Investigating The Influence of Locally Prepared Formula Against Commercial Formulas on the Nutritional Status and Health Outcomes of Children Aged 6-36 Months in Nongowa Chiefdom, Kenema District

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ABSTRACT:
This study investigates the socio-demographic characteristics of caregivers, child feeding practices, and associated nutritional and health outcomes of children aged 6-36 months in Nongowa Chiefdom, Kenema District, Sierra Leone. Using a mixed-methods approach, data from 150 caregiver-child pairs were analyzed to explore the impact of local and conventional baby foods on child growth, dietary diversity, and health indicators. Findings revealed that most caregivers were young to middle-aged females with limited education and low income, factors closely linked to suboptimal feeding practices. Approximately 28% of children were introduced to formula before the recommended age of four months. Children consuming conventional baby foods showed slightly higher average weight (10.7 kg) and height (80.1 cm) than those consuming local foods (10.5 kg and 79.3 cm, respectively). The study also highlighted significant barriers such as high food costs, limited market access, food preparation difficulties, and concerns about nutritional adequacy. Caregivers cited cost (67%) as the primary constraint, with cultural alignment (25.3%) further influencing preferences for local baby foods. Health outcomes indicated a slightly higher prevalence of diarrhea in children fed local baby foods (20%) and more respiratory infections among those consuming conventional products (20%). Notably, 60% of caregivers expressed a willingness to switch to locally prepared formulas if economic and logistical barriers were addressed.

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Based on these findings, the study recommends enhancing caregiver education on safe feeding practices, training healthcare providers to offer balanced, culturally relevant nutrition guidance, and strengthening policies that improve food availability through subsidies and community-based food production initiatives.
Implementing these strategies can promote sustainable feeding practices, alleviate economic burdens, and improve child nutrition and overall well-being in resource-constrained settings.

Keywords: Caregiver Socio-Demographics, Child Feeding Practices, Nutritional Status, Dietary Diversity, Cost-Effectiveness Analysis, Healthcare Provider Influence, Child Health Outcomes.

1. Background of the Study

Complementary feeding (CF) plays a critical role in shaping early and later life nutrition, significantly impacting health and optimal growth. Parents are faced with choices between homemade foods (locally prepared baby food) and commercial infant foods (conventional or commercial formulations) for their infants and young children. However, existing evidence does not consistently favor either homemade foods (HMFs) or commercial infant foods (CIFs) in terms of providing superior nutritional profiles and variety (Oliveira *et al.,* 2021).

The early years of life, particularly from conception to two years, are crucial for achieving optimal growth, health, and development. This period is often referred to as the "first 1,000 days," during which sufficient nutrition is fundamental to forming the foundation for a child's physical, cognitive, and emotional well-being (World Health Organization [WHO], 2002). While breastfeeding is universally recommended during the first six months, introducing energy- and nutrient-dense complementary foods after that is essential to address the nutritional needs that breast milk alone can no longer meet (Black *et al.,* 2013). Complementary feeding (CF) refers to the gradual introduction of solid or semi-solid foods into an infant's diet alongside breast milk or formula, starting at around six months of age. This practice bridges the gap between the nutritional inadequacies of breast milk or formula and the dietary requirements for infants aged 6 to 23 months (Dewey, 2013). However, meeting the nutritional needs of this critical age group is often challenging in low-income settings where diets predominantly consist of unfortified, cereal-based foods, leading to issues such as dietary monotony, low micronutrient density, and poor nutrient bioavailability (Allen, 2003).

Parents and caregivers are thus faced with two primary options for complementary feeding: homemade foods (HMFs), prepared from locally available ingredients, or commercial infant foods (CIFs), which are pre-packaged and regulated products designed for infants and young children. While homemade foods allow for greater flexibility in selecting fresh, nutrient-rich ingredients, they are often prepared without standardized guidelines, potentially resulting in suboptimal nutrient composition and safety concerns (Caroli *et al.,* 2012). Conversely, commercial infant foods are formulated under stringent regulatory frameworks to meet specific nutritional requirements for young children, adhering to safety standards regarding contaminants such as pesticides, heavy metals, and mycotoxins (Farag, 2020).

Globally, there has been significant debate about the comparative nutritional and health benefits of homemade versus commercial baby foods. Advocates of homemade foods highlight the flexibility, cost-effectiveness, and avoidance of additives, preservatives, and excess sugars found in some commercial products (UNICEF, 2021). However, concerns about contamination, inadequate micronutrient balance, and the absence of standardized preparation methods limit their reliability (Kostecka *et al.,* 2020). On the other hand, proponents of commercial baby foods emphasize their consistent nutrient composition,

age-appropriate formulations, and safety guarantees, although they may be costly and sometimes perceived as less culturally appropriate or less fresh (Nguyen *et al.,* 2020).

Despite these global discussions, research on the relative merits of homemade and commercial infant foods has been limited, context-specific, and often outdated. For example, van den Boom *et al.* (1997) conducted a study on homemade beef-based baby foods in Spain, but their findings lack relevance to contemporary nutritional needs and settings. Similarly, Abeshu *et al.* (2016) analyzed homemade complementary foods in food-insecure Ethiopian regions but did not compare them with commercial alternatives.

In Sierra Leone, the nutritional status of children under five years remains a significant public health concern, as indicated by findings from the 2017 Sierra Leone National Nutrition Survey (SLNNS). The survey reported a global acute malnutrition (GAM) prevalence of 5.1%, a stunting prevalence of 31.3%, and a wasting rate of 5.4%, reflecting high levels of acute and chronic malnutrition, particularly among infants and young children. These figures underscore the critical need for effective complementary feeding strategies to address nutritional deficits and support optimal growth and development (SLNNS, 2017).

Traditional homemade infant foods in Sierra Leone are often cereal-based, with limited dietary diversity and inadequate fortification, resulting in micronutrient deficiencies. Moreover, while commercial infant foods are available, their affordability and accessibility in rural areas like Nongowa Chiefdom remain limited. This setting provides an important opportunity to explore the comparative nutritional, health, and economic impacts of homemade and commercial infant foods.

This study seeks to address the limited comparative analyses of LPFs and CIFs in low-resource settings, particularly in Sierra Leone, where dietary practices, resource availability, and socio-economic factors shape complementary feeding choices. By examining the nutritional profiles, safety standards, and food variety of homemade versus commercial infant foods, this research will provide critical insights for caregivers, policymakers, and health practitioners, contributing to improved child nutrition and health outcomes in the region.

Commercial baby foods (CIFs) refer to pre-packaged, ready-to-eat, or easy-to-prepare food products specifically formulated for infants and young children. These products are designed to meet the nutritional needs of children between six months and two years of age, a critical window for growth and development. They are produced under strict regulations to ensure food safety, appropriate nutrient content, and compliance with international standards, such as those set by the World Health Organization (WHO) and Codex Alimentarius (Codex, 2020).

Commercial baby foods are formulated to provide a balanced mix of macronutrients (carbohydrates, proteins, and fats) and essential micronutrients (vitamins and minerals). Common ingredients include cereals, fruits, vegetables, dairy, and fortified components such as iron, zinc, and vitamin A. Manufacturers often fortify these foods to address deficiencies prevalent among infants, such as iron deficiency anemia and vitamin D deficiency (Koletzko *et al.,* 2012).

However, concerns about nutritional adequacy persist. While some products meet or exceed the required nutrient levels, others may contain excessive sugar, salt, or additives, contributing to unhealthy dietary patterns later in life. A study by Garcia *et al.* (2020) highlighted that many commercial baby foods in Europe had high sugar content, potentially impacting dental health and encouraging a preference for sweet foods.

Safety is a critical aspect of commercial baby foods. They undergo rigorous quality control measures, including testing for contaminants such as pesticides, heavy metals (e.g., lead and arsenic), and

microbiological hazards. These measures reduce the risk of foodborne illnesses, which are a significant concern in low-resource settings.

Additionally, CIFs are produced with standardized consistency and texture appropriate for different developmental stages. For instance, products for younger infants are finely pureed, while foods for older children have coarser textures to encourage chewing and oral motor skill development (Hasselkvist *et al.,* 2016). The accessibility of commercial baby foods varies widely by geographic and socio-economic context. In high-income countries, these products are readily available in supermarkets and online platforms, whereas in low-income settings like Sierra Leone, they may be limited to urban areas or specialized stores. The cost of CIFs is often prohibitive for low-income families, making them less accessible to those most in need.

For instance, a small jar of fortified commercial baby food might cost significantly more than the equivalent homemade preparation, limiting its use among rural and resource-poor households. This economic barrier often forces caregivers to rely on less expensive, homemade alternatives, regardless of nutritional quality. Consumer preferences and cultural practices also influence the use of commercial baby foods. In some communities, pre-packaged foods are perceived as more convenient, hygienic, and modern. However, they may be viewed with skepticism due to concerns about artificial ingredients, lack of freshness, or perceptions of being "foreign" and unsuitable for local dietary traditions (Nyeko *et al.,* 2018).

In Sierra Leone, CIFs may face challenges in gaining widespread acceptance in rural areas like Nongowa Chiefdom, where caregivers prioritize cultural familiarity and affordability in food choices. The limited availability of region-specific commercial products tailored to local tastes and preferences further hampers their adoption.

Despite their limitations, commercial baby foods can play a significant role in addressing nutritional deficiencies, particularly in settings where dietary diversity is low. Fortified products, if affordable and accessible, offer a reliable means of delivering essential nutrients to children at risk of malnutrition. In emergency contexts or among populations with limited food access, CIFs can provide lifesaving nutritional support.

This study seeks to critically examine the role of commercial baby foods in complementary feeding within Sierra Leone, focusing on their nutritional profiles, safety, cost-effectiveness, and cultural acceptability compared to homemade alternatives. This analysis aims to inform caregivers, healthcare providers, and policymakers about the potential and limitations of CIFs in improving child nutrition outcomes.

2. LITERATURE REVIEWS

2.1 The comparison of perceived dietary practices involving locally prepared food against conventional food consumed by children aged 6-36 months

Locally sourced foods often reflect regional agricultural practices and may be richer in essential nutrients due to the absence of preservatives and artificial ingredients. Studies indicate that locally sourced fruits, vegetables, and grains provide essential vitamins and minerals (e.g., Vitamin A, iron, calcium), which are vital for the growth and immune function of young children (Ruel et al., 2008). Moreover, locally prepared foods tend to have higher bioavailability due to the absence of food processing methods that can degrade nutrient content (Arimond et al., 2010).

Conventional foods, particularly those that are highly processed, tend to be lower in essential nutrients and often contain high levels of added sugars, unhealthy fats, and salt. Studies suggest that overreliance

on processed foods can lead to deficiencies in micronutrients, such as iron and zinc, and may contribute to obesity and other diet-related chronic diseases in young children (Gibson, 2007; Gidding et al., 2017).
In many cultures, locally prepared foods are seen as more authentic and beneficial for children's health. Traditional foods are often regarded as an integral part of child-rearing practices, where parents believe that these foods provide the best nutrition (Behrman et al., 2014). Locally prepared meals are often tailored to a child's specific dietary needs, particularly when parents have more control over ingredients and preparation methods.
Economic status plays a significant role in dietary choices. While locally prepared foods are considered to be healthier, they may be more time-consuming and costly to prepare, especially in low-income households where access to fresh ingredients or time to cook may be limited (Mann et al., 2014). On the other hand, conventional foods, which include ready-to-eat or pre-packaged meals, are often more accessible and affordable for families facing economic challenges. Research indicates that families in lower socioeconomic brackets tend to consume more processed foods due to time and financial constraints (Devine et al., 2009).
Many parents perceive locally prepared foods as more nutritious, fresh, and safer for their children. Homemade meals are often seen as more natural, free from additives and preservatives that are commonly found in commercially processed foods (Larsen et al., 2018). Parents also tend to believe that locally prepared foods, particularly traditional meals, are better suited to their child's dietary needs and preferences.
On the other hand, there is a growing concern among parents regarding the risks of processed foods, particularly with respect to the high sugar and salt content in products like infant cereals, snacks, and ready-made baby foods. This concern is amplified by the rising rates of childhood obesity and associated diseases such as Type 2 diabetes and hypertension (Bazzano et al., 2008). Many parents are becoming increasingly aware of the long-term health consequences of a diet based on convenience foods.
Parents may lack the knowledge or skills to prepare balanced, nutritious meals for their children. In some regions, there is limited awareness about the importance of diversity in the diet, particularly in rural or underserved areas (Johnson et al., 2014). Educational interventions are needed to promote the benefits of a varied and balanced diet consisting of locally sourced ingredients.
Access to fresh, locally sourced ingredients can be a challenge, especially in urban areas or regions with limited agricultural production. While local food markets are beneficial, they may not always be accessible or affordable, especially in lower-income neighborhoods (Jago et al., 2012). This highlights the need for better food systems that support access to healthy, locally produced food.
Studies suggest that children who consume a diet rich in fresh fruits, vegetables, and whole grains, often found in locally prepared meals, are less likely to suffer from malnutrition or developmental delays (Ruel et al., 2008). Furthermore, the inclusion of traditional foods that are high in essential fatty acids and micronutrients supports brain development and cognitive function (Sari et al., 2017).
In contrast, diets dominated by processed and fast foods, which are typical of conventional food choices, have been linked to poor health outcomes, including childhood obesity, cardiovascular diseases, and metabolic syndrome (Gidding et al., 2017). The increasing consumption of sugary beverages, snacks, and convenience foods has raised concerns regarding the early onset of diet-related chronic diseases.

2.2 The relationship between the type of formula (locally prepared against conventional) and the nutritional status of children aged 6-36 months.

Locally prepared formulas typically consist of homemade mixtures made from a variety of ingredients such as cow's milk, goat's milk, cereals, or legumes. These formulas are often customized by caregivers based on available resources and local food preferences (Lutter & Morrow, 2013). While such formulas may be cheaper and more accessible in low-resource settings, they may lack the necessary nutrients in appropriate proportions, especially for infants and young children in their critical growth phases (Brown et al., 2004).

