



BALANCED DIETARY INTAKE AND PREGNANCY OUTCOMES AMONG WOMEN OF REPRODUCTIVE AGE IN SOUTHERN TARABA SENATORIAL DISTRICT

Madugu, Doris Lami

Department of Sociology

Faculty of Social Sciences

Federal University Wukari, Taraba State

lamidoris1@gmail.com

Abstract

Poor maternal nutrition continues to contribute significantly to adverse pregnancy outcomes such as low birth weight, preterm delivery, and maternal complications, particularly in low-resource settings. Despite the known benefits of adequate nutrition, many pregnant women still do not maintain a balanced diet due to socioeconomic, cultural, and behavioural constraints. This study examined the influence and effect of balanced diet on pregnancy outcomes among pregnant women. The study was guided by the Social Cognitive Theory (SCT) and the Social-Ecological Model (SEM). SCT explains how personal factors such as knowledge, self-efficacy, and observational learning influence dietary behaviour, while SEM emphasizes the role of multiple levels of influence including individual, interpersonal, community, and institutional factors on maternal dietary practices. The objectives were to assess the influence of balanced diet on positive pregnancy outcomes and determine its effect on pregnancy outcomes among pregnant women. A descriptive survey design was adopted. A sample of 1,113 pregnant women attending antenatal clinics was selected using multistage sampling technique. Data were collected using a structured questionnaire and analyzed using descriptive statistics and chi-square test at 0.05 significance level. Findings revealed that pregnant women who consistently practiced balanced dietary intake were more likely to experience positive pregnancy outcomes such as normal birth weight, full-term delivery, and reduced complications. A significant relationship was found between balanced diet and pregnancy outcomes ($p < 0.05$). However, influencing factors included low income, inadequate nutritional knowledge, cultural food restrictions, and limited family support. The study concluded that balanced diet significantly influences positive pregnancy outcomes among pregnant women. It was recommended that healthcare providers strengthen nutritional counselling during antenatal care, while government and community stakeholders should implement multi-level nutrition intervention programmes.

Keywords: Balanced diet, pregnancy outcomes, Social Cognitive Theory, Social-Ecological Model, maternal nutrition, antenatal care, pregnant women.

Introduction

Nutrition during the reproductive years occupies a foundational position in global public health discourse, with its consequences extending well beyond the individual woman to shape fetal development, neonatal survival, and the long-term health trajectory of successive generations. A balanced diet characterised by adequate intake of macronutrients and key micronutrients such as iron, folate, calcium, vitamin D, zinc, vitamin B12, and long-chain omega-3 fatty acids has been consistently associated with hormonal regulation, ovulatory function, healthy gestation, and reduced chronic-disease risk (Jouanne et al., 2025). The World Health Organization (WHO) estimates that approximately 17.5% of the adult population, roughly one in six individuals

globally, experience some form of fertility difficulty, underscoring the magnitude of reproductive vulnerability in contemporary populations (WHO, cited in Njagi et al., 2024). Globally, 50% of all preschool-aged children and 67% of all women of reproductive age exhibit some form of micronutrient deficiency (MND), particularly in folate, iron, vitamin A, and zinc deficiencies commonly attributed to poor dietary quality, high fertility rates, closely spaced pregnancies, and heightened physiological demands during gestation (Food and Nutrition Journal, 2025). Evidence from large-scale meta-analyses has further demonstrated that higher adherence to healthy dietary patterns rich in fruits, vegetables, whole grains, low-fat dairy products, and fish significantly reduces the risk of gestational hypertensive disorders, maternal depression, low birthweight, and preterm delivery (MDPI Nutrients, 2024).

The international community has increasingly recognised maternal nutrition as integral to achieving the United Nations Sustainable Development Goals (SDGs), particularly SDG 2 (Zero Hunger) and SDG 3 (Good Health and Well-being). A life-course approach anchored in improving the nutritional status of women of reproductive age holds the potential to reduce the global burden of non-communicable diseases (NCDs) across generations (Bailey et al., as cited in Cambridge Nutrition Society, 2021). Dietary interventions during pregnancy are considered cost-effective, with documented potential to reduce future economic burdens associated with maternal morbidity and child developmental delays (Hanson, Jacob and Hod, cited in Cambridge Nutrition Society, 2021). Nevertheless, overnutrition, undernutrition, and nutritional imbalances remain widespread among women of reproductive age globally, increasing the risk of pregnancy complications for both mothers and children, while most women continue to fall short of meeting dietary guidelines for pregnancy as recommended by the WHO (Cambridge Nutrition Society, 2021). The global problem of iron deficiency anemia estimated to affect 40% of pregnant women worldwide illustrates the persistent gap between nutritional policy and its effective implementation at the population level, with inadequate dietary diversity identified as a major contributor to this condition, accounting for at least 15% of maternal deaths and significant neonatal morbidity (Food and Nutrition Journal, 2025; Frontiers in Nutrition, 2023).

