fat, vitamins, minerals and water are all nutrients with particular function in the human body. The amount of each individual nutrient needed to maintain an individual's health is called the nutrient requirement. Nutrient requirements vary depending on age, gender, level of physical activity, physiological status (such as pregnancy), dietary habits and genetic background. The document of Dietary Reference Intake (DRI) are issued by the Food and Nutrition Board of the National Academies of Sciences Engineering, and Medicine. The board addresses issues of safety, quality, and adequacy of the food supply; establishes principles and guidelines of adequate dietary intake; and renders authoritative judgments on the relationships among food intake, nutrition, and health. DRI is the general term for a set of reference values used to plan and assess nutrient intakes of healthy people. These values, which vary by age and sex, include:

- Recommended Dietary Allowance (RDA): Average daily level of intake sufficient to meet the nutrient requirements of nearly all (97–98%) healthy individuals; often used to plan nutritionally adequate diets for individuals.

- Adequate Intake (AI): Intake at this level is assumed to ensure nutritional adequacy; established when evidence is insufficient to develop an RDA.
- Estimated Average Requirement (EAR): Average daily level of intake estimated to meet the requirements of 50% of healthy individuals; usually used to assess the nutrient intakes of groups of people and to plan nutritionally adequate diets for them; can also be used to assess the nutrient intakes of individuals.
- Tolerable Upper Intake Level (UL): Maximum daily intake unlikely to cause adverse health effects.

Dietary reference intake (DRI) has set the Recommended Dietary Allowance (RDA) and Adequate Intake (AI) for children aged less than 5 years as shown in the following table (2.1)

Table 2. 1 Nutrients intake recommendation for children aged 6 to 59

Nutrients	**Child age (Months)**	**Recommendation**	
		Males (M)	**Females (F)**
Energy (K/calorie) (EER)	6-12 13-36 37-59	743 1046 1742	676 992 1642
Protein (g) RDA	6-12 13-36 37-60	11 13 19	
Fat (g) (AI)	6-12 13-36 37-60	30 35 58	
Iron (mg) *(AI)*	6-12 13-36 37-60	11 7 10	
Calcium (mg) AI	6-12 13-36 37-60	260 500 800	270
Ascorbic acid (mg) RDA	6-12 13-36 37-60	50 15 25	

2.10 Nutrients intake in Ethiopia

The period of complementary feeding important as this is when infants and young children experience rapid growth and development. During this period, growth faltering and micronutrient deficiencies are highly prevalent because of children's high nutrient needs relative to their energy and micro- nutrient intakes (Shrimpton, 2001). Micronutrient deficiencies are associated with poor growth, impaired cognitive development and poor health status (Black, 2013). Growth faltering is irreversible after the age of 2 years, thereby leaving a small window of opportunity for intervention (Mortorel, 1994). In this regard, the role of adequate complementary feeding, both in quantity and in quality, is of great importance. Child malnutrition remains a public health concern in Ethiopia. Complementary foods are largely made of unrefined cereals and legumes, which may be inadequate in energy and micronutrients (Makuria, 2006). Many of the children's dietary diversity scores in North Wollo, Ethiopia are in the low (0–2) to medium (3–4) range (Baye *et al* 2012). Consumption of Animal Source Food as well as fruits and vegetables was very low and most children's complementary feeding practices are not in line with the recommended infant and young child feeding (IYCF) practices. Baye *et al* (2013) found that intakes of energy and some nutrients (Ca, Vitamin A, vitamin C) from complementary foods are below estimated needs in north Wollo, Ethiopia. However, the study found that Iron and protein intakes met estimated needs for children. In southern Ethiopia, Beshadu 2020 found that, only 2.7% of children were fed according to minimum standards with respect to dietary diversity, which is four or more food groups. This author found that the median energy intake of children was below the recommended requirement. Nevertheless, folate, vitamin B2, B6 and protein intake of children exceeds the estimated requirement (Beshadu, 2020). On the other side, Hailesillassie *et al* (2022) found that, in Northern Ethiopia, energy and micronutrients intake of children are below the corresponding estimated needs recommended by WHO/FAO. According to this author, the children's nutrient inadequacy prevalence is > 90% for energy, vitamin A, riboflavin, vitamin C and 100% for calcium, zinc, and niacin (Hailesillassie *et al*, 2022). Similarly, in urban slums of west Oromia, Berra (2020) found that zinc, vitamin A, vitamin C, and calcium are key problem nutrients, as they did not meet the recommendation. Accordingly, zinc is the key problem nutrient, while iron is not given the current dietary pattern and the percentage of children consuming EAR or more for most nutrients obtained from median size was 54.3%, 89.9%, 61.8%, 12.9%, 85.6%, 79.7%, and 34.2% for energy, protein, iron, zinc, vitamin A, vitamin C, and calcium, respectively (Berra, 2020).

According to this author, careful combination of local foods has improved the nutrient intake in children across ages, achieving ≥ 99% RDA in the optimized diets.

Chapter Three: Materials and methods

3.1 Description of study area

Oromia region is one of the eleven regions in Federal Democratic Republic of Ethiopia with 353, 690 square kilometers of land area (32% of Ethiopian land), and it represent the largest regional state. The population is estimated to be 38,000,000 in mid May 2018. Currently the region is organized into 21 Zones and 356 *woredas.* The study was conducted in three rural woredas of the region namely Sebeta Hawas, Girar Jarso and Adea from December 2020 to March 2021. Sebeta Hawas is one of the *woredas* in Finfinne Surrounding Oromia Special Zone while Girar Jarso and Adea *woredas* are parts of North and East Shoa zone, respectively. Yet, all of the study areas are located in central Ethiopia within a distance of 20 kilometers (Sebeta Hawas), 50 kilometers (Adea) and 100 kilometers (Girar Jarso) from the capital Addis Ababa. The three study woredas were selected because of the highly fertile land that is suitable for production of cereals, pulses and other crops, and because of its better access to infrastructure and market compared to other *woredas* of the region (Oromia agricultural and natural rsource, 2005).

3.2 Study design

The study was conducted using cross sectional design.

3.3 Study subjects

The study subjects were caregivers of under five children.

3.4 Sample size

The sample size was calculated using online sample size calculator for comparing two proportions, assuming 95% confidence level, 80% power and assuming exclusive breastfeeding among women without land ownership 59% and expecting the proportion among women with land ownership as 70%. Assuming 15% non-response rate the total sample size became 338. Then, subjects were randomly selected from the three woredas using health center registration book as a sampling frame. The number of subjects to be taken from each woreda was based on probability proportional to population size. Complete data was not collected from six subjects then the total subjects included in the study was 332.

3.3 Inclusion criteria

Caregivers whose livelihood depends on agriculture**,** had children aged 6 to 59 months, healthy and volunteer to participate in the study were included

3.4 Exclusion criteria

Sick children during the time of the survey, and those who were not permanent residents in the study area were excluded from the study.

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3.6 Data collection procedures and quality control

Questionnaires were prepared by reviewing different literatures. The questionnaire was prepared in English and was translated to the local language (Afan Oromo). The questionnaire has 6 sections, the first section included questions related to background characteristics of the women in the study areas. The second section contained questions related to access to mass Medias like newspaper, radio and television. The third and the fourth sections included questions related with land and health, and nutrition of the mothers and the children respectively. The fifth and sixth sections correspondingly included questionnaire about child nutrient intakes and household dietary diversity. The questionnaire was pre tested on similar but non-study population. Experienced data collectors were recruited and were provided refresher training on how to collect the data. Data was collected when there was no special occasion both for the Christians, Muslims and other religion followers. The pretested questionnaire was administered to the women after having consent from them.

3.6.1 Dietary intake assessment

Dietary intake assessment was carried out using 24-hour dietary recall method. On behalf of the child, primary child caregivers participated in the dietary recall. Portion size estimation was done through direct weighing of the food and drinks taken during the recall period. Each participant was asked to put the amount of food that was equivalent to the actually consumed on the weighting scale from a salted replica of the food. The participants also estimate the portion size of a leftover

if any. The estimation was done twice for each food and the average measurements was taken for analysis. The estimated portion size was weighed and converted in to gram after weighing.

Food composition tables of Ethiopia part 3 and 4 were used to convert food consumption data into energy and nutrient intakes using Nutrisurvey 2007. Since there was no nutrient value of boiled milk, raw milk was taken and converted by nutrient retention factor if milk was boiled approximately 10 min (Ahuja, 2007). The nutrient composition of thin gruel made from the flour of mixture of different cereals and legumes was calculated from the flour in Ethiopian FCT (EHNRI, 1998).