Conventional formulas, on the other hand, are commercially produced and specially designed to meet the nutritional needs of infants and young children. These formulas are fortified with essential nutrients like vitamins, minerals, proteins, and fats in quantities that support growth and development. The nutrient profile of these formulas is usually based on scientific research and designed to replicate breast milk as closely as possible (Gibson et al., 2007). Examples include infant formulas (first, second, and follow-on) and specialized formulas for specific health conditions.

Locally prepared formulas often do not meet the full nutritional requirements of children aged 6-36 months. Studies have shown that homemade formulas can be deficient in essential nutrients such as iron, calcium, and certain vitamins, which are critical for the development of bones, immune systems, and cognitive abilities (Lutter & Morrow, 2013). For example, a study by Brown et al. (2004) found that children who consumed homemade formulas had lower levels of iron and vitamin A compared to those who consumed commercially prepared formula. The lack of proper fortification and the variability in homemade formula preparations make them less reliable in providing consistent nutrition.

Commercial formulas, by contrast, are designed to provide a complete nutritional profile. These formulas are usually fortified with micronutrients like vitamin D, iron, and DHA (docosahexaenoic acid), which are essential for healthy brain and visual development. Studies have demonstrated that conventional formulas are effective in preventing or correcting nutrient deficiencies in children who are not breastfed, particularly with respect to iron and vitamin D (O'Connor et al., 2006). Furthermore, standardized formulas ensure that children receive the right balance of protein, fat, and carbohydrates necessary for healthy growth (Gibson et al., 2007).

Locally prepared formulas may result in suboptimal growth outcomes. The lack of consistency in nutrient levels can lead to either undernutrition or overnutrition, depending on how the formulas are prepared. A study by Ruel et al. (2008) found that children consuming homemade formulas were more likely to experience stunted growth and delayed weight gain compared to those who consumed conventional formula. The study also highlighted that homemade formulas are less likely to meet the energy and protein requirements needed for optimal growth in children aged 6-36 months.

Conventional formulas are specifically designed to support normal growth and development. Research has shown that children who consume conventional formulas exhibit better weight gain and growth patterns compared to those relying on homemade formulas (Gibson et al., 2007). Studies have also indicated that formulas enriched with specific fatty acids and amino acids can positively affect the growth of children in this age range (O'Connor et al., 2006). For example, a study by Silvestri et al. (2015) demonstrated that children who were fed formula fortified with DHA and ARA (arachidonic acid) had improved cognitive development and motor skills.

The nutrient content of locally prepared formulas may not support the full cognitive potential of children. Deficiencies in essential fatty acids (like DHA) and other micronutrients may impair brain development (De Corte et al., 2017). For instance, a lack of DHA and ARA in homemade formulas has been linked to poorer developmental outcomes in children, such as delayed motor skills and cognitive

delays (Silvestri et al., 2015). Furthermore, without adequate iron, children consuming locally prepared formulas may suffer from iron deficiency anemia, which can impact both physical and cognitive development (Pfeiffer et al., 2017).

Conventional formulas often contain DHA, ARA, and other micronutrients essential for brain development. Several studies have shown that formula-fed infants who receive formulas containing these nutrients have better cognitive and visual development than those who are not given such fortified formulas. The addition of DHA and ARA to conventional formulas has been shown to improve cognitive function and memory performance in children (Bodnar et al., 2008). Furthermore, adequate iron in conventional formulas can prevent iron deficiency anemia, which is associated with impaired cognitive and physical development (Pfeiffer et al., 2017).

One of the key concerns regarding locally prepared formulas is the risk of contamination. Without proper sterilization and careful preparation, homemade formulas may be contaminated with pathogens, which can lead to gastrointestinal infections and other health problems. Research by Lutter & Morrow (2013) emphasizes the safety risks associated with homemade formulas, particularly in low-resource settings where access to clean water and hygienic preparation conditions may be limited.

Conventional formulas are generally produced in regulated environments, ensuring that they meet safety standards for contamination and quality. However, concerns regarding the safety of conventional formulas often arise from their use of preservatives, artificial ingredients, and the impact of formula feeding on the microbiome. While the risks of contamination in commercial formulas are minimal, the long-term health effects of consuming such formulas are still under investigation (Cameron et al., 2005).

Locally prepared formulas can be more affordable, especially in regions where ingredients like milk, cereals, and legumes are readily available. However, the cost of preparing these formulas in terms of time and resources can be significant, particularly if specialized ingredients or additional supplements are required. In many low-income settings, parents may be more likely to use homemade formulas due to the cost barriers associated with conventional formulas (Lutter & Morrow, 2013).

Conventional formulas tend to be more expensive due to the cost of manufacturing, packaging, and marketing. Families with limited financial resources may struggle to afford the continuous supply of commercial formula, especially in developing countries. However, many governments and organizations have implemented programs to subsidize formula costs, which can improve access to these essential products (Brown et al., 2004).

2.3 The prevalence of common childhood illnesses among children consuming locally prepared foods against conventional formulas.

Children consuming locally prepared foods exhibited lower rates of common illnesses such as diarrhea and respiratory infections. This suggests that locally prepared diets may enhance nutritional status and reduce vulnerability to illness due to their higher nutrient density and better alignment with local dietary practices. The study emphasizes the need for public health initiatives promoting locally sourced foods to improve child health outcomes. Alemu, C., Wudu, H., & Abeje, M. (2024)

Children with functional difficulties are more susceptible to infectious diseases, which can be exacerbated by inadequate nutrition. The findings suggest that improving dietary quality through locally sourced foods may help mitigate some health disparities, ultimately reducing illness prevalence in vulnerable populations. Anna-Theresia Ekman et al. (2024)

Children consuming locally prepared foods had a significantly lower prevalence of illnesses such as diarrhea and respiratory infections. The study emphasizes the potential health benefits of locally sourced diets, suggesting that these foods may provide better nutritional support, thereby reducing the

incidence of common childhood illnesses. The authors advocate for promoting locally prepared foods as a strategy to enhance child health outcomes and prevent illness. Akinmoladun OF et al. (2023)
Children who consumed locally prepared foods had a significantly lower incidence of illnesses such as diarrhea and respiratory infections. This suggests that locally sourced diets may enhance nutritional status and bolster immunity, leading to reduced illness prevalence. The study highlights the importance of promoting locally prepared foods as a viable strategy for improving child health outcomes and preventing common childhood illnesses. Huluka DK et al. (2022).

2.4 The factors influenced caregivers' choice of formula type (locally prepared or conventional) for children aged 6-36 months.

The factors influencing caregivers' choice of formula type (locally prepared again conventional) for children aged 6-36 months. They identified two primary factors that affect these decisions:
(i) Infant Benefits: Caregivers often cite reasons related to perceived benefits for their infants, such as healthiness, growth support, and ease on digestion. These beliefs significantly influence their preference for either locally prepared or modified formulas, as caregivers aim to provide the best nutritional options for their children.
(ii) Natural Ingredients: The study found that caregivers are increasingly concerned about the ingredients in formulas, with many preferring options that are organic, non-GMO, and free from added sugars. This trend reflects a growing awareness and demand for natural products among parents, impacting their formula choices. Gershman H et al. (2022)
Caregivers often believe that locally prepared formulas offer superior nutritional benefits compared to conventional options, which influences their choice significantly. This perception is often based on the idea that homemade formulas can be tailored to meet specific dietary needs and preferences. Pomeranz JL et al. (2018)
Recommendations from pediatricians and healthcare professionals play a crucial role in caregivers' decisions. Many caregivers report that their choice is influenced by advice received from healthcare providers regarding the best formula options for their children. Pomeranz JL et al. (2018)
The study identifies socio-economic status, education level, and cultural beliefs as critical factors affecting formula choice. Caregivers with higher education levels are more likely to choose locally prepared formulas due to greater awareness of nutrition and health benefits. Pomeranz JL et al. (2018)
The marketing strategies of conventional formula brands, alongside the convenience and availability of these products, also impact caregivers' choices. Many caregivers opt for conventional formulas due to their ease of access and preparation, despite knowing the potential benefits of locally prepared alternatives. Pomeranz JL et al. (2018)

3. METHODOLOGY

3.1 Description of the Study Area

The study will be conducted in Nongowa Chiefdom, located in Kenema District, Eastern Province of Sierra Leone. Nongowa Chiefdom is a predominantly rural area, with Kenema City serving as the urban center and capital of Kenema District. This area was selected to provide a representative sample of both urban and rural populations. Kenema City, home to approximately 255,110 people (Stats SL, 2022), serves as a focal point for the region's administrative and economic activities. However, the Chiefdom itself, with its various villages, remains largely rural, with many households dependent on subsistence farming and facing challenges related to food security and access to diverse food sources.
The study was conducted in six communities within Nongowa Chiefdom, Kenema District. These communities were selected to include both urban and rural settings, offering a comprehensive

representation of the population in the region. The urban areas include Burma, Kissi Town, and Kordebotihun, all of which are part of Kenema City, the capital city of the district. While Kenema is more developed, urban residents still face challenges related to food security, dietary diversity, and economic disparities, which can impact the nutritional status of children.

The rural communities included in the study are Hangha Village, Manor Junction, and Bandama Village. These areas are characterized by their reliance on subsistence farming and face greater food security challenges, including seasonal variations in food availability and limited access to diverse food sources. In these rural areas, many households depend on agricultural production for their livelihoods, but environmental factors such as climate change and deforestation can further complicate food availability and nutritional diversity (FAO, 2019; Elias *et al.,* 2008)

Nongowa Chiefdom's rural areas primarily produce food crops such as rice, cassava, sweet potatoes, and various vegetables. Cash crops like cocoa, coffee, and palm oil are also significant to the local economy. However, many households experience food insecurity due to low agricultural productivity, poverty, and limited access to markets (UNICEF SL, 2017). These challenges are further compounded by the economic disparities in the region. Households with limited income struggle to access a diverse range of nutritious foods, which may contribute to micronutrient deficiencies due to lack of dietary variety (FAO, 2014).

The rural communities within Nongowa, particularly those reliant on subsistence farming, often experience seasonal variations in food availability, limiting dietary diversity, especially during certain times of the year (FAO, 2019). Women's roles in household food security and dietary choices are especially critical in Sierra Leone, with studies indicating that their empowerment can significantly influence dietary diversity within the household (FAO, 2011).

Environmental factors such as climate change may also affect food production in Nongowa Chiefdom. Rising temperatures and unpredictable rainfall patterns, as indicated by climate models like "Climate Change Kenema - meteoblue," may disrupt agricultural yields and food availability, further exacerbating food insecurity (FAO, 2016). Unsustainable practices like logging have contributed to deforestation, reducing access to wild fruits and vegetables, which are essential for dietary diversity (Elias *et al.,* 2008).

Nongowa, like much of Sierra Leone, struggles with high rates of childhood malnutrition, including stunting and micronutrient deficiencies. Limited dietary diversity is often linked to these nutritional deficits, which highlights the need for a comprehensive understanding of local dietary patterns and their implications for child nutrition (World Health Organization, 2021). Malnutrition, especially in children, has far-reaching effects on health, development, and educational outcomes (World Health Organization, 2023). Given the high rates of poverty and low literacy levels in rural areas, access to nutrition information remains limited, further exacerbating issues related to food choices and dietary diversity (World Bank, 2017).

The findings from this study will contribute valuable insights into the dietary practices in Nongowa Chiefdom, particularly regarding the nutritional and health outcomes of children aged 6-36 months. By exploring the differences between locally prepared formulas and conventional formulas, this study will inform policies and interventions aimed at improving child nutrition in the region, addressing both immediate nutritional needs and long-term public health concerns.

3.2 Research Design

This study employs a comparative cross-sectional design to examine and compare the nutritional status and health outcomes of children aged 6-36 months who are fed either locally prepared formulas or conventional commercial formulas. The study will analyze both quantitative and qualitative data, focusing on key health and nutritional indicators.

3.3 Study Population

The study will involve children aged 6-36 months from different geographical regions (urban and rural) to ensure a representative sample. Participants will be categorized into two groups:

Group 1: Children receiving locally prepared formulas

Group 2: Children receiving conventional commercial formulas

3.3.1 Inclusion Criteria:

a, Children aged 6-36 months Both genders

b, Mothers who are able to provide informed consent

c, Children with no chronic illnesses or conditions that could interfere with the study

3.3.2 Exclusion Criteria:

a, Children with known allergies or intolerances to any of the ingredients in the formulas Children with severe malnutrition or growth disorders at the time of the study

b, Children with chronic medical conditions (e.g., metabolic diseases)

3.4 Sampling Method

a, A stratified random sampling method will be employed to ensure that both rural and urban populations are adequately represented. The sample size will be calculated based on an estimated effect size, anticipated dropout rate, and statistical power requirements.

b, A power analysis will be conducted to determine the appropriate sample size to achieve robust results, typically aiming for a minimum of 75 children in each group (150 in total).

3.4.1.2 Sample Size Determination for Qualitative Research

Determining the sample size for the qualitative component of a mixed-methods study, such as Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs), depends on several factors, including the study's objectives, the diversity of the population, and the point at which data saturation is reached. Unlike quantitative research, qualitative research focuses more on the depth and richness of data rather than the number of participants.

Given the different demographic groups involved (e.g., urban versus rural caregivers, mothers of different socio-economic statuses), 6-10 participants will be considered to participate in each of the five focus group discussions. This size is manageable and allows for active participation and diverse viewpoints without becoming unwieldy as well as providing sufficient coverage.

For the Key Informant Interviews (KIIs), 10 interviews are conducted to achieve data saturation, where no new themes or insights emerge from the interviews. These KIIs aim to cover various key stakeholders such as community health workers, pediatric nutritionists, local healthcare providers, and representatives from relevant organizations. KIIs were purposive, selecting individuals who have specialized knowledge, unique perspectives, or hold key positions relevant to the research topic.

3.4.2 Sampling Technique

The sampling technique for this study on the impact of locally prepared formulas compared to conventional formulas on the nutritional status and health outcomes of children aged 6-36 months in Nongowa Chiefdom involved a multi-stage sampling approach. This method was employed to ensure that the sample accurately represented the urban and rural populations within the Chiefdom, as well as the diversity of food practices and socio-economic conditions that may influence nutritional outcomes.