At the regional level, sub-Saharan Africa (SSA) bears a disproportionate share of the global burden of maternal and neonatal mortality, with poor nutritional status constituting one of its leading determinants. Women of childbearing age in this region are especially vulnerable to micronutrient inadequacies due to the intersection of poverty, food insecurity, suboptimal healthcare infrastructure, frequent infections, and short inter-pregnancy intervals (PubMed, 2008). Evidence from Burkina Faso, Ghana, Kenya, and Tanzania documents alarmingly low rates of dietary diversity among pregnant women, with inadequate dietary diversity linked to intrauterine growth restriction, preterm birth, low birthweight, and maternal anemia (BMC Public Health, 2024). A systematic review and meta-analysis of observational studies across Africa found that inadequate dietary diversity during pregnancy significantly increased the risk of maternal anemia and low birthweight, with the prevalence of maternal anemia ranging from 31% in South Africa to 53% in Sudan and parts of Ethiopia figures that reflect structural failures in food systems rather than individual dietary choices alone (Food Science and Nutrition, 2023). Community qualitative research conducted across rural sub-Saharan African communities further revealed that while women are often aware of the importance of dietary diversity, structural inequalities, food insecurity, and cultural norms continue to impede access to nutritionally adequate diets during pregnancy and lactation (PRECISE Network, 2025). Evidence-based

nutritional education interventions in SSA have shown promise in improving birth outcomes, yet their systematic integration into routine antenatal care (ANC) remains limited, partly because of funding deficits and the absence of coordinated partnerships between governments, health promoters, and non-governmental organizations (BMC Systematic Review, 2024).

Within Nigeria, maternal nutrition presents a complex public health challenge shaped by the country's dual burden of undernutrition and overnutrition, compounded by significant socioeconomic and geographical disparities. Studies from Nigeria have revealed high prevalence of both under- and over-nutrition, alongside nutrient deficiencies in iron, folate, vitamin D, and vitamin A, with consequent obstetric complications including hypertension, anaemia, neural tube defects, low birthweight, and maternal and perinatal mortality (PubMed, 2012). The Nigeria Demographic and Health Survey (NDHS) data indicate that 11% of women of reproductive age are undernourished (BMI < 18.5 kg/m²), 17% are overweight, and 8% are obese, while the prevalence of anaemia among pregnant women stands at approximately 61% (NDHS, 2018, as cited in Bayelsa State micronutrient study, 2025). Research conducted in Ibadan using the Ibadan Pregnancy Cohort Study a prospective study of 1,745 pregnant women identified five major dietary patterns and found that white rice was the most frequently consumed meal, with dietary patterns strongly associated with sociodemographic factors including educational attainment and household income (Adeoye et al., PLOS ONE, 2022). Furthermore, food insecurity among pregnant Nigerian women has been documented as a multilevel problem, with higher parity, larger household size, and gender of household head identified as significant determinants, highlighting the need for gender-centred approaches in nutrition policy (PLOS Global Public Health, 2023). Nigeria's significant share of the global burden of maternal and child mortality has been repeatedly acknowledged, yet nutritional education and micronutrient supplementation coverage remain inconsistent, with supply chain disruptions and inadequate funding constraining programme delivery at the state level (Frontiers in Health Services, 2023).