3.7 Operational and standard definition

Minimum dietary diversity score: The proportion of children who received five or more food groups during the previous day (WHO, 2010). Eight food groups were used to calculate Minimum Dietary diversity score

Women land ownership: women who are capable of making decision on the use of agricultural land

Mass media: Diverse array of media technologies that reach a large audience via mass communication. In the present study three forms of mass media, which are newspaper, radio and television are considered depending on Ethiopian Health and Demographic survey (EDHS, 2016)

Women's access to media: Women's are considered as they have access to media if they have at least one form of media at least once in a week depending on EDHS 2016 survey.

3.8 Statistical analysis

The normality of data was checked and SPSS version 25 was used for data analysis. Comparison of each variable was done based on women landownership. The result was presented in the form of frequency counts for categorical variables and in the form of mean ± SD for continuous variables. The estimated nutrient intakes were compared with RDA and the gap between the intakes and the recommendations were presented as percentages. Then, any difference in the variables, based on women-land ownership, was compared using Chi square test and Mann whitney u test depending on the type of data.

3.9 Ethical Clearance

The study was conducted after obtaining ethical approval for the protocol from Addis Ababa University College of Natural and Computational Sciences Institutional Review Boards and Oromia Health Bearue. The overall objective of the study and the possible risks and benefits of the study to the participating volunteers were clearly presented. When the participants were willing to take part in the study, written informed consent was obtained from the household. The data from the participant were obtained using oral interview. Following the existence of COVID-19 pandemic disease, all prevention methods such as social distancing, wearing mask for both respondent and interviewee, were taken to prevent the transmission. All the information collected from participants was kept confidential, in such a way that personal information was not disclosed.

Chapter Four: Results and Discussions

4.1 Results

4.1.1 Background characteristics of the respondents

The mean age of the mothers was thirty-one (30.9±4.9) and sixthy percent (59.9%) of them were married while the remaining were either divorced or widowed (40%). More than half of the caregivers received formal education (53.2%). The average family size of the households was 6 (6.3 ± 2) but close to 80% of the households with the children were having more than five family members. Sixty-eight percent of the caregivers were Orthodox Christians and majority of them were farmers (79.2%). Majority of the caregivers received nutrition education (65.9%) through the health extension services (Table 4.1) that included practices of hygiene, sanitation and child feeding. Nevertheless, those who received it through the media were only 13%. More than ¾ (78%) of the women received pre-natal or post-natal care from a health center while pregnant with the study child. Mothers were the decision makers about family wellbeing in forty percent of the households; however, most of the children's caregivers were both parents (59.9%). On the otherhand, the mean age of the children was 38 months (38±20). But a little bit higher than half of the children were between 13-36 months of age while the remaining 10% and almost 40% of the children were between the months of 6-12 and 37-60 respectively (Table 4.1). The proportion of male (52%) and female (48) children in the study were almost equal and majority of them ever got vaccinated (87.7%).

The proportion of married women among those women who own land were lower than those who do not own land. Similarly, higher proportion of women without land received education at the level of secondary and above. Although, less than 15% of the households practice pastoral/agro pastoral activities, relatively more number of women with land ownership practice it.

Table 4. 1 Background characteristics of 6 to 59 children and their caregivers in Sebeta Hawas, Adea, and Girar Jarso woredas of Oromia

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Variable	Mean ± SD/ Frequency (%) (332)	Mothers of children		P Value
		With land ownership (143)	Without land ownership (189)	
Mother's age	30.9 ± 4.9	30.84±4.86	30.06±4.86	0.15
Marital status:				0.00*
Married	199(59.9)	69 (48.25)	130 (68.78)	
Divorced/ widowed	133(40.1)	74 (51.75)	59 (31.22)	
Educational status:				0.00*
No formal education	155(46.7)	73 (51.05)	82 (43.39)	
Primary	120(36.1)	57 (39.86)	63 (33.33)	
Secondary and above	57(17.1)	13 (9.09)	44 (23.28)	
Religion:				0.69
Muslim	66(19.9)	28 (19.58)	38 (20.11)	
Orthodox Christian	227(68.4)	101 (70.63)	127 (67.20	
Other	39(11.7)	14 (9.79)	24 (12.70)	
Family size:				0.14
≤ 5	71(21.4)	37 (25.87)	36 (19.05)	
>5	261(78.6)	106 (74.13)	153 (80.95)	
Livelihood system:				0.03*
Pastoral/ agro pastoral	47(14.16)	13 (9.09)	34 (18.00)	
Farmer	263(79.22)	124 (86.71)	139 (73.54)	
Government/private employee	1(0.30)	0	1(0.53)	
Other	21(6.33)	6 (4.20)	15 (7.93)	
Received ante natal /post-natal care				0.23
Yes	259(78)	108 (75.52)	153 (80.95)	
No	71(21.4)	35 (24.48)	36 (19.05)	
Received nutrition education				0.52
Yes	218 (65.66)	89 (62.24)	129 (68.25)	
No	114 (34.34)	54 (37.76)	60 (31.74)	
Received health & nutrition related information from media				0.25
Yes	44 (13.25)	17 (11.89)	27 (14.29)	
No	288 (86.75)	126 (88.11)	162 (85.71)	
1Decision maker about family wellbeing:				0.52
Mother and father	194(58.4)	86 (60.14)	107 (56.61)	
Mother only	138(41.6)	57 (39.86)	82 (43.39)	

Child characteristics				
Child sex: Male Female	 173(52) 159(48)	 73 (51.05) 70 (48.95)	 93 (49.21) 96 (50.79)	0.07
Child age (months) 6-12 13-36 37-60	 33(9.9) 170(51.1) 129(38.9)	 16 (11.2) 67 (48.6) 60 (42)	 28 (14.8) 85 (45) 75 (39.7)	0.61
Child caregiver Both parents Single mom	 199 (59.9) 133(40.1)	 109 (76) 34 (24)	 80 (42) 109 (58)	0.04*
Child ever vaccinated Yes No	 291(87.7) 41(12.3)	 116 (81.12) 27 (18.88)	 175 (92.59) 14 (7.41)	0.00*

4.1.2 Properties owned by caregivers of under-five children

All participants do have land to use; however, 31% of the participants owned the land through rent while (9.9%) owned it though other form of land ownership (9.9%). The land size of close to 95% of the participants was less than 2ha and the women land ownership was 43.1% (Table 4.2). However, 31.9% of the women reported that traditionally there are barriers that prevent women's equal access and utilization of land with men. More than half (56.9%) of the land ownership was by fathers, sons or jointly by fathers and mothers.

Most of the farmers produced either fruits or vegetables in addition to cereals and pulses. However, more than1/3 (34.6%) of the households produce only cereals and pulses. Intercropping method of agricultural production was used by 19.6% of the participants; however, less than 10% (7.8%) of the households used irrigation facility for production of agricultural commodities.

Table 4. 2 Women land ownership and land use related information of caregivers of under-five children in Sebeta Hawas, Adea, and Girar Jarso woredas of Oromia

Characteristics	Frequency (%) All (332)	Mothers of children		P Value
		With women land ownership (143)	Without women land ownership (189)	
Have land to use Yes	100 (100%)	143 (43.10)	189 (56.93)	0.00*
Form of land ownership				
Own land	197(59.3)	84 (58.7)	112 (59.3)	0.99
Rented	102(30.7)	45 (31.4)	58 (30.6)	
Other	33(9.9)	14 (9.8)	19 (10.0)	
Land size				
< 2 hectare	312(94)	138 (96.5)	174 (92)	0.09
≥ 2 hectares	20(6)	5 (3.5)	15 (7.9)	
Practice intercropping				
Yes	65(19.6)	28 (19.6)	36 (19)	
No	267(80.4)	115 (80.4)	153 (80.9)	
Irrigation facility				
Yes	26(7.8)	10 (7.0)	16 (8.5)	0.62
No	305(91.9)	133 (93)	173 (91.5)	
Commonly produced crops:				
Cereals and pulses only	115(34.6)	53 (37.1)	62 (32.8)	0.22
Fruits and vegetables only	37(11.1)	20 (14.0)	18 (9.5)	
Cereals, pulses, fruits, vegetables	179(53.9)	70 (49)	109 (57.7)	
Barriers exist to women land ownership				
Yes	106(31.9)	45 (31.5)	61(32.3)	0.88
No	226(68.1)	98 (68.5)	128 (67.7)	

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Domestic animals such as goats, sheep, cows, chickens were owned by 80% of the respondents. Close to 40%, 26.2% and 37% of the respondents had access to radio, television and mobile phone respectively. However, the proportion of women who own radio and mobile phone were higher among women without land. From the total women only 45.2% had independent income source and almost half (49.4) of them have access to credit services from credit providing institutions such as government and bank institutions. Majority (80.1%) of the households are members of one or more associations such as Ikub and Idir.