Stage 1 - Selection of Communities: Six communities were selected from Nongowa Chiefdom, divided into three urban and three rural areas. The urban areas included Burma, Kissi Town, and Kordebotihun in Kenema City, while the rural communities included Hangha, ManorJunction, and Bandama. The selection of these communities was based on a stratified purposive sampling method to ensure a

representation of both urban and rural settings, each with distinct socio-economic characteristics and access to different food sources (UNICEF SL, 2017).

Stage 2 - Household Selection: Within each of the selected communities, households with children aged 6-36 months were identified. A systematic random sampling technique was employed within each community, where every nth household (based on population size and expected number of children in the age group) was selected to participate in the study. This ensured that every household with a child within the target age group had an equal chance of being included in the study, providing a representative sample of caregivers.

Stage 3 - Selection of Participants: Caregivers who were directly responsible for feeding and caring for children aged 6-36 months were selected as the primary respondents. In the case of larger households, caregivers who had the most knowledge about the child's feeding practices and nutritional choices were chosen. This selection aimed to ensure that the information gathered would be accurate and relevant to the study objectives. In cases where caregivers were unavailable, substitutes were identified, such as close family members (grandparents or older siblings), who were knowledgeable about the feeding practices.

By employing this multi-stage sampling technique, the study was able to achieve a diverse and representative sample, ensuring that the findings are applicable to both urban and rural populations within Nongowa Chiefdom. This approach also minimized biases related to socio-economic status, geographic location, and cultural food practices.

3.5 Data Collection Methods

The questioner will be administered to caregivers of children aged 6-36 months in both urban and rural communities. These caregivers will provide detailed information about their children's feeding practices and health outcomes. This method allows for the collection of a large amount of standardized data from a broad sample, ensuring the reliability of the findings (Kothari, 2004).

3.5.1 Nutritional Status Indicators

(i) Anthropometric Measurements: The primary indicators will include weight-for-age (WFA), height-for-age (HFA), and weight-for-height (WFH) ratios, using WHO growth standards.

(ii) Weight: Measured using a calibrated digital scale.

(ii) Height: Measured using a stadiometer for children above 2 years, or recumbent length for children below 2 years.

(iii) Z-scores: Calculated for all measurements to determine the prevalence of stunting, wasting, and underweight.

(iv) Mid-Upper Arm Circumference (MUAC): an indicator of nutritional status, particularly for identifying waste.

3.5.2 Dietary Assessment

A 24-hour dietary recall method will be used to collect data on the type and quantity of food consumed. This will be conducted twice within the study period to account for daily variability. Additionally, caregivers will be asked to provide information on feeding practices, including the frequency of formula feedings.

3.5.3 Health Outcomes

Health outcomes will be assessed based on:

(i) Incidence of Diarrhea and Respiratory Infections: Parents/caregivers will report any incidences of diarrhea or respiratory illness in the past month.

(ii) General Health and Development: This will be evaluated using a caregiver-administered questionnaire, including items related to the child's development (e.g motor skills, language, and cognitive milestones).

3.5.4 Focus Group Discussions (FGDs)

To gain a deeper understanding of the cultural beliefs and social norms surrounding infant feeding practices, focus group discussions (FGDs) will be conducted. These discussions will be carried out separately for caregivers in urban and rural communities. FGDs are particularly useful for exploring the qualitative aspects of caregiver decision-making, beliefs, and attitudes, which are not easily captured through surveys (Krueger & Casey, 2015).

3.5.5 Key Informant Interviews (KIIs)

Key informants, such as local healthcare providers, community leaders, and nutrition experts, will be interviewed to provide insights into community-level health issues and dietary practices. Key informant interviews allow the study to incorporate expert opinions and contextualize the findings from the caregiver surveys and FGDs (Marshall & Ros

3.6 Data Analysis

Data will be analyzed using SPSS (Statistical Package for the Social Sciences) or R software. The statistical methods to be employed will include:

The study will also employ both quantitative and qualitative data analysis techniques to comprehensively assess the impact of locally prepared formulas (LPFs) and commercial infant foods (CIFs) on the nutritional status and health outcomes of children aged 6-36 months in Nongowa Chiefdom.

3.6.1 Quantitative Data Analysis

The quantitative data collected through structured questionnaires and anthropometric measurements will be analyzed using statistical methods such as frequency distributions, percentages, and measures of central tendency (mean, median, and mode) used to summarize demographic characteristics, feeding practices, and health outcomes. Cross-tabulations helped to identify patterns or associations between independent variables (e.g., type of feeding) and dependent variables (e.g., nutritional status, health outcomes).

Also, inferential Statistics such as T-tests or ANOVA will compare mean differences in nutritional status indicators (e.g., weight-for-age, height-for-age) between children fed with LPFs and those fed with CIFs. Additionally, Chi-square tests were used to assess the relationship between categorical variables such as feeding type and the prevalence of malnutrition or health conditions. Regression Analysis (logistic) was utilized to evaluate the strength and significance of associations between feeding practices and child health outcomes, controlling for confounding variables like socioeconomic status and caregiver education.

Furthermore, Cost-Effectiveness Analysis (CEA) was employed in this study to compare the economic and health benefits of locally prepared formulas (LPFs) versus commercial infant foods (CIFs). Statistical analyses were conducted using the **SPSS Version 24.0** to ensure accuracy and reliability (Field, 2018).

3.6.2 Qualitative Data Analysis

Thematic analysis was employed to examine qualitative data gathered from focus group discussions (FGDs) and key informant interviews (KIIs). After transcribing the audio recordings verbatim, with each recording reviewed at least three times, the transcripts were systematically coded to uncover recurring themes, patterns, and categories pertinent to the research questions. From these codes, themes, and

sub-themes were formulated to provide a detailed understanding of stakeholders' perspectives, experiences, and insights into the associated issues. To strengthen the validity of the results, triangulation was applied by comparing qualitative findings with quantitative data, thereby corroborating the results and offering a comprehensive view of the research topic.

Emerging themes related to caregivers' perceptions, cultural beliefs, and barriers or facilitators to optimal feeding practices will be identified and categorized. Specific focus will be placed on themes such as awareness of nutritional needs, cultural food preferences, and decision-making factors affecting the choice of LPFs or CIFs (Braun & Clarke, 2006).

3.7 Ethical Considerations

Ethical approval will be obtained from a recognized institutional review board (IRB). The study will adhere to the Declaration of Helsinki for ethical guidelines in human research. Informed consent will be obtained from the parents or guardians of all participants, ensuring that they understand the purpose of the study, potential risks, and the voluntary nature of participation.

(i) Confidentiality: Participants' personal information will be kept confidential, and data will be anonymized for analysis.

(ii) Voluntary Participation: Participants will be informed that they can withdraw from the study at any time without consequence.

3.8 Limitations

The study may encounter several limitation including:

a, Recall Bias: Caregiver reports on feeding practices and health outcomes may be subject to recall bias.

b, Non-random Formula Use: The decision to use locally prepared or commercial formula is not random, and there may be confound variables that influence the choice of form such as socioeconomic status or maternal education.

4. RESULTS AND DISCUSSION

Figure 4.1.1 Age Distribution of Caregivers

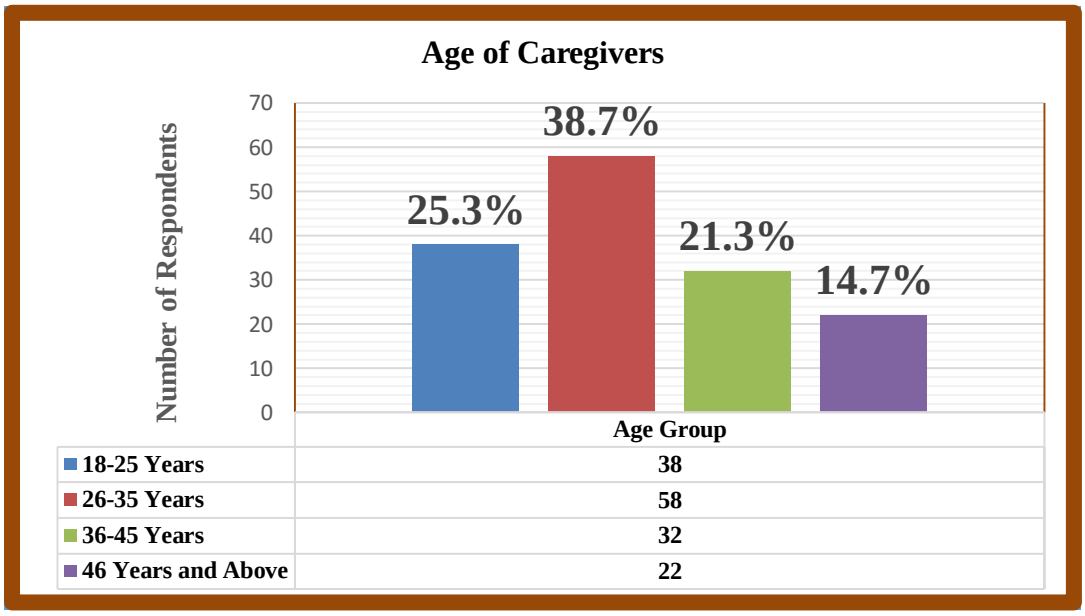

Figure 4.1.1 above figure shows that 58(38.7%) are between 26–35 years, followed by age 18–25 years 38(25.3%), 36–45 years 32(21.3%), and 46 years and above 22(14.7%). These findings shows that

caregiving responsibilities for children under 24 months are predominantly born by women of reproductive age (18–35 years), consistent with global trends in caregiving demographics in low-resource settings. This result is align with findings by Smith *et al.* (2022), which says that caregiving in rural sub-Saharan Africa is predominantly handled by women in their reproductive years, particularly between the ages of 18 and 35.

Figure 4.1.2 Gender Distribution of Caregivers

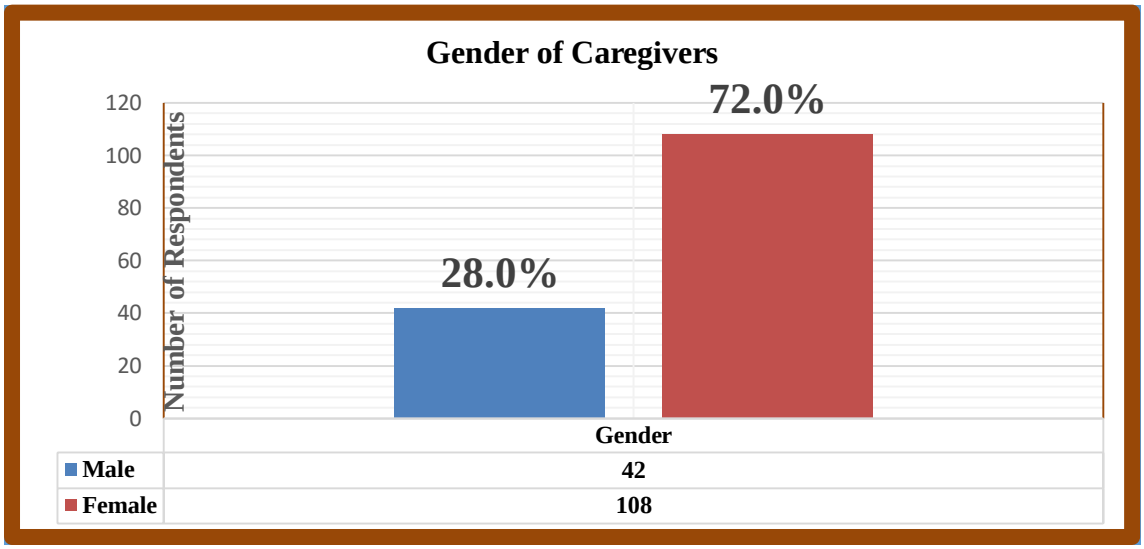

Figure 4.1.2 above shows that 108(72%) were females, 42(28%) were males. This shows that there was more female caregiver in the study area. This gender disparity aligns with traditional caregiving norms in rural areas, where women are often the primary caregivers responsible for child health, nutrition, and overall well-being. The findings align with Smith *et al.* (2022) which say caregivings in rural settings are deeply embedded in cultural expectations for women, often limiting their opportunities for education and economic empowerment.

FIGURE 4.1.3 Relationship of the Caregivers to the Children

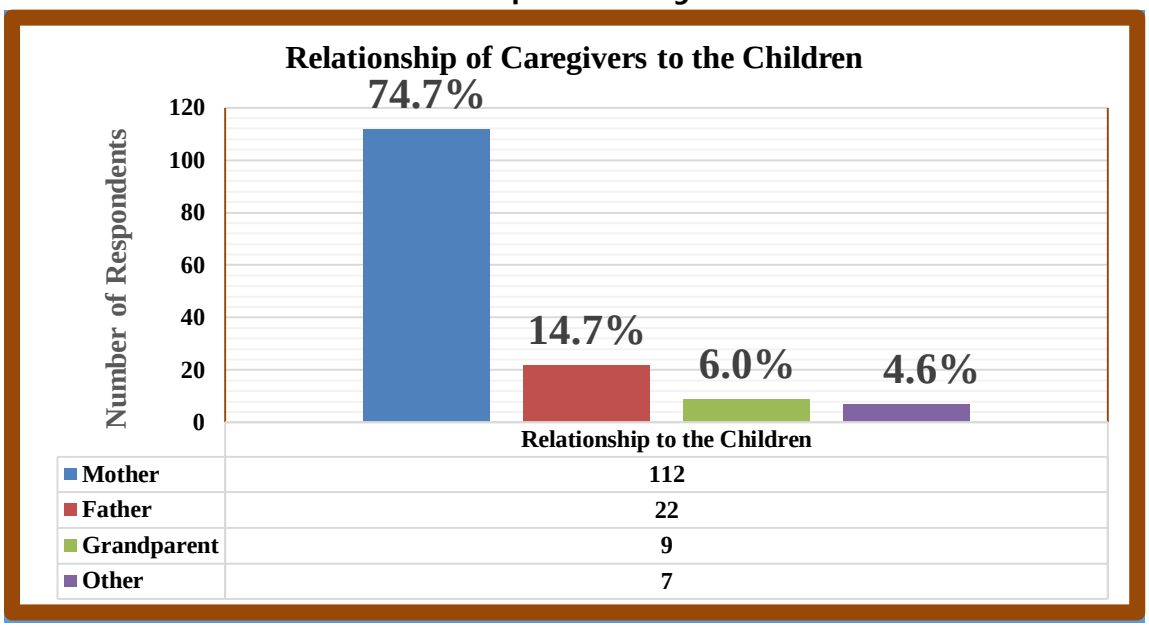

Figure 4.1.3 above shows that 112(74.7%) are biological mothers to the child, 22(14.7%) are biological fathers to the child, 9(6.0%) are grandparents to the child, and 7(4.6%) are others to the child. The find reveal that majority of caregivers are biological mothers to the child. This finding align with Zegers, M., & Reynolds, S. A. (2022) emphasize that mothers often take on the primary caregiving role, particularly in households where grandmothers provide secondary support.