In the Northeast geopolitical zone of Nigeria, and more specifically in Taraba State, the nutritional and reproductive health challenges facing women of reproductive age are acute and poorly addressed by existing health systems. A landmark study by Webb Girard et al. (2012) conducted across four Local Government Areas (LGAs) in Taraba States elected as a representative state for the Northeast zone given its diversity in religion, terrain, geography, ethnicity, and culture found that maternal nutrition was neither prioritized nor adequately funded in either governmental or non-governmental systems (Food and Nutrition Bulletin, 2012). Considerable variation exists among Taraba State's three senatorial districts Northern, Central, and Southern with respect to religion, ethnicity, food culture, and levels of food poverty, suggesting that nutritional vulnerabilities are not uniformly distributed across the state (Webb Girard et al., 2012). Within this context, southern Taraba Senatorial District, which shares demographic and cultural characteristics with parts of the broader Middle Belt region, is home to communities where traditional food systems and dietary practices intersect with contemporary food insecurity, limited access to antenatal care, and low maternal health literacy. Supply chain challenges have further been documented as a barrier to equitable access to iron-folic acid (IFA) supplements in Taraba State, resulting in unequal coverage among pregnant women across LGAs (Frontiers in Health Services, 2023). Despite this documented burden, empirical research specifically examining the relationship between balanced diet and pregnancy outcomes among women of reproductive age in the southern Taraba senatorial district remains sparse, constituting

a significant gap in the evidence base needed to inform targeted nutrition programming and maternal health governance in the region.

The foregoing evidence establishes a compelling theoretical and empirical basis for examining the relationship between balanced diet and pregnancy outcomes in Southern Taraba Senatorial District. The interplay of global micronutrient deficiency trends, region-specific patterns of dietary inadequacy in sub-Saharan Africa, documented nutritional vulnerabilities in Nigeria, and the understudied context of Taraba State collectively underscore the urgency of this research. Food choices and consumption patterns strongly predict overall health, wellness, and pregnancy outcomes among women of reproductive age (Bhandari et al., 2016, as cited in PLOS ONE, 2024), yet this relationship has rarely been explored within the specific socio-cultural and agroecological milieu of Southern Taraba. Understanding how dietary adequacy or inadequacy manifests in this population and how it shapes outcomes such as birthweight, gestational complications, maternal anaemia, and neonatal survival is essential not only for filling academic gaps in the sociological and public health literature but also for providing actionable evidence for policymakers, healthcare providers, and community-based organizations operating in the senatorial district. This study, therefore, situates itself at the nexus of medical sociology, public health nutrition, and reproductive health, with the aim of contributing to evidence-informed maternal health interventions in Southern Taraba and comparable contexts across Northern Nigeria.

Statement of problem

Adequate nutrition during pregnancy is widely acknowledged as a cornerstone of maternal and foetal health. Empirical evidence consistently demonstrates that a balanced diet, rich in essential macronutrients and micronutrients, is critical for preventing adverse pregnancy outcomes such as anaemia, preeclampsia, intrauterine growth restriction, low birth weight, preterm delivery, and maternal mortality (WHO, 2016; Black et al., 2013). Despite this well-documented scientific consensus, a significant proportion of pregnant women across sub-Saharan Africa, and Nigeria in particular, continue to experience nutritional deficiencies during the gestational period, with serious consequences for both mother and child.

In Southern Taraba Senatorial District, the nutritional status of pregnant women remains a pressing public health concern. The region is characterized by subsistence farming, widespread food insecurity, low household income levels, and limited access to healthcare services, all of which cumulatively undermine the capacity of women of reproductive age to maintain a balanced diet during pregnancy (NBS, 2020; NDHS, 2018). Furthermore, prevailing cultural norms, food taboos, and gender-based inequalities in food allocation within households have been identified as structural impediments to adequate nutritional intake among pregnant women in communities across Taraba State (Oguntona & Akinyele, 2010; Nnam, 2015).

National demographic and health survey data indicate that anaemia affects approximately 58% of pregnant women in Nigeria, with higher prevalence recorded in the North-East geopolitical zone, to which Taraba State belongs (NDHS, 2018). Maternal mortality ratios in Taraba State have also been reported at levels far above the national average, with malnutrition identified as a compounding factor (TSHSM, 2019). Despite these alarming statistics, empirical studies specifically examining the relationship between dietary balance and pregnancy outcomes in the

Southern Taraba Senatorial District are sparse, leaving a critical evidence gap that limits the development of targeted nutritional interventions.