Table 4. 3 Properties owned by caregivers of under-five children with and without women land ownership, Sebeta Hawas, Adea, and Girar Jarso woredas of Oromia.

Property name	Frequency (Percent)	Women with land 143	Women without land 189	P Value
Own livestock				
Yes	266(80.1)	122 (85.31)	146 (77.25)	0.06
No	66(19.9)	21 (14.68)	43 (22.75)	
Own radio				
Yes	131(39.5)	47 (32.8)	84 (44.4)	0.03*
No	198(59.6)	96 (67.1)	105 (55.5)	
Own television				
Yes	87(26.2)	39 (27.27)	48 (28.40)	0.7
No	245(73.8)	104 (72.72)	141(74.60)	
Own mobile phone				
Yes	123(37)	44 (30.7)	79 (41.7)	0.03*
No	209(63)	99 (69.2)	110 (58)	
Women with independent income source				
Yes	150(45.2)	58 (40.56)	96 (50.79)	0.6
No	181(54.5)	85 (59.44)	93 (46.21)	
Access to credit service				
Yes	164(49.4)	71 (49.65)	100 (52.91)	0.56
No	166(50)	72 (50.35)	89 (47.10)	
Member of one or more associations				
Yes	266(80.1)	115 (80.42)	151(79.89)	0.9
No	66(19.9)	28 (19.58)	38 (20.10)	

4.1.3 Women mass media use

Only 1% of the women read newspaper and only a little bit higher than a quarter of the women watch television and listen radio at least three times a week; however there was no significant difference in the proportion of women who use mass media based on women land owner ship (table 4.4). Even though it was not statistically significant more number of women without land listen radio.

Table 4. 4 Caregivers of under-five children that use mass media at least three times a week categorized on women land ownership in Sebeta Hawas, Adea, and Girar Jarso woredas of Oromia.

Type of media	All n (%) (332)	Women with land (143)	Women without land (189)	P Value
Read newspaper				
Yes	4 (1.2)	2 (1.4)	2 (1.1)	
No	11 (3.3)	5 (3.5)	6 (3.2)	0.94
Watch TV				
Yes	91(27.4)	40 (28)	51(27)	0.19
No	6 (1.8)	1 (0.7)	5 (2.6)	
Listen radio				
Yes	95 (28.6)	35 (24.5)	60 (31.7)	0.56
No	35 (10.5)	11 (7.7)	24 (12.7)	

4.2 Child feeding practices and food groups consumed by the children

Close to half (41%) of the children did not get colostrum within one hour of birth. Similarly, on time introduction of complementary foods was below 50% (39.2%). However, the prevalence of exclusively breastfeeding was 63% and continuous breastfeeding was 65%. More than ¾ of the households own toilet facility but higher than a quarter of the children were suffering from diarrhea during the past two weeks (table 4.5).

Table 4. 5 Feeding practices and diarrhea related information of under five children in Sebeta Hawas, Adea, and Girar Jarso woredas of Oromia

Feeding practices	All N (332)	Women with land (143)	Women without land (189)	P value
Breastfeeding within one hour of birth:				
Yes	196(59)	80 (55.9)	116 (61.4)	0.32
No	136(41.0))	63 (44)	73 (38.6)	
Exclusive breastfeeding for six months				
Yes	208(62.7)	90 (62.9)	120 (63.5)	0.92
No	124(37.3)	53 (37)	69 (36.5)	
Timely introduction of complementary foods				
Yes	130(39.2)	50 (35.0)	80 (42.3)	0.17
No	202(60.8)	93 (65)	109 (57.7)	
Continuous breastfeeding up to 2 years				0.97
Yes	214 (64.5)	92 (64.3)	122 (64.6)	
No	35.5 (118)	51 (35.7)	67 (35.4)	
Diarrhea during the past 2 weeks	93(28)	47 (32.9)	44 (23.3)	0.05
Yes	239(72)	96 (67.1)	145 (76.7)	
No				
Own toilet facility	252 (75.9)	102 (71.3)	150 (79.4)	
Yes	80 (24.1)	42 (29.4)	39 (20.6)	0.09
No				

Starchy staples were consumed by more than 90% of the children and close to a ¾ of the women consumed legumes and nuts. However, children who consumed flesh foods and eggs were below 20%. On the other hand, children who consumed dairy products were 84%. Vitamin A rich fruits and vegetables and other fruits and vegetables were consumed only by less than forty percent of the children. The minimum dietary diversity score was achieved only by 48% of the children (Figure 4.2). The proportion of children of women, who own land, that consumed starchy staples and dairy products were 95.1% and 89.5% respectively and it was higher than the proportion of children of women without land who consumed the foods (87.8%) and (79.3%). On the other hand, the proportion of children of women without land, who consumed legumes and nuts were (78.3) higher than those children of women with land (64.3) ($P<0.05$).

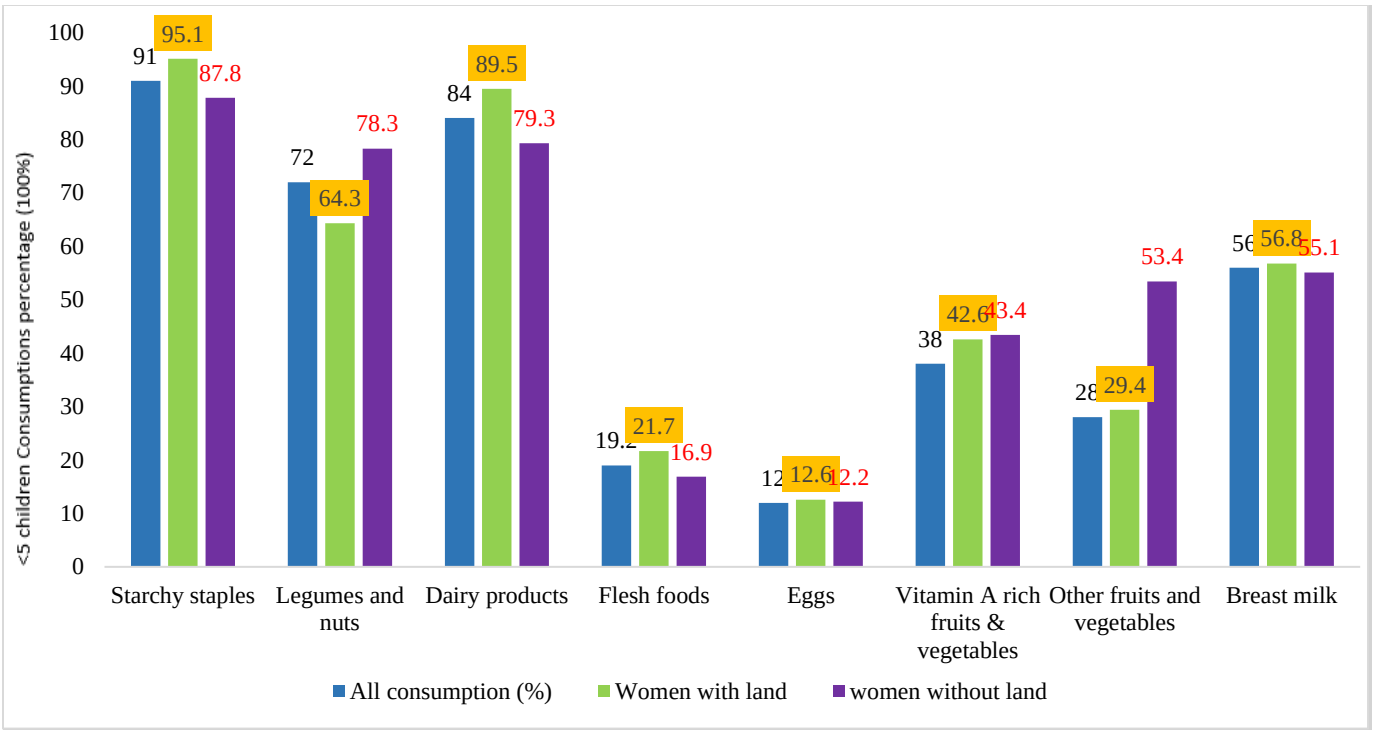

Figure 4. 1 Food groups consumed by children aged 6 to 59 months with respect to landownership in Sebeta Hawas, Adea, and Girar Jarso woredas of Oromia