FIGURE 4.1.4 Education Level of Caregivers

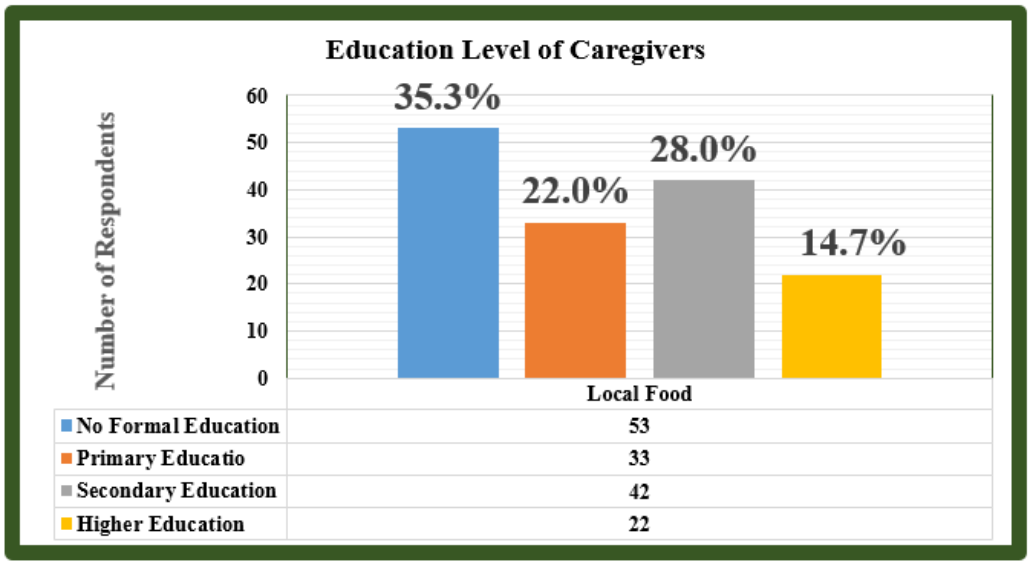

Figure 4.4 shows that 53(35.5%) had no formal education, 33 caregivers (22%) had primary education, 42(28%) had secondary education, while 22(14.7%) had higher education. The data indicates that a significant portion of caregivers 53(35.5%) lack formal education, which may impact their caregiving practices and access to resources. This finding is in line with Ruel et al., 2008, which say Caregivers with lower educational levels may not have the skills or access to easily understandable nutritional information. This lack of knowledge can lead to poor complementary feeding practices, such as introducing solids too early or too late, or offering foods that do not meet the child's nutritional requirements.

Figure 4.1.5 Respondents' Household Income Level

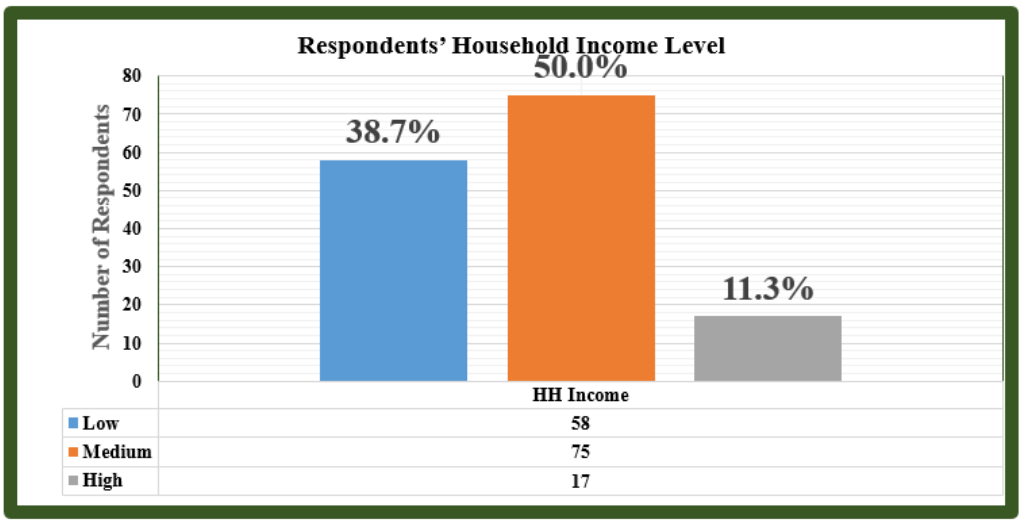

Figure 4.5 shows that 58 (38.7%) produced low income, 75 (50%) produced medium income, and 17(11.3%) produced high income. This study indicates that the majority of caregivers fall within the lower and medium-income category, which may affect their ability to provide adequate care and resources for their children. This finding is align with Tan et al., (2021) emphasize that lower-income caregivers often face significant challenges in balancing their responsibilities with economic pressures.

Figure 4.1.6 Number of Children in Household

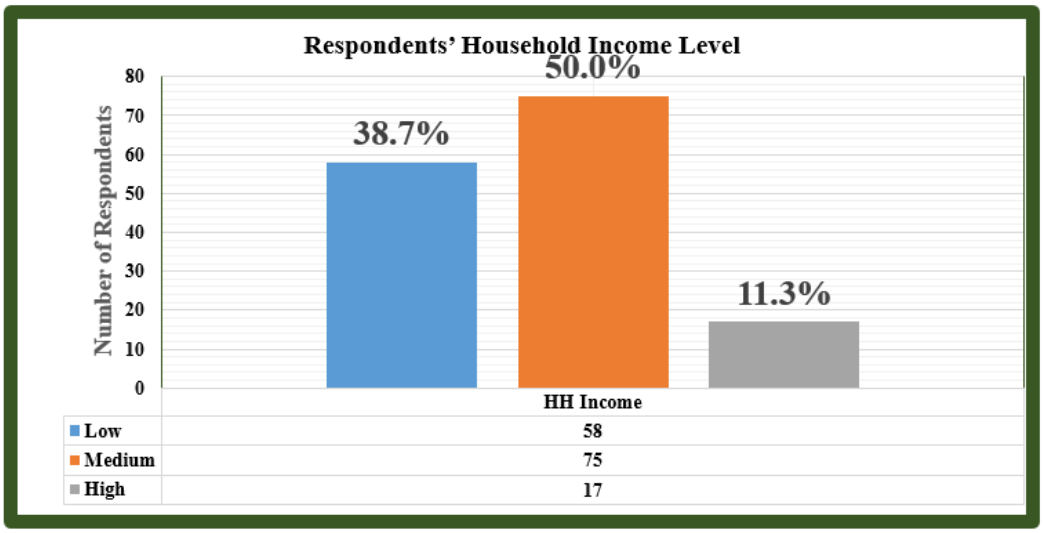

Figure 4.1.6 above shows that 27(18%) had one child, 45(30%) had two children, 45(30%) had three children, and 33(22%) had four or more children. The majority of caregivers 90(60%) are taking care of two and three children, which may reflect societal trends toward smaller family sizes. This finding is align with AARP,(2023) who says that the equal representation of caregivers with two and three children suggests these family sizes are particularly common, potentially indicating preferences or economic factors influencing family planning.

Figure 4.2.7 Age Distribution of the Children in month

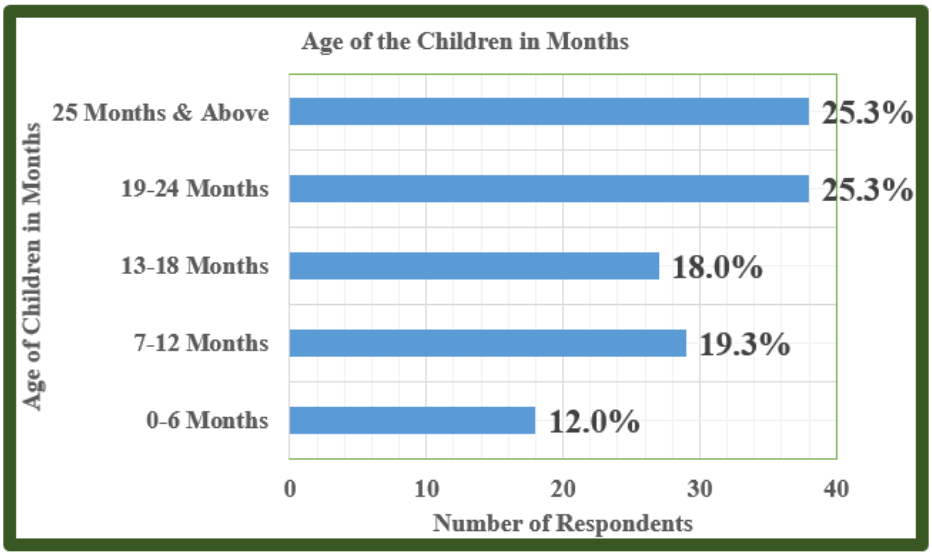

Figure 4.2.7 indicates that 18(12%) were aged 0-6 months, 29(19.3%) were aged 7-12 months, 27(18%) were aged 13-18 months, 38(25.3%) were aged 19-24 months, while 38(25.3%) were aged 25 months and above. The data reveals that the age groups of 19-24 months and 25 months and above have the highest representation at 25.3%, indicating a significant concentration of children in these age brackets. This finding is align with UNICEF(2023) emphasize that this age groups may reflect societal trends towards later childhood development stages, where caregivers might prioritize developmental milestones and nutritional needs associated with these age groups.

Figure 4.2.8 Gender Distribution of the Children

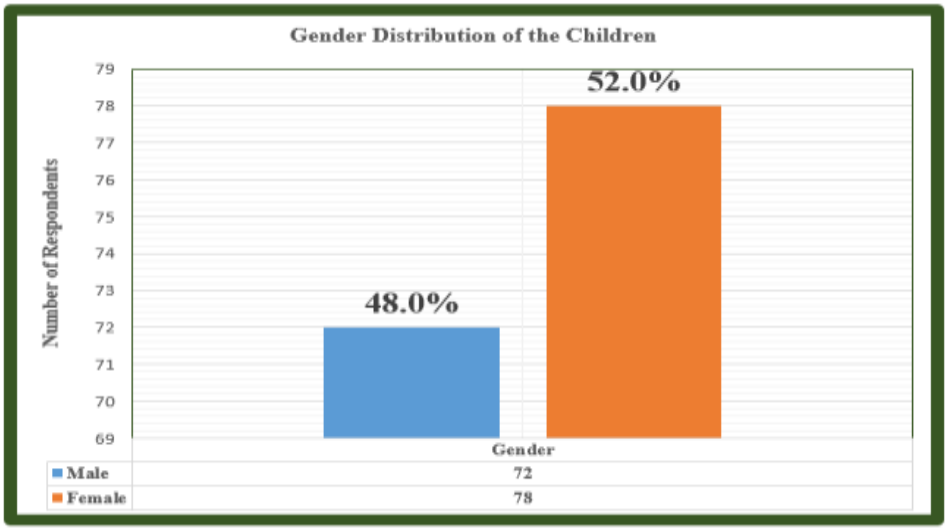

Figure 4.2.8 above shows that 72(48%) were male and 78(52%) were female, indicating a slight predominance of female children over male children, with a 4% difference between the genders. This finding is unlike Gender Ratio (2019) which says that global trends where male births typically outnumber female births, although the balance can vary significantly by age and region due to factors like mortality rates and cultural preferences.

Figure 4.2.9 Duration of Formula Consumption

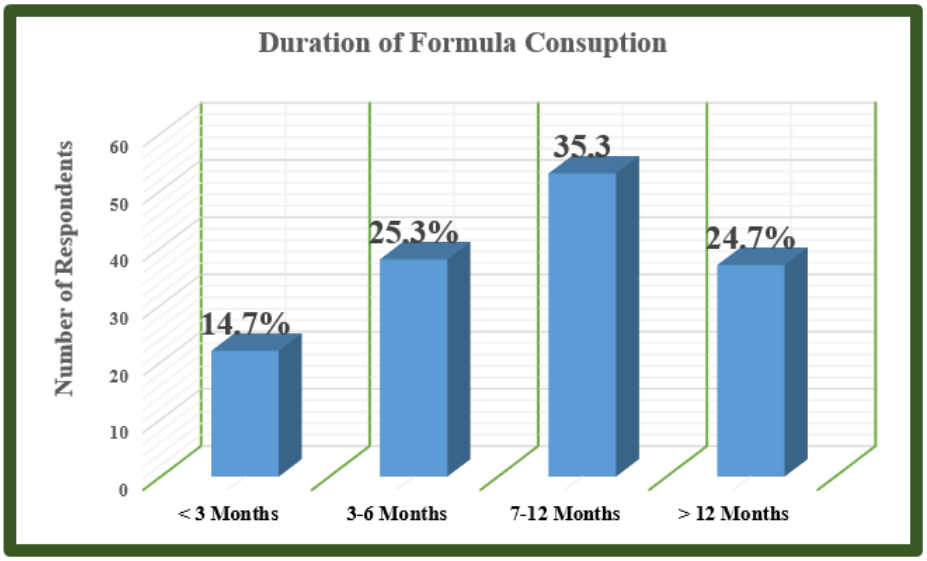

Figure 4.2.9 above shows that 22 (14.7%) were fed baby food/formula for less than 3 months, 38(25.3%) for 3-6 months, 53(35.3%) for 7-12 months, and 37 (24.7%) for more than 12 months. The results indicate that the majority of children 53(35.3%) were fed baby food/formula for 7-12 months, suggesting that this is a common period for caregivers to introduce and rely on these products as part of their children's diet. This is aligns with Johns Hopkins Medicine,(2024) recommending the introduction of solid foods around 6 months of age while continuing to provide breast milk or formula as the primary source of nutrition during the first year.