Existing literature, while informative at the national and regional level, tends to overlook the specific socioeconomic, cultural, and environmental contexts that characterize Southern Taraba Senatorial District a zone that is ethnically diverse, predominantly rural, and underserved in terms of antenatal care infrastructure. The absence of community-specific data on dietary patterns, nutrient intake adequacy, and their measurable effects on maternal and neonatal outcomes represents a significant research lacuna. Without such localized evidence, health planners and policymakers are ill-equipped to design and implement effective, context-sensitive nutritional programmes for pregnant women in the district.

It is against this background that this study seeks to investigate the relationship between balanced diet and pregnancy outcomes among women of reproductive age in Southern Taraba Senatorial District, Nigeria. Specifically, the study interrogates how dietary practices, nutrient adequacy, socioeconomic factors, and cultural food beliefs collectively shape pregnancy outcomes in this under researched context. The findings are expected to provide evidence-based insights that will inform policy and programmatic responses aimed at improving maternal and child health outcomes in Taraba State.

Literature Review

This section presents a review of existing literature on the influence and effect of balanced diet on pregnancy outcomes, with particular attention to evidence from sub-Saharan Africa and Nigeria. It also examines the theoretical underpinnings of the study, specifically the Social Cognitive Theory (SCT) and the Social Ecological Model (SEM), and discusses how these frameworks apply to understanding dietary behaviours and pregnancy outcomes among women of reproductive age in Southern Taraba Senatorial District. The chapter further identifies gaps in existing literature that justify the present study.

Balanced Diet

A balanced diet refers to the habitual consumption of food in proportions that adequately supply all essential nutrients including carbohydrates, proteins, fats, vitamins, minerals, and water in quantities sufficient to support the normal physiological functions of the body (FAO & WHO, 2019). In the context of pregnancy, a balanced diet goes beyond meeting baseline caloric requirements; it entails the intentional and consistent intake of macro- and micronutrients that support foetal development, placental function, and maternal metabolic adaptation (Koletzko et al., 2019).

The World Health Organization defines dietary adequacy during pregnancy as the sustained intake of foods that meet increased physiological demands, including elevated requirements for iron, folic acid, calcium, zinc, iodine, and vitamins A, C, and D (WHO, 2016). Inadequate nutrition during this critical period is associated with a spectrum of adverse outcomes, including intrauterine growth restriction, preterm birth, low birth weight, congenital anomalies, maternal anaemia, pre-eclampsia, and perinatal mortality (Black et al., 2013; Victora et al., 2016). The concept of dietary diversity measured by the number of food groups consumed over a reference period has gained traction in public health research as a proxy indicator of nutrient adequacy (FAO, 2016; Saaka et al., 2017).

In the Nigerian context, dietary patterns during pregnancy are shaped by a complex interplay of cultural traditions, household food security, income levels, and access to nutrition education and antenatal care services (Nnam, 2015; Oguntona & Akinyele, 2010). Women in rural communities, particularly in Northern Nigeria, frequently report low dietary diversity scores, with diets dominated by starchy staples and minimal intake of animal-source proteins, fresh fruits, and vegetables (NDHS, 2018; Olorunfemi et al., 2020). These patterns are especially pronounced in Southern Taraba Senatorial District, where poverty, seasonality of food availability, and cultural food restrictions compound the challenge of adequate nutrition during pregnancy.

Nutritional Requirements during Pregnancy

Pregnancy imposes substantially elevated nutritional demands on the female body, necessitating increased intake of specific macro- and micronutrients to support foetal development and sustain maternal health. Understanding these requirements is foundational to assessing the adequacy of dietary intake among pregnant women and its subsequent effects on birth outcomes.

Macronutrient Requirements

During pregnancy, energy requirements increase by approximately 285–300 kilocalories per day above pre-pregnancy levels, with additional demands for protein to support foetal tissue synthesis, uterine expansion, and increased maternal blood volume (Institute of Medicine, 2006; Koletzko et al., 2019). Protein intake is critical, as amino acids serve as the structural building blocks for foetal organ development, particularly brain and neural tissue formation. Studies conducted in Nigeria and other low-income settings have reported that inadequate protein intake during pregnancy is associated with foetal growth restriction and low birth weight, both of which are significant predictors of infant morbidity and mortality (Okonofua et al., 2017; Victora et al., 2016). Carbohydrates remain the primary energy substrate during pregnancy, and an adequate intake of complex carbohydrates with low glycaemic indices is associated with reduced risk of gestational diabetes and macrosomia (Louie et al., 2013). Dietary fat, particularly essential fatty acids such as docosahexaenoic acid (DHA) and arachidonic acid, plays an indispensable role in foetal neurological development and visual acuity (Koletzko et al., 2019).