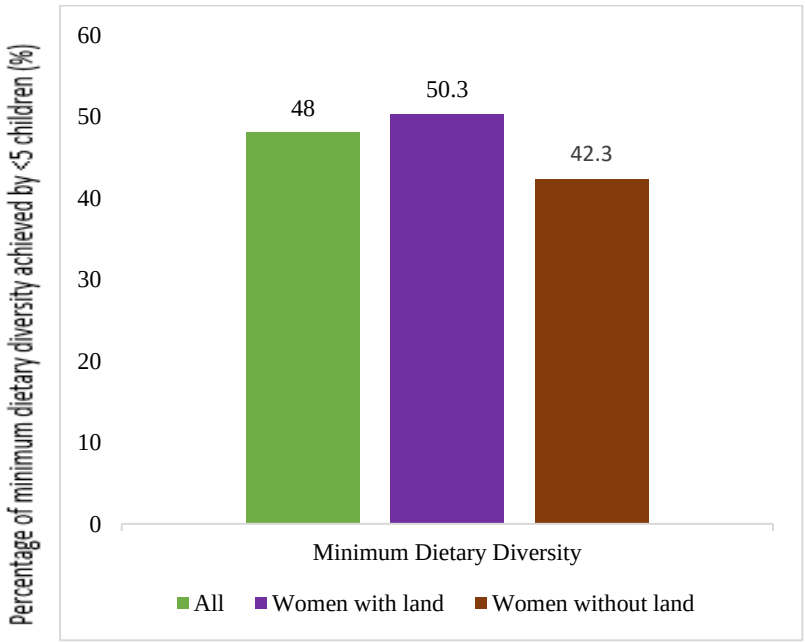

Figure 4. 2 Minimum diet diversity consumption of children aged 6 to 59 months with respect to landownership in Sebeta Hawas, Adea, and Girar Jarso woredas of Oromia.

4.3 Nutrient intakes of the children

The median energy intakes was more than 100% of the recommended intakes for children aged above a year. However, the median intakes of the children at the stage of the second 6 months was below 90%. On the other hand, the average carbohydrate and the protein intakes was close to 190%. However, the fat intake was almost 50% of the recommendation on the average. The calcium intakes was above 100 of the recommended amount during the second half of the first year. Conversely, the calcium intakes of those above one year was only 66% of the recommendation. Nevertheless, the average phosphorous intakes of the children was 140% of the recommended intake on average. Similarly, the iron intakes of the children was 9 times higher than the suggested quantity for the children (Table 4.6). Though the ascorbic acid intake was below 20%, the intakes of children of women without land was significantly higher than those children of women who own land ($P<0.05$). However, there was no significant difference between the other nutrient intakes of children of mothers with land and without land.

Table 4. 6 Energy and nutrient intakes of children aged 6 to 59 months relative to the recommended intake and women land ownership in Sebeta Hawas, Adea, and Girar Jarso woredas of Oromia.

Nutrients	Child age (Months)	Recommendation		Child intake				P value
		Males (M)	Females (F)	All Median	Percent of children met recommendation (M,F)	Children of mothers		
						With land	without land	
Energy (K/calorie) (EER)	6-12 13-36 37-59	743 1046 1742	676 992 1642	604 1883 2123	(81, 89) (180, 190) (122, 129)	1773	1869	0.9
Protein (g) RDA	6-12 13-36 37-60	11 13 19		25 31 43	(227) (238) (226)	36	38	0.83
Fat (g) (AI)	6-12 13-36 37-60	30 35 58		15 21 26	(50) (60) (45)	22	21	0.51
Iron (mg) *(AI)*	6-12 13-36 37-60	11 7 10		44 80 128	(400) (1142 (1280)	89	87	0.67
Calcium (mg) AI	6-12 13-36 37-60	260 500 800	270	307 354 493	(118, 114) (71) (62)	396	420	0.73
Ascorbic acid (mg) RDA	6-12 13-36 37-60	50 15 25		2.34 2.65 2.59	(4.6) (18) (10)	2.3	3.8	0.02*

EER- Estimated Energy Requirement

RDA- Recommended Dietary allowance

AI-Adequate Intake

4.2 Discussion

The key to ending malnutrition in all its forms requires scaling up proven nutrition interventions such as optimal infant and young child feeding (Pietrobelliet al., 2017; Cunha et al., 2015). In cognizant of this, the present study unpacked infant and young child feeding practices and nutrient intakes of children 6 to 59 months of age. Nevertheless, the feeding practices in the study area was suboptimal.

Improper breastfeeding and complementary feeding practices were common. High proportion of children were not breastfed within one hour of birth and were not exclusively breastfed (~ 40%). This is unlucky considering the losses from various dimensions such as health, economic, social and environment (Victora et al., 2016). Improperly breastfed children will miss the benefit of protection from mortality, related to infection; overweight and obesity; and stimulation of cognitive development (WHO, 2020). Not only the children but the mothers will also miss the opportunity to be protected from breast and ovarian cancer (Bartick et al., 2017; Victora, 2016). In addition, the improper breastfeeding will increase greenhouse gases, a carbon footprint and waste of the environment through formula feeding (Karlsson et al., 2019). The prevalence of breastfeeding within one hour of birth (59%) and the prevalence of continuous breastfeeding at 2 years (64.5) were distant from the national proportion of 72% for both feeding practices (CSA, 2019). However, exclusive breastfeeding for six months was 63%, which was slightly higher than the national prevalence of 59% from the 2019 Ethiopian National Health survey (CSA, 2019). The reason for the observed differences in proportion could be differences in the study design. This study is a cross sectional study and only one data point is collected.

The current rate of exclusive breastfeeding in the study area met the WHO global nutrition targets percentage of at least 50% by the year 2025 (WHO, 2014). This is encouraging considering that breastfeeding support lifelong health for the mother and the child (Louis-Jacques and Stuebe, 2020). However, the collective targets for these global rates in 2030 are 70% for initiation in the first hour, 70% for exclusive breastfeeding, 80% at one year, and 60% at two years (WHO, 2019). Based on this, the rate of breastfeeding within one

hour of birth; exclusive breastfeeding; and continuous breastfeeding at two years in the study area were only 84%, 89.6% and 80.6% of the global target set to be met in 2030. Therefore, the country's efforts towards meeting the target rates of breastfeeding must be amplified. Exclusive breastfeeding for six months was only 63% this may be because of the high ownership of domestic animals/cattle among the households that is associated with early introduction of milk (Sellen, 1998).

Arikpo and Odey (2018) indicated that health education to mothers is essential in promoting appropriate age of introduction of complementary foods especially during the ante and post-natal period. However, timely introduction of complementary foods among the women was less than half even though 66% of the women received nutrition education and close to 80% of the women accessed pre-natal or post-natal care from a health center while pregnant with the study child. This may indicate the need to investigate the effective ness of the nutrition education delivered to the women and identify the possible gaps. Also, close to one third of the women watch TV and listen radio at least three times a week on average. However, those women who received health & nutrition related information through mass media were less than 15%. This indicates that the mass media is underutilized with regard to conveying information related to health and nutrition.

The proportion of timely introduction of complementary foods was better in this study compared to the reported 98% children who were complemented before the age of 6 months in Kenya (Kimani-murage et al., 2011). Part of the reason for the proportion difference could be variation in the mothers' perception about child feeding or it might be related to the effectiveness of the nutrition education delivered to the mothers. Also, timely introduction of complementary foods was less than 40% in this study, which is problematic given that early introduction of complementary feeding is associated with a substantially increased risk of frequent diarrhea and other infectious diseases resulting in undernutrition (UNICEF, 2016). This will explain the diarrhea reported by 1/3 of the children in this study that could be linked to inadequate access to clean and safe water in in the country leading to microbial contamination of complementary foods through unsafe preparation and storage.

The proportion of participants who produce cereal and pulses and fruits and vegetables only were close to 50% this might be related to the small land size they own. However, starchy staples and legumes and nuts were consumed commonly among the children. Regrettably, this was combined with the low consumption of animal source foods, except dairy products. Fruits and vegetables consumption was also very low. As a result, the minimum dietary diversity (MDD) score was achieved by less than 50% of the children. This low MDD is common in sub-Saharan African countries (Sayed and Scho¨nfeldt, 2018; Disha *et al* 2012). According to previous reports, low MDD was associated with child stunting (Masuke et al., 2021). Therefore, the prevalence of stunting in the study area is possibly high as a result of the low MDD. More diversified diet is highly correlated with adequate energy and protein, micronutrients, and animal source food (Kennedy et al., 2007; Steyn et al., 2006).