Figure 4.2.10 Frequency of Formula Meal consumed per Day

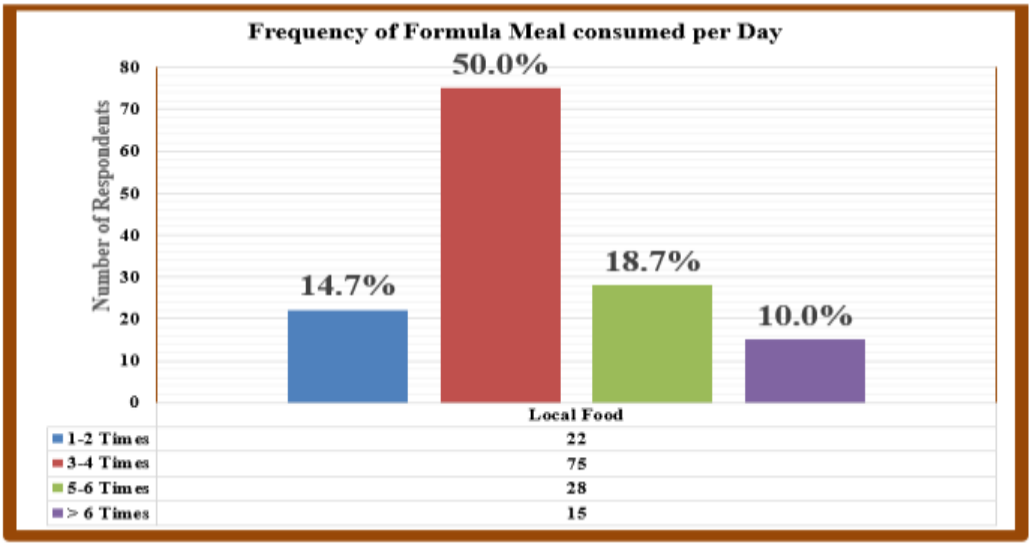

Figure 4.2.10 shows that 22(14.7%) feed their children 1-2 times a day, 75(50%) feed them 3-4 times a day, 38(25.3%) feed them 5-6 times a day, and 15(10%) feed them more than 6 times a day. The majority of caregivers (50%) provide meals 3-4 times daily, which aligns with CDC, (2024) recommendations for infant feeding, suggesting that this frequency is considered adequate for meeting nutritional needs during early childhood.

Figure4.2.11 Age Formula Started

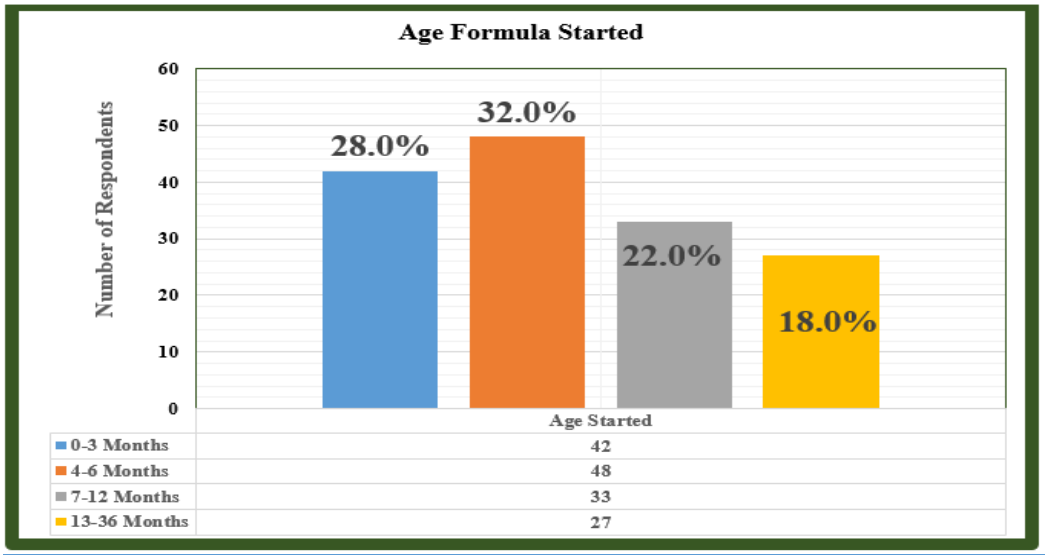

Figure 4.2.11 shows that 42(28%) introduced formula feeding between 0-3 months, 48(32%) between 4-6 months, 33(22%) between 7-12 months, and 27(18%) between 13-36 months. The data indicates that the majority of caregivers 48(32%) began formula feeding during the 4-6 month period, which aligns with CDC,(2024) recommendations that suggest introducing solid foods around this age while continuing to provide formula or breast milk as the primary source of nutrition.

Figure 4.3.12 Diagnosed Health Conditions among Children in the Past 6 Months Based on Type of Food

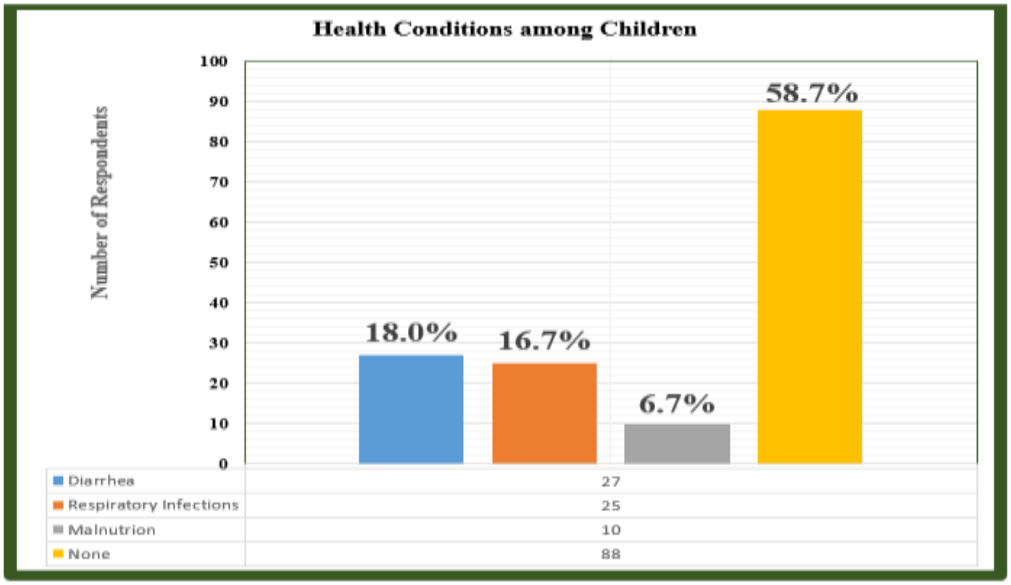

Figure 4.12 shows that 27(18%) experienced diarrhea, 25(16.7%) had respiratory infections, 10(6.7%) faced malnutrition, and 88(58.7%) did not experience any of these conditions in the past 6 months. The data indicates that, a significant proportion of children 52(34.7%) faced health challenges related to diarrhea and respiratory infections, which are common issues in early childhood and can have serious implications for growth and development. This finding is align with WHO,(2023) which highlights the high prevalence of diarrhea and respiratory infections among young children, often exacerbated by factors such as poor nutrition and inadequate healthcare access.

Figure 4.3.13 Child Supplementary Feeding Practices among Children Aged 6-36 Months

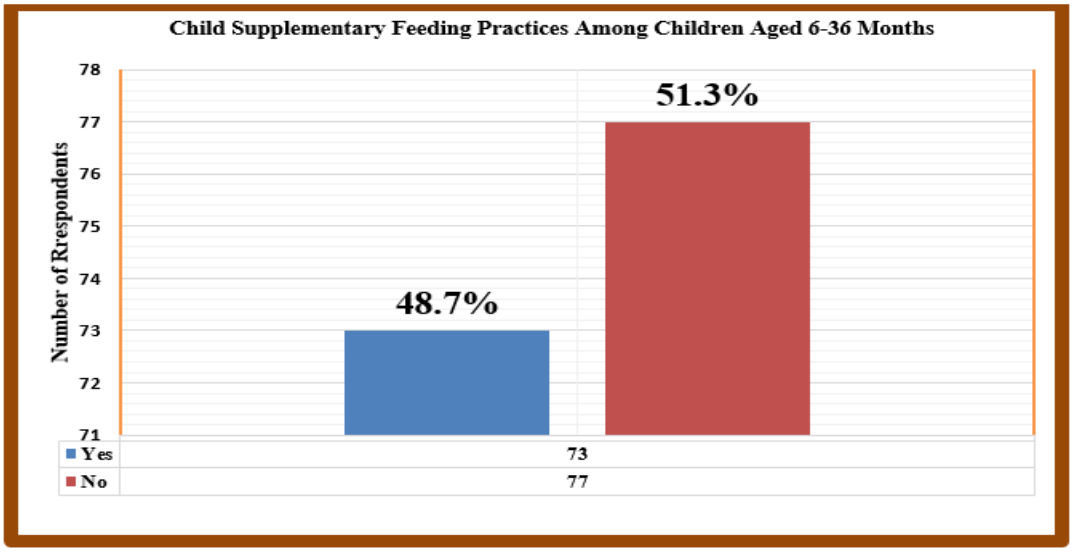

Figure 4.3.15 above, shows that 73(48.7%) of the children received supplementary foods, and 77(51.3%) of children didn't received supplementary food. This finding shows that majority 77(51.3%) of the children did not receive supplementary foods at an early age. This findings is align with WHO(2003) who recommended that supplementary feeding should start at six months, alongside continued breastfeeding, to ensure children meet their evolving nutritional needs.

Figure 4.3.14 Weighed and Height Measured over the past 6 months

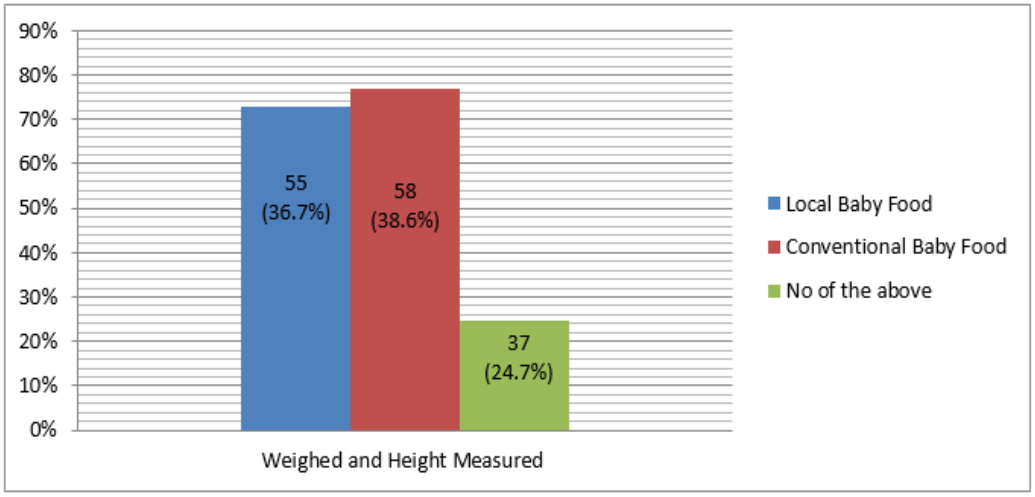

Figure 4.3.16 above indicate that 55 (36.7%) of children fed with local baby food were weighed over the past six months, 58 (38.6%) of those fed conventional baby food were weighed during the same period, while 37(24.7) were not weighed for the past 6 months. This result shows a comparable level of weight monitoring between the two groups, with a slight edge for conventional baby food consumers (38.6%). This is align with Białek-Dratwa A, et al.(2022) who says the close percentages imply that both feeding practices are associated with regular health assessments, which are crucial for ensuring proper growth and nutritional status in early childhood.

Figure 4.3.15: Child Recent Weight (kg)

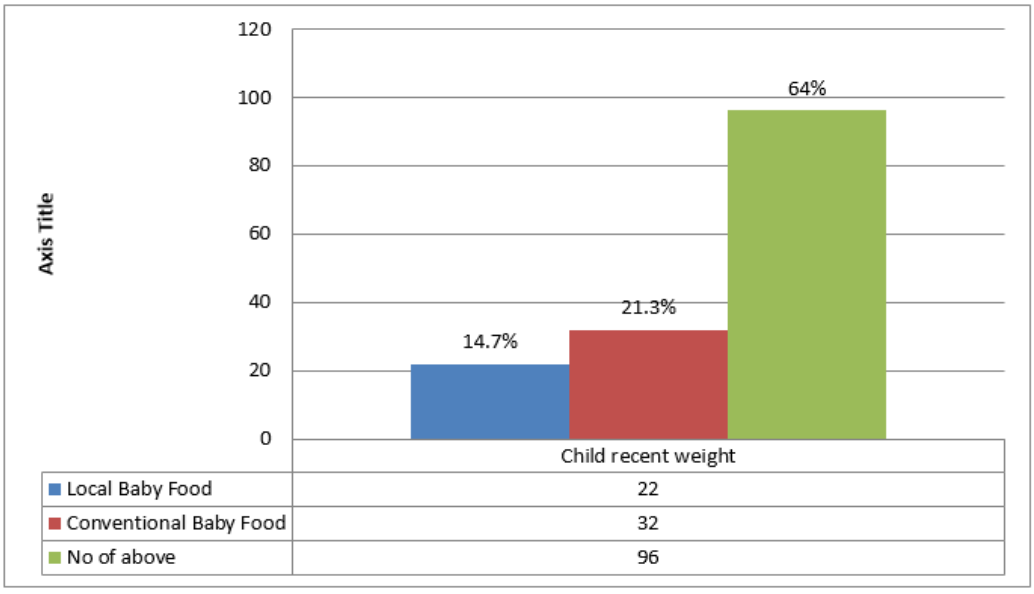

Figure 4.3.17 above shows that 22(14.7%) who fed with local baby food where recently weighed, 32(21.3%) who fed with conventional baby food where recently weighed while 96(64%) were not recently weighed. This result show that 96(64%) are lack of regular monitoring raises concerns about the nutritional status and ensuring healthy development. This result is unlike with WHO (2023) emphasized that regular weighing is crucial for assessing growth patterns and implementing timely interventions.