Micronutrient Requirements

Micronutrient deficiencies during pregnancy constitute a major public health burden in low- and middle-income countries. Iron deficiency anaemia remains the most prevalent micronutrient disorder globally, affecting an estimated 40% of pregnant women in low-income countries, with the highest burden in sub-Saharan Africa (WHO, 2020). In Nigeria, the National Demographic and Health Survey (2018) reported anaemia prevalence of 58% among pregnant women, with Taraba State recording some of the highest rates in the North-East zone. Iron deficiency in pregnancy is associated with preterm delivery, low birth weight, impaired cognitive development in the infant, and increased maternal mortality risk (Scholl, 2011).

Folate (folic acid) is essential in the periconceptional period and early pregnancy for the prevention of neural tube defects, including spina bifida and anencephaly. Calcium deficiency during pregnancy has been implicated in the development of pre-eclampsia and eclampsia, which remain leading causes of maternal mortality in Nigeria (Hofmeyr et al., 2014; WHO, 2011). Iodine deficiency is associated with cretinism, stillbirth, and impaired neurocognitive development in the newborn, while zinc deficiency is linked to preterm birth and foetal growth

retardation (Black, 2003). Vitamin A deficiency, prevalent in many parts of Northern Nigeria, is associated with night blindness, increased susceptibility to infection, and maternal mortality (UNICEF, 2019). These micronutrient deficiencies are compounded in settings like Southern Taraba, where dietary diversity is low and supplementation coverage through antenatal care is inadequate.

Influence and Effect of Balanced Diet on Pregnancy Outcomes

Maternal Outcomes

A growing body of evidence documents the direct influence of dietary quality on maternal health outcomes during and after pregnancy. Pre-eclampsia, one of the leading causes of maternal mortality in sub-Saharan Africa, has been significantly associated with inadequate intake of calcium, magnesium, and antioxidant vitamins (C and E) (Hofmeyr et al., 2014; Rumbold et al., 2015). Women who consume diets low in these protective nutrients are at substantially higher risk of hypertensive disorders of pregnancy, which account for a disproportionate share of maternal deaths in Nigeria (Abalos et al., 2013). Gestational diabetes mellitus (GDM), increasingly common in Nigerian urban and peri-urban settings, is strongly influenced by dietary patterns, particularly excessive consumption of refined carbohydrates and inadequate intake of dietary fibre (Balogun & Sekoni, 2017). GDM in turn increases risks of caesarean delivery, postpartum haemorrhage, and future development of type 2 diabetes in the mother. Studies conducted in South-Western and North-Central Nigeria have demonstrated that maternal dietary quality, as assessed by dietary diversity scores and nutrient adequacy ratios, is a statistically significant predictor of both gestational hypertension and anaemia (Akinloye et al., 2020; Omotayo et al., 2018). These findings underscore the centrality of nutritional status in maternal health outcomes.

Foetal and Neonatal Outcomes

The influence of balanced diet on foetal outcomes is mediated through several biological pathways, including placental nutrient transfer, epigenetic programming, and oxidative stress regulation. Inadequate maternal nutrition, particularly protein-energy malnutrition, is the primary driver of intrauterine growth restriction (IUGR), a condition in which the foetus fails to achieve its genetically determined growth potential in utero (Barker, 2007; Gluckman & Hanson, 2006). IUGR is strongly predictive of low birth weight (LBW, defined as birth weight below 2,500 grammes), neonatal mortality, developmental delays, and increased risk of non-communicable diseases in adulthood a phenomenon known as the Barker hypothesis or the Developmental Origins of Health and Disease (DOHaD) framework (Barker, 2007). In Nigeria, the prevalence of low-birth-weight ranges between 14% and 23%, with significantly higher rates reported in rural Northern states (UNICEF, 2019; NDHS, 2018). Studies conducted in Taraba and adjacent states have consistently identified maternal undernutrition including anaemia, low mid-upper arm circumference, and poor dietary diversity as key determinants of LBW and preterm birth (Idris et al., 2014; Umar et al., 2016). Conversely, studies from other parts of Nigeria and sub-Saharan Africa demonstrate that improved dietary diversity during pregnancy is significantly associated with higher birth weight, reduced preterm birth rates, higher Apgar scores, and better neonatal survival (Saaka et al., 2017; Zerfu et al., 2016).