In the present study, the intakes of energy, fat, calcium, and ascorbic acid among the children was below the recommendation, which is possibly associated with the low MDD. This is in line with the nutrition collaborative research support program report that indicated that low animal source food consumption is associated with low intakes of nutrients such as calcium, zinc, riboflavin etc. (Calloway et al., 1992) all of which are considered vital for healthy body development, muscle growth, and nervous system function, and are recommended to be consumed on a regular basis (Murphy and Allen, 2003). It has been estimated that appropriate complementary feeding practices contribute to 17 percent reduction in the prevalence of stunting at 24 months of age and could avert 6 percent of under-five deaths each year. Missing this opportunity in a country where the problem is serious is annoying through simply improving modifiable behaviors.

Women landownership was less than 50% this is unfortunate given that the proportion of women landownership was not in line with the Federal Democratic Republic of Ethiopia (FDRE) constitution, which recognizes gender equality (FDRE, 1995). It also did not fulfill the revised family laws that recognizes the equality of men and women in all aspects including ownership and administration of personal and common property (FDRE, 2000) and the Ethiopian government land administration legislations, which recognize a woman's

equal right to rural land (FDRE, 2005; FDRE, 1997). Above all, the low women landownership will have significant impact on child feeding practices and it was expressed in this study through high consumption of dairy products among children of women with land ownership ($p=0.01$). The high consumption of dairy products among the children was without the presence significant difference in the proportion of women who own livestock among the two group of women. In this study large proportion of women with land were single moms that will enable them to have decision making power on child feeding. This women autonomy allows them to choose the right or wrong thing about child feeding practices as indicated by Jennings (2015) which might have positive contribution on both long and short term nutritional status of children (IFPRI, 2003).

Approximately a third of the women reported the existence of barriers to women land ownership in the area. This result is in line with the report from Wolaita that indicated challenges to women's right to and control over rural land because of pessimistic attitude of the community towards women and lack of legal awareness on the extent of their right to the rural land. Besides, there is resource limitation and lack of an effective legal aid system to women that challenges them in enforcing their right through the trial scheme that has a lengthy procedure from the lowest administrative unit to the federal court of cassation (Tura et al., 2014).

Large proportion of children of women without land ownership got their child vaccinated ($p< 0.05$). This is a good news because it is known that vaccination is associated with good nutrition (Teresa et al., 2020). The possibility of large vaccination uptake among children of women without land ownership could be the better educational status ($P<0.05$) among the women. In addition, working in other sectors than farming ($p=0.03$), having radio ($p<0.05$) and mobile phone ($p<0.05$) would gives them access to information related to the benefits child vaccination.

The consumption of starchy staples by significant proportion ($p<0.05$) of children of women with land ownership and the high consumption of legumes and nuts ($p<0.05$) among children of women without landownership could be because of the presence and absence of male support among women without land and with land respectively. The ascorbic acid intake of children of women with landownership was substantially lower than

women of children without land ownership this might be related to the higher proportion of children women without land ownership who consumed other fruits and vegetables (Table, 4.6).

Less than 50% of the children met the minimum diet diversity and there was no association between land ownership and diet diversity this result disagrees with the report from rural Ethiopia that indicated association between land ownership and high diet diversity (Kuche et al., 2010). Women landownership was partially associated with child feeding practices and nutrient intakes. However, it was known that women's empowerment facilitates the IYCF practices. However, child-feeding practices has multiple dimensions therefore in addition to empowering women their work load should be limited so they still have time to provide optimal IYCF practices to their children. However in this study substantial proportion of women with landownership were single moms who did not get male support.

4.3 Limitation and strength of the study

This study investigated the association between child feeding practices and women-landownership but it did not study the direction of association. In addition, the study design was cross sectional; and it has no data on child nutritional status. However, the study unpacked association of women-land ownership with child feeding practices, which can fill the huge information void in the country on the topic.

Chapter Five: Conclusion and Recommendation

5.1 Conclusions

The infant and young child feeding practices were sub-optimal. Even though majority of the households own toilet facility the prevalence of diarrhea was substantial among the children. Starchy staples, legume and nuts were consumed widely among the children. However, consumption of animal source foods was very low except dairy products. Likewise, the intake of Vitamin A rich fruits and vegetables and other fruits and vegetables was small. The minimum dietary diversity was achieved by a little number of children. There was sub optimal energy intake among the children during the second 6 months of life. However, the median energy intake from one year to five years met the recommended amount. The carbohydrate and the protein intakes met the recommendation. However, the median fat intake fulfilled only half of the recommendation for all the children on average. The iron intake met the recommended intake but the median calcium intake met the recommended amount only during the second half of the first year. But calcium intakes of the children 13 to 59 months of age was below 70% of the recommended amount. Similarly, the median intakes of ascorbic acid was very low. Breast-feeding practices was not associated with land ownership. However, consumption of starchy staples, legumes and nuts and dairy products as well as ascorbic acid intake was associated with land ownership

5.2 Recommendations

Breastfeeding and complementary feeding practices should be addressed as a modifiable health behavior to support lifelong health for the mother and child and continued efforts are needed to achieve the 2030 global breastfeeding target**.** In addition, production and consumption of diversified diets should be promoted and it is necessary to strengthen the role of women and their landownership, so that they will be more confident in performing appropriate IYCF practice for their children.

The society residing in the rural areas should be encouraged to utilize information obtained from different sources such as mass media for better child feeding practices. Extension service has to be further enhanced and strengthened to promote optimal infant and young child feeding practices through the promotion of consumption of diverse diet by including animal source food. Ensuring equal access and use of assets for both males and females in home can bring positive impact on children nutrient intake. The farmers should be encouraged to produce and consume commodities such as fruits and vegetables for the sake of dietary diversity by practicing home gardening, irrigation and others. Similarly, the promotion of small animal rearing for household consumption may also bring significant improvement in the consumption of animal source food. Further research is also needed to study child nutritional status and to identify the effect of seasonal variation on nutrient intake and feeding practice.

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Annexes
Questionnaire

Title: Association of Women Landownership with Child Feeding Practices and Nutrient Intakes among Children Aged 6 to 59 Months in Oromia, Ethiopia

(During the interview, some sayings that are very traditional and have connection with to the study, will be paid attentions and a note will be taken)

1. General information and socio-demography

1.1 Name of the respondent: _____
1.2 Date of interview: _____Day of interview: _____
1.3 Name of the Zone, Woreda and Kebele:_____
1.4 Name of the PA_____
1.5 Questionnaire Number _____
1.6 Time interview started _____
1.7 Gender [1] Male [2] Female
1.8 Age_____
1.9 Marital status [1] Married [2] single [3] Divorced
1.10 Education [1] None [2] Primary [3] Secondary [4] college/University
1.11 Religion 1) Muslim 2) Orthodox 3) Catholic 4) Protestant 5) Wakefata 6) Other
1.12 Livelihood system

a. Pure pastoral
b. Crop production
c. Agro-pastoral
d. Trading
e. Government worker
f. Others (to be mentioned) _____

2. Mass media exposure

2.1 Do you read newspaper at least once in a week less than once a week or not at all?

A) Yes B) No

2.2 If Yes how many times in a week_____

2.3 Do you own radio? A). Yes B). No

2.4 Do you listen to radio at least once in a week, less than once a week or not at all? (If do not have at home from neighbor, public places….)

A) Yes B) No

2.5 If Yes how many times in a week_____
2.6 Do you own Television? A) Yes B) No
2.7 Do you watch television at least once in a week, less than once a week or not at all? (If do not have at home from neighbor, public places….)

A). Yes B). No

2. 8 If Yes how many times in a week_____

2.9 Do you own mobile phone_____

A). Yes B). No

2.10 What information do you obtain from mass Medias?

_____
_____
_____
_____

2.11 Have you ever had any kind of training that are related to nutrition whether from health center, hospital or health extensions?

A). Yes B). No

_____
_____
_____
_____

3. Land ownership information

3.1 Do you have your own land or rented? _____

3.2. What is the area of your land? (In hectare)_____

3.3 Do you use all of them for crop production

_____
_____
_____

3.4. Who owns the land from this family? (You? your husband? Your daughter, son others) or jointly?

3.8. Are there barriers (historical, traditional, cultural, religious and other) affecting the equal access of women to land?