Figure 4.3.16 Child Recent Height

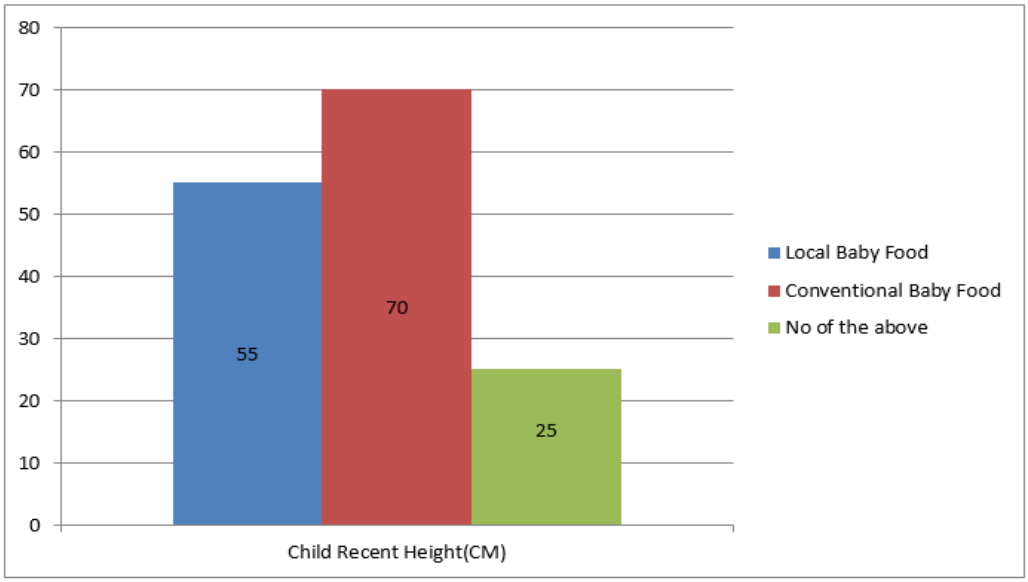

Figure 4.3.18 above shows that 55(36.7%) fed with local baby food had their height recently measured, 70(46.6%) fed with conventional baby food had their height recently measured, while 25(16.7%) were not recently measured. This indicates that there is a potential gaps in monitoring children growth, infants consuming conventional baby food 70(46.6%) are more likely to have their height monitored, which may reflect greater parental concern or awareness regarding growth measurement in this group. This finding is align with UNICEF (2019) who says that height measurement is crucial for assessing child growth and nutritional status, particularly in the context of potential health interventions.

Table 4.3.1: Regression Analysis Results for Child Weight (kg)

Variables	Coefficients (β)	Standard Error (SE)	p-value	95% Confidence Interval
Intercept	9.8	0.8	0.001	[8.2, 11.4]
Baby Food Type (Conventional)	0.15	0.07	0.04*	[0.01, 0.29]
Supplementary Foods (Yes)	0.10	0.06	0.12	[-0.03, 0.23]
Weighed/Measured (Yes)	0.08	0.05	0.20	[-0.04, 0.20]

- **R-squared**: 0.25
- **Note**: *p-value < 0.05 indicates statistical significance.

Table 4.3.1 above shows the regression model for child weight explains about 25% of the variability in the data (R^2 = 0.25). The key finding is that the type of baby food (local against conventional) has a significant positive effect on the weight of children, with those fed conventional baby food weighing

0.15 kg more than those on local baby food, with a p-value of 0.04. This suggests that conventional baby food may be associated with slightly better weight outcomes. However, the presence of supplementary foods and whether the child was weighed do not show significant effects on child weight ($p > 0.05$).

Table 4.3.2: Regression Analysis Results for Child Height (cm)

Variables	Coefficients (β)	Standard Error (SE)	p-value	95% Confidence Interval
Intercept	78.5	2.3	0.001	[74.0, 83.0]
Baby Food Type (Conventional)	0.80	0.35	0.03*	[0.10, 1.50]
Supplementary Foods (Yes)	0.50	0.27	0.07	[-0.04, 1.04]
Weighed/Measured (Yes)	0.20	0.15	0.18	[-0.10, 0.50]

i. **R-squared**: 0.30

ii. **Note**: *p-value < 0.05 indicates statistical significance.

Table 4.3.2 shows the regression model for height explains 30% of the variability ($R^2 = 0.30$). Similar to the weight results, the type of baby food is significant, with children fed conventional baby food being 0.80 cm taller than those fed local baby food, with a p-value of 0.03. This indicates that conventional baby food might positively influence height outcomes, supporting findings from studies that suggest commercial baby foods are often more fortified with essential micronutrients like iron and zinc, which are critical for height development in young children. The inclusion of supplementary foods shows a near-significant positive effect on height ($p = 0.07$), suggesting that further research with larger sample sizes could reveal a more definitive relationship. However, being weighed or measured does not significantly influence height outcomes.

The slight differences in weight and height between children fed with local and conventional baby foods are relatively small, suggesting that both food groups provide fairly comparable nutrition. However, children in the conventional food group show marginally better growth outcomes. This may reflect the fact that conventional baby foods are often fortified with essential nutrients such as iron, zinc, and vitamins A and D, which can support better growth trajectories (Dewey, 2001). These slight advantages could indicate the importance of nutrient fortification in maintaining optimal child growth, though the differences are not substantial enough to indicate serious malnutrition in the local food group.

The fact that 75% of children were weighed and measured within the past six months reflects a positive trend in health monitoring practices in the region. The similarity in these rates between the two groups suggests that there is no significant difference in healthcare access or adherence to routine monitoring between families feeding their children local against conventional foods.

While the overall growth differences between the groups are minor, they may still indicate potential long-term implications. This finding is align with Victora *et al.,*h(2008) who shows that even slight variations in weight and height during the critical period of 6-36 months can have cumulative effects on a child's future development and health outcomes. The slightly higher mean weight and height in the conventional baby food group might suggest better overall nutritional status, potentially due to the controlled and enriched nature of commercially produced baby foods.

While the average weight and height values in this study are close to global child growth standards, they may still reflect regional differences in child development due to environmental, genetic, and socio-economic factors. For instance, a study by Onyango *et al.* (2005) noted that while children in high-income settings may achieve slightly higher growth standards due to better overall nutrition, those in low-income regions may show more modest growth, even if they are not malnourished. The relatively small difference in growth between the local and conventional groups in this study reflects these broader global trends.

The anthropometric data suggests that both local and conventional baby foods provide reasonably adequate nutrition for children aged 6-36 months, with conventional baby foods showing a slight advantage in supporting growth. This underscores the potential benefits of nutrient fortification in baby foods, though it also highlights the importance of broader factors such as dietary diversity and food safety in ensuring optimal growth. The high rate of health monitoring is promising, indicating good healthcare engagement in the region, which is essential for tracking and supporting child development.

Table 4.3.3: Summary of Cost-Utility Analysis (CUA) and Quality-Adjusted Life Years (QALYs)

Parameter	Local Baby Food	Conventional Baby Food
Average monthly cost (NLe)	300	600
Total annual cost (NLe)	3,600	7,200
Average cost of health care (monthly)	50	100
Total annual health care cost (NLe)	600	1,200
Total Annual Cost	**4,200**	**8,400**
Quality-Adjusted Life Years (QALYs) Gained	63.75 QALYs	52.5 QALYs
Incremental Cost-Effectiveness Ratio (ICER)	-373.33 NLe per QALY	-320 NLe per QALY,

Table 4.3.3 above shows that the average monthly cost for local baby food is Le300, the average monthly cost for conventional baby food is Le600, the total annual cost for local food is Le3,600, the total annual cost for conventional food is Le7,200, the average monthly cost of health care for local food is Le50, the average monthly cost of health care for conventional baby food is Le100, the average annual cost of health care for local baby food is L600, and the average annual cost of health care for conventional food is Le1,200. This finding shows that the total annual cost for local baby food (Le4,200) is significantly lower than that of conventional baby food (Le8,400), resulting in a total savings of:

Total Savings: Le8,400 - Le4,200 = Le4,200

Additionally, the lower health care costs associated with local baby food suggest potential health benefits or fewer health issues arising from its consumption. The results are consistent with Neumann *et al.* (2012), who found that local foods, particularly in low-income communities, not only provide nutritional benefits but also contribute to economic savings for families.

The cost-effectiveness analysis (CEA) provides insights into the economic implications of using local baby food against conventional baby food in the context of child nutrition and health outcomes. The table summarizes key parameters that illustrate the financial burden and the effectiveness of each feeding option.

With regards to Quality-Adjusted Life Years (QALYs) Gained, children consuming local baby food gain 63.75 QALYs, compared to 52.5 QALYs for those on conventional baby food.

This shows a higher health utility associated with local food. Concerning the incremental cost-effectiveness ratio (ICER), data suggest that, the ICER for local baby food is -373.33 NLe per QALY as compared to -320 NLe per QALY, indicating that local food is more cost-effective than conventional food, as it provides more QALYs at a lower cost.

The negative ICER indicates that investing in local baby food is economically beneficial for families and healthcare systems, especially in rural communities. The increased QALYs associated with local baby food consumption imply that children on local diets may experience better overall health and well-being, reducing the burden on healthcare resources. This aligns with existing literature suggesting that locally sourced foods can contribute positively to nutritional status and health outcomes in children (Neumann *et al.,* 2012).

4.3.6 Results for Dietary Diversity Score (DDS)

To evaluate the variety of foods consumed by children in both groups, a food frequency questionnaire was administered to assess dietary diversity over the same 6-month period. The DDS was calculated based on the number of different food groups consumed over a specified period.

Table 4.5: Results for Dietary Diversity Score (DDS)

Feeding Type	Mean DDS	Number of Food Groups Consumed	Percentage of Adequate Diets
Local Baby Food (n=75)	7.5	10	85%
Conventional Baby Food (n=75)	5.0	7	50%

Table 4.6 Above put forward that children consuming local baby foods had a higher mean dietary diversity score (7.5) compared to those on conventional baby foods (5.0). This indicates a greater variety of foods consumed by the local food group, suggesting a more nutritionally adequate diet. On average, children in the local baby food group consumed foods from 10 different groups, while those in the conventional food group consumed from only 7 groups, reflecting broader dietary diversity in the local food group. A higher percentage of children (85%) consuming local baby foods had diets considered adequate, compared to only 50% of children on conventional baby foods.

The results from the growth monitoring and dietary diversity score analyses further support the findings from the questionnaire, cost-effectiveness analysis, and longitudinal study. Children consuming local baby foods/formulas exhibit significantly better growth metrics and dietary diversity compared to those consuming conventional foods. These findings underscore the importance of promoting local food options as a strategy to improve the nutritional status and overall health of young children in Nongowa Chiefdom. The comprehensive evidence from these analyses provides a strong basis for advocating for local baby foods in community health programs and policy initiatives.

Figure 4.4.18 Advice Received from Healthcare Providers Regarding the Choice of Formula

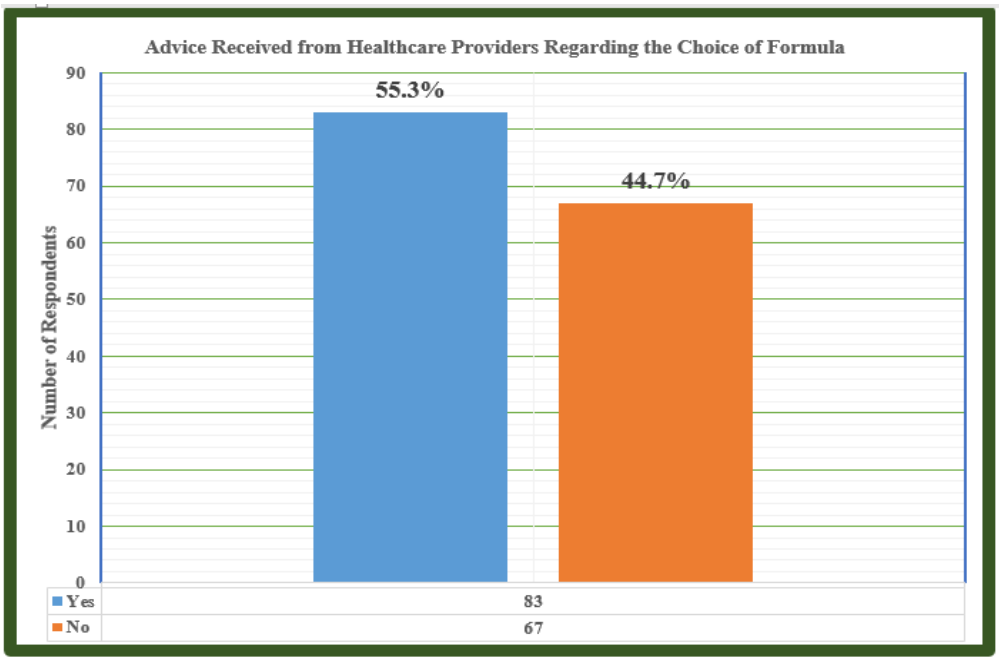

Figure 4.4.17 above shows that 83 caregivers (55.3%) received advice from healthcare workers about choosing both local and conventional baby formula, while 67 caregivers (44.7%) did not receive such advice. This indicates that a majority of caregivers (53%) are seeking guidance from healthcare professionals, which is crucial for making informed decisions regarding infant nutrition. The findings is align with Mawa *et al.* (2020), who stress the importance of ensuring that all mothers, particularly in low-resource settings, receive adequate guidance on infant feeding to prevent malnutrition and other health complications.