_____
_____
_____
_____

3.9 Decision maker on wellbeing of the family?

A). You B). Husband

3.10 Do you own domestic animals? A) yes B) No

3.11If Yes List them? Cows, Oxen, Heifers, Calves, Bulls, Goats, Sheep, Poultry, Donkey, Horse, Camel, Others (specify)

3.11. Do you have the power to make decision on other assets in the house (sheep, got, chicken, eggs, butter, and cash?)

A). Yes B). No

3.12. Do you have your own independent income source?

A). Yes B). No

3.13 If yes, source of your Income

_____

_____

_____

3.14. What kind of crop do you produce?

_____

_____

_____

3.15. Do you use all of your production for consumption or sell some of them?

_____

_____

_____

3.16. Do you practice intercropping?

A). Yes B). No

3.17 Do you have irrigation facilities?

A). Yes B). No

3.18 If yes what are the major crops grown under irrigation

_____

_____

_____

3.19What is the source of water for house consumption? 1) Tap water 2) Bottled 3) Spring 3) Running water 4) Pit water 5) Other- please specify

3.20 How much water do you consume per day? _____

3.21Is the water for drinking and sanitation coming from different source?

A) Yes B) No

3.22 Have your children been suffered from diarrhea in the past 2 weeks?

A) Yes B) No

3.23Did you/ your children receive vaccination/ immunization?

A). Yes B). No

3.24 Do you follow prenatal/ post-natal care at health facility?

A). Yes B). No

3.28 Do you own toilet facility?

A). Yes B). No

3.29 Do you have credit access?

A). Yes B). No

3.31. Do you have associations (iddir, iqub_)

A). Yes B). No

3.32 Your child age_____

3.33 Your child sex _____

3.33 When did your children started complementary food? (age) _____

3.34 Exclusive breastfeeding for the first 6 months

A) Yes B). No

3.34 Did you give colostrum to your child?

A) Yes B). No

3.35 Breastfeeding now_____?

3.36 continuous breastfeeding up to 2 years? A) Yes B) No

4. Children's nutrient intake

Please describe the food and drinks (meals and snacks) that your children ate or drank yesterday during the day and night at home or outside the home. Start with the first food or drink of the morning.

Breakfast	How much?	Lunch	How much?	Dinner	How much?

5. Dietary diversity

Please describe the food and drinks (meals and snacks) that you ate or drank yesterday during the day and night at home or outside the home. Start with the first food or drink of the morning (respondent will be mother).

Breakfast	Lunch	Dinner

Mata-duree: Association of Women Landownership with Child Feeding Practices and Nutrient Intakes Among Children Aged 6 to 59 Months in Oromia, Ethiopia

(*Yeroo af gaaffii jechoonni beekamoo hin ta'in kan naannoo sanatti dubbatamu yoo jiraate yoo dhageessan kan qorannoo kana waliin deemu yoo jiraate xiyyeeffannoo itti kennuudhaan qabsiisa qabadhaa*)

1. Odeeffannoo walii galaa fi Hawaasaa

1.1 Maqaa nama gaafatamuu _____

1.2 Guyyaa gaaffii (Lakkoofsaan)_____Guyyaa gaaffii(Maqaadhaan)_____

1.3 Maqaa godinaa, aanaa, ganda _____

1.4 Maqaa garee (PA)_____
1.5 Lakkoofsa bargaaffii_____
1.6 Yeroo itti gaaffiin jalqabame_____
1.7 Saala [1] Dhiira [2] Dubartii
1.8 Umurii_____
1.9 Haala gaa'ilaa [1] kan eerume/ mte [2] kan hin fuune/hin eerumne [3] kan addaan bahe/ baate
1.10 Sadarkaa barnootaa [1] omaa kan hin baranne [2] sad. jalqabaa [3] sad. lammaffaa [4] kolleejjii/ yuunivarsitii
1.11 Amantaa_____1) Musliima 2) Ortodoksii 3) kaatolikii 4) Protestaantii 5) Waaqeffataa 6) kan biraa_____
1.12 Haala jireenyaa

g. Horsiisee bulaa
h. Qotee bulaa
i. Wal makaa (qonnaa fi horsiisee bulaa)
j. Daldala
k. Hojjetaa mootummaa
l. Kan biraa _____

2. Waayee miidiyaa ilaalchisee

2.1 Gaazeexaa torbanitti yoo xiqqaate yeroo tokko ni dubbistuu, torbanitti yeroo tokkoo gadi yookiin tasuma hin dubbistanii?

A) Eeyyee B). Lakki

2.2 Yoo eeyyee ta'e torbanitti hangam?_____
2.3 Raadiyoo ni qabduu?

A. Eeyyee B). Lakki

2.4 Raadiyoo yoo xiqqaate torbanitti yeroo tokko ni dhaggeeffattuu, torbanitti yeroo tokkoo gadi yookiin tasuma hin dhaggeeffattanii?(Yoo hin qabdan ta'e ollaadhaa, alaa, bakka kan biraadhaas_____

A).Eeyyee B). Lakki

2.5 Yoo eeyyee ta'e torbanitti hangam_____

2.6 Televiizhinii ni qabduu?

2.7 Televiizhinii yoo xiqqaate torbanitti yeroo tokko ni daawwattuu, torbanitti yeroo tokkoo gadi yookiin tasuma hin daawwattanii? ?(Yoo hin qabdan ta'e ollaadhaa, alaa, bakka kan biraadhaas_____)

A) eeyyee B) Lakki

2.8 Yoo eeyyee ta'e torbanitti hangam?_____

2.9 Mobaayilii qabduu?

A) eeyyee B) Lakki

2.10 odeeffannoo akkamii irraa argattu, gaazexaas ta'e, raadiyoos. Tv's _____
_____
_____
_____

2.11 Leenjii/ barumsa waayee sirna nyaataa, qulqullina naannoo fi kanaan wal fakkaatan buufata fayyaarraa, hospitaalaa yookiin eksteenshinii fayyaarraa fudhattanii/ dhageessanii beektuu?

A) eeyyee B) Lakki

_____
_____
_____
_____

3. Odeeffannoo waayee abbummaa lafaa

3.1 Lafa kan mataa keessanii qabdumoo kireeffattanii fayyadamtu?
3.2 Bali'inni lafa keessanii hangam ta'a ?(Hektaaraan)_____
3.3 Lafa hundumasaa midhaan oomishuuf ni fayyadamtuu?_____
3.4 .Maatii keessan keessaa eenyutu lafa hooggana (abbummaa qaba)? (isin ? abbaa warraa? Intala , ilma, kan biraa_____ibsi) moo waliini?
3.5 Lafa irratti hooggantuu ta'uun yookiin ta'uu dhiisuun miidhaa/ faayidaa qabaa?
A) Eeyyee B) lakki
3.6 Yoo isin ta'e faayidaa/ miidhaa maalii qaba lafa irratti hoogganuun? _____
_____
3.7 Hoogganuu dhiisuunhoo miidhaa/ faayidaa maalii qaba? _____
_____
_____
3.8 Seenaan, aadaanis ta'e amantaadhaan akka dubartoonni carraa lafatti fayyadamuu dhiiraan qixxee hin qabaanne wanti godhu jiraa?
_____
_____

_____
_____

3.9 Yoo kan lafa hoogganu nama biraadha ta'e waayee gosa midhaanii oomishamuu, akkaataa kamiin jireenya maatii keessanii akka fooyyessitan irratti isiniif carraa marii ni kennaa/kennuu?

A) Eeyyee B) Lakki

3.10 Horii manaa maalfaa qabdu (loon dhalaa, sangaa, goromsa, Jibicha, lukkuu, harree, farda, gala, kan biraa_____)

3.11 Qabeenya kan biraa qabdan irratti murteessuuf aangoo qabduu? (hoolaa, re'ee, lukkuu, hanqaaquu, dhadhaa_____gosa kamiinuu?)

A) Eeyyee B) Lakki

3.12 Galii kan dhuunfaa keessanii qabduu?

A) Eeyyee B) Lakki

3.13 Yoo eeyyee ta'e maddi galii keessanii maali?

_____
_____
_____

3.14 Midhaan maalfaa oomishtu? (midhaan callaa, kuduraa fi muduraa, gosa kan biraa_____ibsi?)

3.15 Kan oomishtan hundumaa nyaataaf oolchitu moo kaan ni gurgurtu?_____
_____

3.16 Mala oomishaa midhaan wal makaa (intercropping) ni fayyadamtuu?

A) Eeyyee B) Lakki

3.17 Jal'isii qabduu?

A) Eeyyee B) Lakki

3.18 Yoo qabaattan, jal'isiidhaan maal oomishtu

_____
_____
_____

3.19 Maddi bishaanii isin fayyadamtanii maali? 1. Kan lagaa 2. Kan warshaa (bottled) 3. Kan bool'aa_____

3.20 Guyyaatti bishaan hangam dhugdu?_____

3.21 Bishaanni kan dhugaatiifi kan qulqullinaaf fayyadamtan bakka garaa garaatii dhufaa?

A) Eeyyee B) Lakki

3.22 Daa'imni keessan dhukkuba garaa kaasaatiin guyyaa 15 as qabamee?

A) Eeyyee B) Lakki

3.23 .Ijoolleen keessan kittibaatii fudhatanii beekuu?

A) Eeyyee B) Lakki

3.24 Yoo eeyyee ta'e Kaardii kittibaatii natti agarsiisaa

3.25 Tajaajila da'umsa duraa/ da'umsa boodaa dhaabbata fayyaatti ni fayyadamtuu

A) Eeyyee B) Lakki

3.26 Yoo lakki jettan maalif

_____
_____
_____
_____

3.27 Hojjettoonni eksteenshinii fayyaa mana dhufanii gorsa isiniif kennuu?

A) Eeyyee B) Lakki

3.28 Mana fincaanii qabduu?

A) Eeyyee B) Lakki

3.29 Liqii mootummaarraa liqeeffachuuf yoo barbaaddan carraa qabduu?

A) Eeyyee B) Lakki

3.30. Yoo eeyyee jette liqii yoo liqeeffattan maalif fayyadamtu?

_____
_____
_____
_____

3.31 Dhaabbilee hawaasummaa qabduu (Iddir, iqqub?)

A) Eeyyee B) Lakki

3.32 Umuriin daa'ima keessanii meeqa?_____

3.33 Saala daa'imaa_____

3.32 Umurii kamitti mucaa keessaniif nyaata dabalataa kennitan

_____
_____
_____
_____

3.33 Osoo waan biraa hi kenniniif hanga baatii 6 tti harma qofaa hoosistaniittuu?

A) eeyyee B). lakki

3.34 Mucaa keessan silga hoosistaniittuu?

A) eeyyee B). lakki

3.35 Amma harma hoosisaa jirtuu?

A) eeyyee B). lakki

3.36 Hanga waggaa lamaatti harma hoosistaniittuu?

A) eeyyee B). lakki

4. Children's nutrient intake

Guyyaa kaleessaa ganamaa kaastee hanga halkaniitti nyaatas ta;e dhugaatii mana keessas ta'u alatti mucaan keessan nyaatte/te, kan ganamaarraa kaasuun natti himaa

Ciree	Hangam?	Laaqana	Hangam?	Irbaata	Hangam?

5. Dietary diversity

Guyyaa kaleessaa ganamaa kaastanii hanga halkaniitti nyaatas ta;e dhugaatii mana keessas ta’u alatti nyaattan, kan ganamaarraa kaasaa natti himaa

Breakfast	Lunch	Dinner

INFORMATION SHEET AND CONSENT

Greeting

We are conducting MSc thesis study entitled as Association of Women Landownership with Child Feeding Practices and Nutrient Intakes Among Children Aged 6 to 59 Months in Adea, Girar Jarso and Sebeta Hawas *woredas* in Oromia, Ethiopia from the center for food sciences and nutrition, college of natural and computational sciences. The study aims to Assess the the association of women landownership with child feeding practices and nutrient intakes among children aged 6 to 59 months in Adea, Girar Jarso and Sebeta Hawas *woredas* in Oromia, Ethiopia. We are going to ask you the questionnaire that includes the questions of ownership of land and the food and drink; you have eaten or drunk in the previous 24 hours. This will provide potentially useful information to the concerned bodies and government about the status of the land ownership as well as dietary adequacy of this area. We do not expect any relevant risk in this study. Whatever information's you provide will be kept confidential and anonymous. You have the right to refuse from participating in this research if you do not wish to. The interview may take a maximum of 30 minutes.

If you need any further explanation at any point, you can contact Geleta Dereje mobile +251913330820. If you have any questions about your rights as a research participant or wish to obtain information asks question or discus any concern about this study with some of other than the researchers, please contact the Ethics Review Board of the

College of Natural and Computational sciences, Addis Ababa University that has reviewed and approved the research project cnsethical@gmail.com.

Do you have any questions?

Do you agree to participate in the study?

- If you agree, read the consent form to the participant, date and sign it. If no, thank you and proceed to the next participant.

Consent form for Association of Women Landownership with Child Feeding Practices and Nutrient Intakes Among Children Aged 6 to 59 Months in Adea, Girar Jarso and Sebeta Hawas *woredas* in Oromia, Ethiopia. I have been informed about the objectives, risks and benefits of the study. I have also been informed about my rights not to participate in the

study and withdraw any time without any consequences. I have been able to ask questions about the study and my questions have been answered to my satisfaction. I understand that taking part in the study involves interview and sensory testing.

I understand the information collected will not be shared beyond the study. However, I agree that may be shared with other researchers for future research studies that may be similar to this study.

Based on the information provided above, I have agreed to participate in the study

_____ Name of participant (legal representative)	signature_____ date_____

I have witnessed the accurate reading of the consent form with the potential participant and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

_____ _____	_____	
Name of witness	signature	date

I have accurately read out the information sheet to the potential participant and, to the best of my ability, ensured that the participant understands to what they are freely consenting.

_____ Researchers/data collectors name	_____ _____ signature	_____ date

የጥናቱዓላማዎች፣አደጋዎችእናጥቅሞችመረጃተሰጥቶኛል።እኔምሆንኩበጥናቱላለመሳተፍመብቶ ቼንአሳውቆኛልእናምያለምንምጊዜማንሳትየሚያስከትለውመዘዝስለጥናቱጥያቄዎችንመጠየቅየቻ ልኩሲሆንጥያቄዎቼምስለነገሩእርካታእንዳገኝአስችሎኛል።

የተሰበሰበውመረጃከጥናቱበላይእንደማይጋራተረድቻለሁ።ሆኖምለወደፊቱየምርምርጥናቶችከዚህ ጥናትጋርተመሳሳይሊሆኑከሚችሉሌሎችተመራማሪዎችጋርሊጋራእንደሚችልእስማማለሁ።

ከዚህበላይበተጠቀሰውመረጃመሠረትእኔበጥናቱለመሳተፍእስማማለሁ።

የተሳታፊስም (የሕግወኪል) _____ _____

ፊርማ_____ ቀን_____

የስምምነትቅጹትክክለኛንባቡንከሚመለከተውተሳታፊጋርአይቻለሁ።ግለሰቡጥያቄዎችንየመጠየቅ እድልአግኝቷል።ግለሰቡእንዳለውይህበነፃፈቃድእንደሰጠአረጋግጣለሁ።

የምሥክርነትስም_____ ፊርማ_____
ቀን_____

የመረጃውንወረቀትበተቻለመጠንለተሳታፊውእናእስከሚቻልድረስአንብቤዋለሁየእኔተሳታፊበነጻ ምንእንደሚስማሙተረድቼያለሁ።
ተመራማሪዎች / የመረጃሰብሳቢዎችስም _____
ፊርማ _____ ቀን_____

Kaayyoon qorannoochaa, miidhaa fi faayidaa isaa irratti odeeffannoon naaf kennameera. Qorannocharratti hirmaachuu diduuf mirga akkan qabus natti himameera. Gaaffii kana yeroon barbaadetti addaan kutuus ta'e gaaffii gaafachuu kanin danda'u yoo ta'u, gaaffileen gaafadhus qorannocharratti hubannoo gahaa akkan argadhu na taasiseera. Odeeffannoon sassaabames qorannoodhaan alatti akka hin hiramnes hubadheera. Gara fuula duraattis qorannoolee wal fakkaatan keessattis hirmaachuuf itti walii galeera. Odeeffannoowwan olitti eeraman irratti hundaa'uun an qorannoo kanarratti hirmaachuuf walii galeera.
Maqaa hirmaataa_____
Mallattoo_____Guyyaa_____
Unka walii galtee kanaa nama hirmaatuu wajjin ilaaleera. Namni kun gaaffii gaafachuuf mirga argateera. Haaluma kanaan namni kun fedhiidhaan eyyama tolaa akka kenne nan mirkaneessa.
Maqaa
Ragaa_____Mallattoo_____Guyyaa_____

Waraqaa ragaa hanga dandaa'ame hirmaataadhaaf dubbisuun hirmaataan kun akka tolaan walii gale hubadheera.