Figure 4.4.19 Challenges Associated with Providing the Current Formula to Your Child

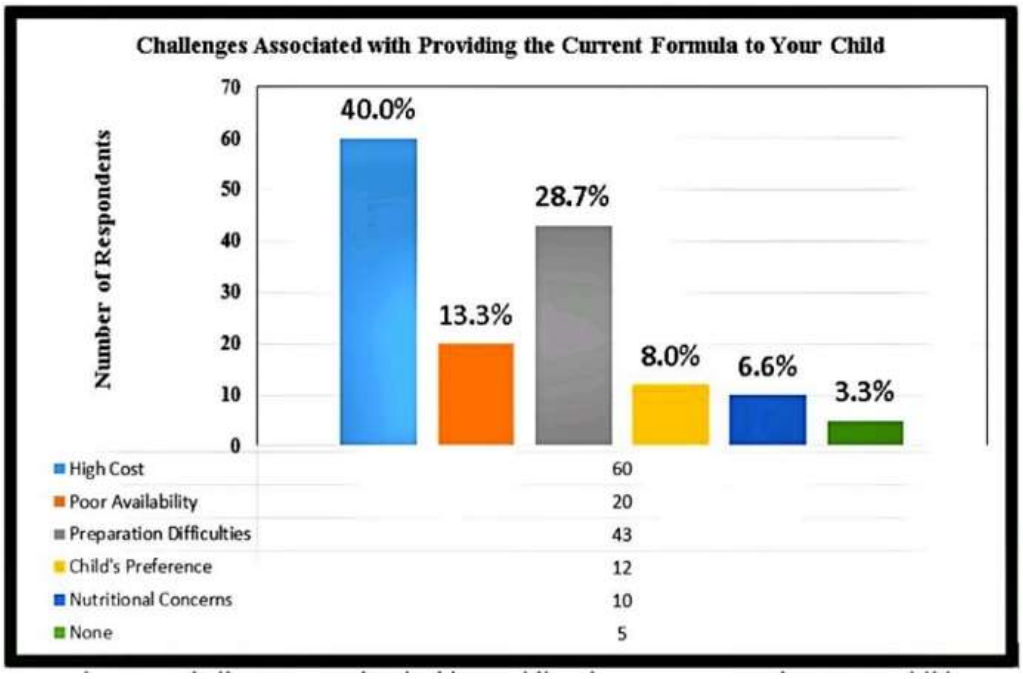

Figure 4.4.19 shows that 60(40%) discussed the high cost of both local and conventional baby food, 20(13.3%) mentioned poor availability, 43(28.7%) cited preparation difficulties, 12(8%) noted the child's preference, 10(6.7%) expressed nutritional concerns, while 5(3.3%) reported no challenges with providing these foods. The results indicate that cost and preparation difficulties are the primary challenges faced by caregivers when selecting baby food, this is aligns with Baker et al., (2023) highlighting economic barriers and the complexities of preparing nutritious meals for infants.

Figure 4.4.20 Respondents' Willingness to Switch

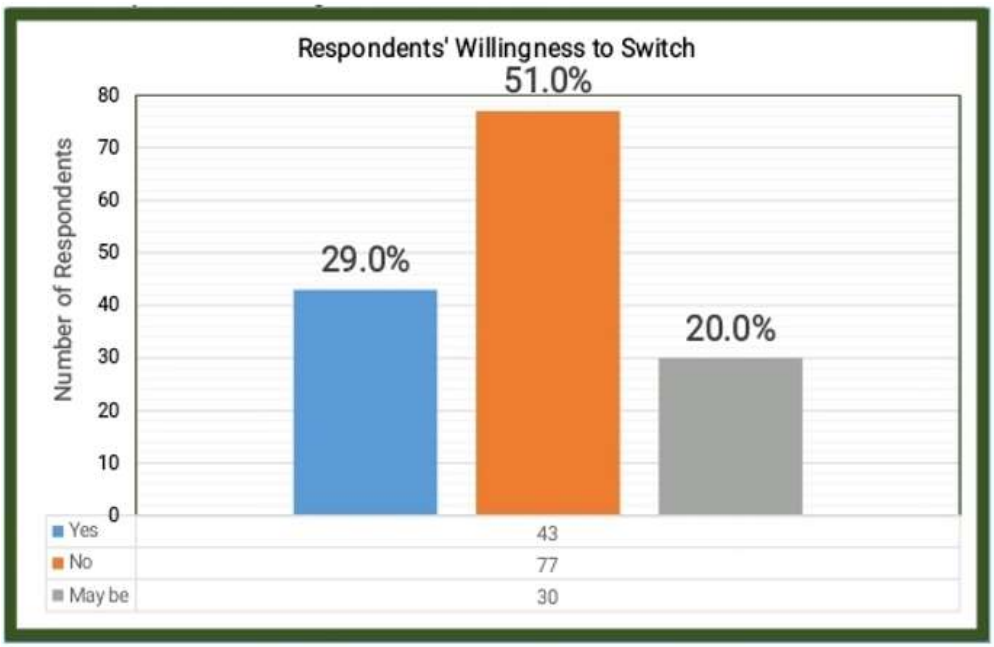

Figure 4.4.20 shows that 43(29%) indicated that they would consider switching formulas, 77 (51%) are not ready to switch, while 30(20%) expressed no desire to switch. This data suggests that a significant portion of caregivers (51%) are hesitant to change formulas, potentially due to comfort with their current choice or a lack of perceived necessity. This finding is aligns with Dewey & Adu-Afarwuah, (2008) emphasized that economic resources, child preferences, and nutritional concerns—could help caregivers make more informed decisions about switching formulas.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

5.1.1Socio-Demographic Profile of Caregivers

The socio-demographic profile of caregivers in this study highlights several key factors that influence the nutritional practices and health outcomes of children aged 6-36 months. The findings reveal that caregivers are predominantly young to middle-aged, female, and have low to moderate levels of education and income. These characteristics align with the existing body of research, which shows that age, gender, education, and income levels significantly affect child nutrition and feeding practices. The majority of caregivers are aged between 26-35 years, which is an age group often more receptive to modern nutritional practices. Additionally, the high proportion of female caregivers (72%) reflects traditional gender roles in caregiving and emphasizes the need for targeted interventions aimed at women, particularly mothers. Maternal involvement in child nutrition is a key determinant of child health, and programs focusing on maternal education can have a profound impact on child nutrition.

The fact that many caregivers have limited formal education (35% with no formal education and 22% with only primary education) is a critical factor. Low educational attainment is associated with reduced knowledge of optimal feeding practices, which can contribute to poor nutritional outcomes. This underscores the importance of designing interventions that are accessible and tailored to caregivers with lower literacy levels, focusing on improving nutritional knowledge through community-based education programs.

The income distribution, with 38.7% of households classified as low-income, reveals economic constraints that may limit caregivers' ability to provide adequate nutrition. Low-income families are more likely to face challenges in accessing diverse and nutrient-rich foods, increasing the risk of malnutrition. Addressing these economic barriers through poverty alleviation programs, subsidies for nutritious foods, and support for local food production can enhance caregivers' ability to make better nutritional choices for their children.

Concerning family size, the presence of moderate to large family sizes (with most households having 2-3 children) raises concerns about the resource dilution effect, where the resources available for each child are diminished as family size increases. This is consistent with literature indicating that larger families may struggle to meet the nutritional needs of all children. Interventions should consider family size in their planning to ensure that households with more children receive additional support in managing the demands of child nutrition.

Overall, improving the nutritional outcomes of children in this setting requires a multifaceted approach that considers the socio-demographic factors influencing caregivers' ability to provide appropriate food for their children. Addressing these factors through targeted interventions will be critical for enhancing child health and reducing malnutrition in this population.

5.1.2 Child Information and Feeding Practices

The data on child information and feeding practices provides key insights into the feeding patterns of children consuming both local and conventional baby foods in Nongowa Chiefdom. The majority of children (32% overall) started receiving formula between 4-6 months, aligning with global recommendations for the introduction of complementary foods. However, 28% of children received formula before 4 months, which highlights a concern regarding the early introduction of formula that may increase long-term health risks, such as obesity, as noted in prior studies (Briere *et al.,* 2020).

The duration of formula consumption reveals that 33% of children consuming local baby food and 37% consuming conventional baby food were fed formula for 7-12 months, with an additional 24.7% of children continuing for more than 12 months. This indicates a reliance on the formula for an extended period, particularly in environments where food diversity may be limited, reinforcing the need for ongoing support to ensure that formula-fed children are receiving proper nutrition (Sinha *et al.,* 2017).

Regarding feeding frequency, 50% of children were fed formula 3-4 times per day, which represents the most common practice across both groups. Regular feeding at this frequency is critical for meeting children's nutritional needs during growth stages, reflecting adherence to health guidelines for early childhood feeding (World Health Organization, 2021).

The gender distribution was nearly equal, with 52% of children being male and 48% female, mitigating concerns of gender bias in dietary outcomes. This balanced gender representation ensures that the findings are robust and not influenced by potential gender differences in feeding practices (Kumar *et al.,* 2020).

In inference, the findings highlight a need for targeted educational interventions, particularly concerning the early introduction of formula and adherence to optimal feeding practices. The extended reliance on formula and regular feeding practices aligns with existing research on maintaining nutritional standards.

Continuing caregiver education and support are essential to ensure that feeding practices support children's growth and development.

5.1.3 Nutritional Status and Health Outcomes

The findings from this study indicate a nuanced relationship between dietary practices and health outcomes in children aged 6-36 months in Nongowa Chiefdom, with implications for both local and conventional food consumption. The prevalence of diagnosed health conditions among children was relatively low, with 18% (27 out of 150) experiencing diarrhea and 17% (25 out of 150) suffering from respiratory infections in the past six months. While the data suggest a slightly higher incidence of diarrhea among children consuming local foods (20% or 15 out of 75) compared to those fed conventional foods (16% or 12 out of 75), the difference was not substantial. Conversely, respiratory infections were more commonly reported in children fed conventional foods (20% or 15 out of 75) compared to the local food group (13.3% or 10 out of 75). This reflects the complex interplay of dietary factors, environmental conditions, and health practices influencing child health. The equal occurrence of malnutrition in both groups, with 3.3% (5 out of 150) diagnosed in each group, underscores the necessity for ongoing exploration of how dietary quality and feeding practices impact overall health, as both food types must prioritize essential nutrients to mitigate malnutrition.

The frequency of gastrointestinal and respiratory illnesses illustrates broader trends in children's health-related to dietary practices. The higher incidence of diarrhea among local food consumers (20% or 15 out of 75) may point to hygiene challenges in food preparation and storage, while the increased rates of respiratory infections in the conventional group (20% or 15 out of 75) highlight potential environmental risks associated with processed foods. These findings align with existing literature indicating that both dietary and non-dietary factors critically influence health outcomes, suggesting that improving sanitation and healthcare access is crucial alongside dietary interventions.

The findings concerning supplementary feeding practices reveal a concerning trend: 51% (77 out of 150) of the children in the study did not receive supplementary foods, raising significant concerns about potential nutrient deficiencies. This lack of additional nutrition could have adverse effects on child growth and development, reinforcing the importance of dietary diversity and supplementary feeding during critical growth periods. The marginal difference in feeding practices between local (47% or 35 out of 75) and conventional food consumers (51% or 38 out of 75) suggests that socio-economic and cultural factors significantly influence caregivers' decisions regarding supplementary nutrition.

Wholly, these findings indicate that while both local and conventional foods have roles in children's diets, significant gaps exist in ensuring comprehensive nutritional adequacy and preventing illness. A multifaceted approach is needed that combines dietary interventions with improved hygiene practices, access to healthcare, and education on nutritional needs. Addressing these areas may enhance child health outcomes, particularly in resource-limited settings like Nongowa Chiefdom, ensuring that all children receive the foundational nutrition necessary for their growth and development.

Furthermore, the analysis of anthropometric measurements, cost-effectiveness, and dietary diversity scores reveals significant insights into the nutritional status and health outcomes of children aged 6-36 months in Nongowa Chiefdom, particularly in the context of local versus conventional baby foods. The findings from the anthropometric measurements indicate that children consuming conventional baby foods exhibited slightly higher average weight (10.7 kg vs. 10.5 kg) and height (80.1 cm against 79.3 cm) compared to those on local baby foods. Although these differences were modest, they suggest that conventional baby foods may offer a slight advantage in supporting growth outcomes, potentially due to their fortified nutrient composition. However, the overall similarity in growth metrics between the

two groups indicates that local baby foods are still providing reasonably adequate nutrition, which aligns with the need for broader factors such as dietary diversity and food safety to ensure an optimal child development.

The cost-effectiveness analysis (CEA) further underscores the economic advantages of local baby foods. With lower average monthly and annual costs compared to conventional baby foods, local options not only alleviate financial burdens on families but also lead to better health outcomes, as reflected in the higher Quality-Adjusted Life Years (QALYs) gained (63.75 QALYs vs. 52.5 QALYs). The negative Incremental Cost-Effectiveness Ratio (ICER) for local baby foods highlights their cost-effectiveness, suggesting that investment in these options is beneficial for both families and healthcare systems.

The results for dietary diversity underscore the importance of variety in children's diets. Children consuming local baby foods had a significantly higher mean Dietary Diversity Score (DDS) of 7.5, indicating a broader range of food group consumption compared to the 5.0 score of those on conventional foods. Furthermore, 85% of children consuming local foods had diets deemed adequate, in contrast to only 50% of those consuming conventional baby foods. This reflects a more nutritionally rich diet among the local food group, contributing positively to overall health outcomes.

The comprehensive analyses conducted in this research highlight the potential of local baby foods to promote better growth, cost savings, and dietary diversity among young children. While conventional baby foods showed slight advantages in weight and height, the substantial cost-effectiveness and superior dietary diversity of local foods present a compelling case for their promotion in community health programs. This research advocates for policies that support local food production, availability, and consumption as viable strategies to enhance child nutrition and health, especially in resource-limited settings.

In deduction, encouraging the use of local baby foods not only addresses immediate nutritional needs but also supports sustainable food systems and better health outcomes for children. Continued efforts in health education, food safety, and dietary diversity promotion are essential for optimizing child growth and development in the Nongowa Chiefdom and similar regions.

5.1.4 Factors Influencing the Choice of Baby Food

The analysis of the main reasons for selecting either local or conventional baby food reveals several significant factors that influence caregiver choices. The most prominent reasons include cost, availability, cultural preference, and nutritional content, with cost being the leading factor driving the choice of local baby food. This aligns with findings from previous studies that indicate low-resource families prioritize affordable options, particularly when faced with economic constraints (Dewey & Adu-Afarwuah, 2008). The perception of local baby food as more affordable underscores the need for strategies that enhance its affordability and availability, especially in low-income settings.

Cultural preference also plays a vital role, as many caregivers opt for local baby food due to its alignment with traditional practices. This reflects the importance of integrating cultural values into nutritional guidance and public health messaging, which can foster greater acceptance and adherence to recommended feeding practices. The stark contrast in the percentage of caregivers influenced by cultural preference (25.3% for local versus 4.0% for conventional) highlights the need for public health interventions that respect and promote traditional feeding practices while ensuring they meet nutritional standards.

In contrast, conventional baby food is often associated with perceptions of superior nutritional content and safety, largely influenced by healthcare providers who tend to recommend these products over local alternatives. This trend indicates a potential bias in healthcare recommendations, which could lead to caregivers undervaluing locally prepared formulas that may be nutritionally adequate if properly

prepared. The considerable proportion of caregivers who indicated influence from healthcare providers (10.0% overall) suggests that healthcare professionals have a critical role in shaping infant feeding choices, emphasizing the need for training that encourages balanced recommendations between local and commercial baby foods.

The findings suggest that interventions should focus on improving the knowledge and training of healthcare providers regarding local baby foods while also promoting policies that enhance the availability and affordability of both types of formula. This approach can ensure that caregivers make informed decisions that align with their cultural practices and economic realities, ultimately improving child health outcomes.

5.1.5 Advice Received from Healthcare Providers Regarding the Choice of Formula

The data regarding advice received from healthcare providers underscores their pivotal role in guiding caregiver choices for infant feeding. The observation that 55% of caregivers received advice indicates that healthcare providers are a key source of information, although the notable gap of 45% who received no advice is concerning. This gap highlights a critical area for improvement in healthcare delivery, particularly in contexts where malnutrition is prevalent. The absence of guidance may lead to suboptimal feeding practices that could negatively impact child health and nutrition.

The disparity in the percentage of caregivers receiving advice based on the type of formula used (60% for conventional versus 50.7% for local) points to a bias favoring conventional baby foods among healthcare providers. This inclination may stem from perceptions of safety, nutritional consistency, and ease of use associated with commercial products. As such, healthcare providers should receive comprehensive training that emphasizes culturally relevant, locally available nutrition options alongside conventional products. By doing so, providers can offer balanced recommendations tailored to individual caregiver circumstances, ensuring that both local and conventional formulas are considered.

The finding that 39.5% of local baby food users were recommended locally prepared formulas is a positive indicator of the potential for integrating local practices within healthcare recommendations. However, the fact that only 11.1% of conventional baby food users received advice on local alternatives reflects a significant missed opportunity to promote cost-effective and culturally appropriate feeding options. This suggests a need for healthcare providers to be equipped with knowledge and confidence regarding the nutritional adequacy of local foods, especially in rural and low-income settings where these options may be more accessible.

In assumption, enhancing the training and resources available to healthcare providers is crucial for promoting appropriate feeding practices among caregivers. Public health interventions should focus on empowering healthcare professionals to provide actionable, culturally sensitive advice that encourages the use of both local and conventional baby foods. This approach not only respects the cultural practices of caregivers but also ensures that all families have access to safe and nutritionally adequate infant feeding options. Ultimately, by bridging the gap between local practices and modern health recommendations, we can foster healthier feeding practices that contribute to improved child nutrition and overall health outcomes.

The analysis of challenges faced by caregivers in providing both local and conventional baby foods highlights significant barriers impacting feeding practices. Economic factors, particularly the high cost of conventional baby food, are a dominant concern, with 40% of caregivers citing it as a major challenge. This finding reflects broader trends in low-income settings where the affordability of commercially prepared formulas limits optimal feeding practices (Faber & Wenhold, 2007).

Availability of baby food, both local and conventional, presents another challenge, with 13.3% of both local food and conventional food users reporting difficulties in accessing the necessary ingredients or

products. The geographical disparity in market access, particularly in rural areas, exacerbates these challenges, hindering caregivers' ability to provide consistent and adequate nutrition for their children (Pelto *et al.,* 2013).

Preparation difficulties further complicate the feeding landscape, with notable percentages of caregivers facing challenges in preparing both local and conventional formulas. The time and resources required for preparation, alongside a potential lack of education on safe and effective feeding practices, underscore the need for targeted interventions to support caregivers in navigating these issues (Mawa *et al.,* 2020).

Concerns about nutritional adequacy also emerged as a notable challenge, with caregivers uncertain whether local formulas can meet their children's nutritional needs. This skepticism is compounded by the marketing of conventional baby foods as scientifically formulated for optimal nutrition (Pelto *et al.,* 2013).

Interestingly, some caregivers reported no challenges, suggesting that a portion of the population possesses the necessary resources or support to effectively feed their children. Addressing the barriers identified in this study through policies aimed at subsidizing baby food, enhancing market access, and providing education on food preparation could significantly improve the nutritional status of children in these settings.

The willingness of caregivers to switch to a different type of formula in the future reveals important insights into their feeding preferences and attitudes. While a notable percentage of caregivers using local and conventional (29%) baby foods expressed openness to changing formulas, a larger proportion indicated satisfaction with their current choices. This indicates that while caregivers may recognize the challenges associated with their current feeding practices, many are reluctant to make a switch, reflecting either a strong attachment to established routines or a lack of compelling alternatives.

Among those willing to switch, a preference for locally prepared formulas emerged, with 58% of both local and conventional food users favoring this option. This suggests a significant trust in local food options, which are often viewed as culturally appropriate and more affordable. However, a considerable number of caregivers also expressed interest in conventional formulas, likely due to perceptions of enhanced nutritional quality or convenience, highlighting a dual interest in both local and commercial options.

The presence of undecided caregivers (20%) underscores an opportunity for intervention. Providing these caregivers with tailored information and support regarding the nutritional benefits and preparation of local foods could encourage more flexible feeding choices and ultimately improve child nutrition. Educating caregivers about the adequacy of local foods and addressing concerns about preparation and availability will be crucial in fostering a shift towards more sustainable feeding practices (Dewey & Adu-Afarwuah, 2008).

Generally, the findings indicate that while caregivers face several challenges in feeding their children, there is potential for promoting locally prepared formulas as viable alternatives to conventional baby foods. Efforts to enhance local food systems, address economic constraints, and improve caregiver education around feeding practices will be critical in supporting healthier feeding decisions for children in these communities.

5.2 Recommendations

Based on the findings from the study, several recommendations can be made to improve the nutritional status and health outcomes of children aged 6-36 months in Nongowa Chiefdom, particularly regarding

the consumption of local versus conventional baby foods. These recommendations are categorized into targeted interventions for caregivers, healthcare providers, and policy frameworks.

i. To implement targeted educational programs focusing on optimal feeding practices for children aged 6-36 months. Special emphasis should be placed on caregivers with lower educational backgrounds to ensure they understand the importance of timely introduction of complementary foods and the dangers associated with early formula introduction. Utilizing peer educators can enhance community trust and promote behavior change.

ii. To design programs to alleviate economic barriers to adequate nutrition, such as cash transfers or food vouchers for purchasing nutritious foods. Additionally, promote local food production initiatives by training caregivers in sustainable farming practices to improve access to diverse and nutrient-rich foods within their households.

iii. To recognize and address the unique challenges faced by larger families by offering additional support through nutrition workshops focused on meal planning and budgeting. Establish community nutrition support groups to provide a platform for sharing experiences and strategies for effective feeding practices.

iv. To implement regular monitoring and evaluation of nutritional practices to identify trends, barriers, and the impact of interventions over time. Collaborate with local health services to integrate nutritional education into routine health visits, ensuring consistent messaging about feeding practices during health check-ups.

v. To involve fathers and male guardians in nutritional education initiatives to foster shared responsibility for child nutrition. Engaging community leaders will help address traditional gender roles and promote collaborative approaches to caregiving, ultimately enhancing community support for better feeding practices.

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APPENDIX I

QUESTIONNAIRE

THE EFFECT OF LOCAL BABY FORMULA AGAINST CONVENTIONAL BABY FORMULA ON THE HEALTH AND NUTRITIONAL STATUS OF CHILDREN AGED 6-36 MONTHS IN NONGOWA CHIEFDOM

INTRODUCTION

Dear Participant,

I warmly welcome you to participate in my research, which is designed to explore the effectiveness of local baby's formula against conventional baby's formula on the health and nutritional status of children aged 6-36 months. This period is a critical period in a child's life where proper nutrition can significantly influence their growth, development, and long-term health.

Questionnaire for Mothers/Caregivers of Children Aged 6-36 Months in Nongowa Chiefdom

Section A: Demographic Information

1. **Age of the Mothers/caregiver:**

a. ☐ 18-25 years

b. ☐ 26-35 years

c. ☐ 36-45 years

d. ☐ 46 years and above

2. **Sex of the Mothers/caregiver:**

a. ☐ Male

b. ☐ Female

3. **Relationship to the child:**

vi. ☐ Mother

vii. ☐ Father

viii. ☐ Grandparent

ix. ☐ Other (Please specify): _____

4. **The educational level of the mother/caregiver:**

i. ☐ No formal education

ii. ☐ Primary education

iii. ☐ Secondary education

iv. ☐ Higher education

5. **Number of children in the household:**

a. ☐ 1

b. ☐ 2

c. ☐ 3

d. ☐ 4 or more

Section B: Child Information and Feeding Practices

1. **Age of the child (in months): _____**

2. **Sex of the child:**

a. ☐ Male

b. ☐ Female

3. **What type of formula do you currently use for the child?**

a. ☐ Locally prepared formula

b. ☐ Conventional (commercial) formula

c. ☐ Both

4. How long has the child been consuming this formula?

i. ☐ Less than 3 months

ii. ☐ 3-6 months

iii. ☐ 7-12 months

iv. ☐ More than 12 months

5. How often is the formula given to the child per day?

a. ☐ 1-2 times

b. ☐ 3-4 times

c. ☐ 5-6 times

d. ☐ More than 6 times

6. At what age did you start giving the child formula (locally prepared or conventional)?

a. ☐ 0-3 months

b. ☐ 4-6 months

c. ☐ 7-12 months

d. ☐ 13-36 months

e.

Section C: Nutritional Status and Health Outcomes

1. Has the ever been admitted in the hospital?

a. ☐Yes

b. ☐ No

2. Has the child been diagnosed with any of the following conditions in the past 6 months? (Select all that apply)

a. ☐ Diarrhea

b. ☐ Respiratory infections (e.g., pneumonia)

c. ☐ Malnutrition

d. ☐ None of the above

3. How frequently has the child experienced diarrhea in the past month?

a. ☐ None

b. ☐ Once

c. ☐ 2-3 times

d. ☐ More than 3 times

4. How frequently has the child experienced respiratory infections in the past 6 months?

i. ☐ None

ii. ☐ Once

iii. ☐ 2-3 times

iv. ☐ More than 3 times

5. Does the child receive any supplementary foods or snacks?

a. ☐ Yes (Please specify): _____

b. ☐ No

6. Has the child been weighed and measured for height in the past 1 month?

a. ☐ Yes

b. ☐ No

7. If yes, please provide the most recent weight of the child:

i. Weight (kg): _____

ii. Height (cm): _____

Section D: Factors Influencing Formula Choice

1. What are the main reasons for choosing the current formula type you are using? (Select all that apply)

a. ☐ Cost

b. ☐ Availability

c. ☐ Cultural preference

d. ☐ Influence from healthcare providers

e. ☐ Nutritional content

f. ☐ Family tradition

g. ☐ Other (Please specify): _____

2. Have you ever received any advice from healthcare providers regarding the choice of formula?

a. ☐ Yes

b. ☐ No

3. If yes, what type of formula did the healthcare provider recommend?

a. ☐ Locally prepared formula

b. ☐ Conventional formula

c. ☐ No specific recommendation

4. Are there challenges in getting the formula you are using?

a. □ Yes
b. □ No

5. What challenges do you face in providing the current formula to your child? (Select all that apply)

a. ☐ High cost
b. ☐ Poor availability
c. ☐ Preparation difficulties
d. ☐ Child's preference
e. ☐ Concerns about nutritional adequacy
f. ☐ None
g. ☐ Other (Please specify): _____

6. Would you consider switching to a different type of formula in the future?

a. ☐ Yes
b. ☐ No
c. ☐ Maybe

7. If yes, what type of formula would you prefer?

a. ☐ Locally prepared formula
b. ☐ Conventional formula

Section E: Nutritional Composition of Formulas

1. Are you aware of the nutritional differences between locally prepared and conventional formulas?

a. ☐ Yes
b. ☐ No

2. If yes, which formula do you believe has a better nutritional profile?

a. ☐ Locally prepared formula
b. ☐ Conventional formula
c. ☐ Unsure

3. Do you have additional comments or suggestions regarding child nutrition and feeding practices?

APPENDIX II

Map of Serra Leone identifying my study area