Maqaa qorataa/ nama raga sassaabuu_____
Mallattoo_____Guyyaa_____

Curriculum vitae of the researcher (CV)

1. **Personal information**

Name	Geleta Dereje
Sex	Male
Date of birth	January 19, 1993
Marital status	Unmarried
Nationality	Ethiopian
Religion	Christian
Place of birth	Oromia region, Kellem Wolega zone, Dembidolo, 03 kebele
Contact address	Mobile 0923698876 /0913330820
E-mail	galatade@gmail.com
C/o	Fekadu Dereje mobile 0911922364

Date of Employment in OARI	January 2016
Present Research institute	Oromia Agricultural Research institute
Directorate	Food Science
Team	Food Chemistry and Nutrition

2. **Educational back ground**

Grade	School	Year (E.C)
1-8	Serba Elementary school	1992-1999
9-10	Lalo kile Secondary School	2000-2001
11	Lalo Aira Secondary School	2002
12	Dale Sadi Secondary School	2003
Degree	Addis Ababa Science and Technology University	2004-2007

3. **Academic status and qualification**

BSc degree in food science and applied nutrition from Addis Ababa science and Technology University in 2015

4. **Experience**: from January 2016 to august I employed in Oromia agricultural research institute as a researcher under food science research directorate and have been working as a nutrition researcher from January 2016 to January 2018 as junior researcher and from January 2018 to August 2019 as Assistant researcher 1
5.

6. Language skill

Language	Speaking	Listening	Reading	writing
Afan Oromo	Excellent	excellent	excellent	excellent
English	Excellent	Excellent	Excellent	Excellent
Amharic	Excellent	excellent	excellent	Excellent

7. Interest

To work hard and solve currently existing problem around my profession and proceed further education

1. Declaration by the applicant

The information I have provided is true and correct.

Name Geleta Dereje Asefa

Signature _____

Date 18/12/2020

2. References

Dr. Paulos Getachew Department head of Centre for Food Science and Nutrition (AAU)
Email: p- getachew@yahoo.com
Phone: 0989821171
Dr. Aynadis Tamene lecturer at Centre for Food Science and Nutrition (AAU)
Email: aynadistamene@yahoo.com
Phone: 0912062604
Dr. Zewewter Abebe
Email: Zeweterab@gmail.com

Phone: 0911878094

Advisors CV

Curriculum vitae of Dr. Zeweter

Name: Zeweter Abebe

Gender: Female

Email: Zeweterab@gmail.com

Education

Education level	Field of study	Institution
Post-doc	Maternal and child Nutrition	University of California Davis & Addis Ababa University
PhD	Food Science and Nutrition	Addis Ababa University, Potsdam University, Germany& University of Massachusetts, Amherst, USA
MPH	Public Health Nutrition	University of Gondar

Professional experiences

Current: **Assistance professor of Food Science and Nutrition**

Addis Ababa University, Addis Ababa, Ethiopia

Selected publications

Abebe Z, Haki GD, Baye K. Simulated effects of home fortification of complementary foods with micronutrient powders on risk of inadequate and excessive intakes in West Gojam, Ethiopia. ***Matern Child Nutr***. *2017; e12443.http://doi.org/10.1111/mcn.12443*

Abebe Z, Haki GD, Baye K. Child feeding style is associated with food intake and linear growth in rural Ethiopia. ***Appetite*** 116 (2017) 132-138.

Abebe Z, Haki GD, Baye K. Health Extension Workers Knowledge and Knowledge-Sharing Effectiveness of Optimal Infant and Young Child Feeding Are Associated With

Mothers Knowledge and Child Stunting in Rural Ethiopia. ***Food Nutr Bull***. 2016;1–11.

Abebe Z, Haki GD, Schwigert F, Baye K. Low breast milk vitamin A concentration is prevalent

in rural Ethiopia. ***Eur J Clin Nutr***. 2018. doi: 10.1038/s41430-018-0334-4.

Abebe Z, Baye K, Desse G. Building the evidence-base for effective communication strategies to improve child feeding in rural Ethiopia: 149/1028. Annals of Nutrition and Metabolism. 2015 67:539-40.

Curriculum vitae of Dr. Aynadis Tamene

1. Personal information

Name: Aynadis Tamene Hailemariam

Sex: Male

Date of Birth: 22/ 08/ 1983

Place of Birth: Addis Ababa

Nationality: Ethiopian

Marital Status: Married

Contact Address: Tel:- +251912062604

Email:- aynadis.tamene@aau.edu.et

aynadistamene@yahoo.com

2. Educational background

Year	Institution
2001/ 02 - 2004/05	Jimma university
2010/ 11 - 2011/12	Addis Ababa university
2013/14 – 2017/18	Addis Ababa university

Level

Degree (4 years)

MSc (2 years)

PhD (5 years)

3. Qualification

1. Degree of Bachelor of Education in Biology
2. Master of Science in Food Science and Nutrition
3. Assistance professor (PhD) in Food Science and Nutrition
4. Specialized in Food and Industrial Microbiology
5. Lecturer at Center for Food Science and Nutrition of Addis Ababa University
5. Member of the National Codex Alimentarius Committee
6. Participated in curriculum development for Community Nutrition, Clinical Nutrition,

Dietetics and Food Science and Nutrition (MSC and PhD)

7. Member of Institutional Research Ethics Review Board (IRB) of the College of Natural and Computational Sciences of Addis Ababa University

8. Technical committee member at Ethiopian Standard Agency

4. Language

English	Excellent
Amharic	Excellent

5. Training

Multi-sectorial Implementation of Food fortification Programme in Ethiopia

Molecular biology techniques for clinical microbiology laboratory course.

Food Safety Laboratory Workshop.

The 4th African Food and Nutrition Forum

Higher diploma in learning-teaching in higher education

6. Skills

Problem solving

Critical thinking skill.

Flexibility

Team working

Communication

Creativity

Computer skills: Design of Experiments, Data Analysis Using Open Epi Info, STAT SAS, SPSS and nutritional assessment packages such as ENA and other Nutritional statistics

Report writing skill

7. Publications

Aynadis, T. H., Tilahun, B. G., & Gulelat, D. H. (2013). Thermostable alpha-amylase from geothermal sites of Ethiopia (Afar Region): Isolation, purification and characterization. Greener Journal of Biological Sciences, 3(2), 061-073.

Tamene, A., Kariluoto, S., Baye, K., & Humblot, C. (2019). Quantification of folate in the main steps of traditional processing of tef injera, a cereal based fermented staple

food. Journal of cereal science, 87, 225-230.

Tamene, A., Baye, K., Kariluoto, S., Edelmann, M., Bationo, F., Leconte, N., & Humblot, C. (2019). Lactobacillus plantarum P2R3FA isolated from traditional cereal-based fermented food increase folate status in deficient rats. Nutrients, 11(11), 2819.

Keba, A., Rolon, M. L., Tamene, A., Dessie, K., Vipham, J., Kovac, J., & Zewdu, A. (2020).

Review of the prevalence of foodborne pathogens in milk and dairy products in Ethiopia. International Dairy Journal, 104762.

Tamene, A., Baye, K., & Humblot, C. (2021). Fermentation of a cereal with selected folate-producing microorganisms is efficient to increase folate content of a staple food. (Submitted article)

8. Research grant

working as co-principal investigator of the project Ensuring the Safety and Quality of Milk and Dairy Products Across the Dairy Value Chain in Ethiopia (ENSUREEdairy). Funded by The UK Department for International Development (DFID) and the Bill & Melinda Gates Foundation (BMGF).

Working as co-investigator of the project OR4FOOD, funded by African Union.

Working as a co-principal investigator of the project Fola, funded by Ethiopian biotechnology institute.

9. Experience

Seven (7) years of teaching in preparatory, college and university level.

Currently working as an assistant professor at Addis Ababa University.

Advising both MSc and PhD students at Addis Ababa University.

Working as a researcher and co-leader of both local and internationally granted researches.

Consulting both governmental and nongovernmental organizations on the quality and safety of foods and improved nutrition.

10. References

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Botswana University of Agriculture and Natural Resources (BUAN)
Faculty of Agriculture
Department of Food Science and Technology (FST)
Tel: - +267-74925819
Email: - gulelatw@yahoo.com

CONFIRMATION

I hereby confirm that I have given the information truthfully and completely to the best of my knowledge.