Long-term Developmental Outcomes

Beyond the immediate perinatal period, the quality of maternal diet during pregnancy exerts lasting influence on the child's developmental trajectory. The DOHaD framework establishes that nutritional insults during critical windows of foetal development programme the child's metabolic, immunological, and neurological systems in ways that shape health outcomes across the life course (Gluckman & Hanson, 2006; Victora et al., 2016). Children born to nutritionally deficient mothers demonstrate higher rates of stunting, wasting, and micronutrient deficiency in early childhood, as well as poorer cognitive performance, reduced school attainment, and lower adult productivity outcomes with significant implications for human capital development in communities like those in Southern Taraba Senatorial District.

Socioeconomic and Cultural Determinants of Dietary Practices in Pregnancy

The dietary practices of pregnant women in low-income settings are not solely a function of individual nutritional knowledge or personal choice; they are embedded within broader socioeconomic structures and cultural systems that determine food access, food preference, and food use. Household income and poverty status are among the strongest determinants of dietary quality during pregnancy in Nigeria and across sub-Saharan Africa (Arimond & Ruel, 2004; Onyiriuka & Iheagwara, 2013). Women in food-insecure households are significantly less likely to consume diverse diets or to maintain adequate intake of animal-source proteins, fruits, and vegetables food groups that carry higher costs relative to starchy staple foods.

Cultural food beliefs and taboos exert powerful influence over dietary behaviour during pregnancy in many Nigerian ethnic groups. In Taraba State, which is home to numerous ethnic nationalities including the Jukun, Mumuye, Tiv, Kuteb, and Fulani communities, ethnographic evidence suggests that a range of food proscriptions including the avoidance of eggs, certain fish species, red meat, and specific fruits are observed during pregnancy based on beliefs about their presumed harmful effects on foetal development or the birth process (Nnam, 2015; Amuna & Zotor, 2008). While some traditional food practices may carry nutritional benefits, many taboos restrict the intake of nutrient-dense foods and thereby compound the risk of micronutrient deficiency. Gender dynamics and the intra-household distribution of food also significantly influence maternal nutritional status. In many rural Nigerian communities, women consume meals last, receive smaller portions, and have limited agency in household food decisions patterns that disproportionately affect pregnant and lactating women (Fabiansen et al., 2016; Mgawadere et al., 2017). Educational attainment is another key mediator: women with higher levels of education demonstrate significantly better nutrition knowledge, greater dietary diversity, and more consistent uptake of antenatal care services that provide nutritional counselling (Omotayo et al., 2018). Access to antenatal care, maternal nutrition programmes, and community health education has been shown to significantly improve dietary practices and birth outcomes in comparable settings within Nigeria (Akinloye et al., 2020; FMOH, 2016).

Theoretical Framework

This study is anchored on two complementary theoretical frameworks: the Social Cognitive Theory (SCT) developed by Albert Bandura, and the Social Ecological Model (SEM) as elaborated by Bronfenbrenner and subsequently applied to health behaviour research by McLeroy et al. (1988) and Stokols (1996). Together, these theories provide a multi-level analytical lens through which the complex determinants of dietary behaviour during pregnancy

spanning individual cognition and agency, interpersonal dynamics, community norms, institutional systems, and policy environments can be systematically examined and understood.

Social Cognitive Theory (SCT)

Social Cognitive Theory, originally articulated by Albert Bandura in his seminal work 'Social Foundations of Thought and Action' (1986) and further developed in subsequent publications (Bandura, 1997, 2004), posits that human behaviour is the product of a dynamic triadic interaction among personal cognitive factors (beliefs, expectations, self-efficacy), behavioural patterns, and environmental influences. This triadic reciprocal determinism is the central mechanism through which SCT explains why individuals adopt, maintain, or abandon health behaviours, including dietary practices.

At the core of SCT relevant to this study is the construct of self-efficacy defined as an individual's belief in her capacity to successfully perform a specific behaviour, such as maintaining a balanced diet during pregnancy (Bandura, 1997). Research has consistently demonstrated that high levels of nutrition-related self-efficacy are positively associated with dietary diversity, meal planning, and adherence to nutritional recommendations among pregnant women (Anderson et al., 2011; Mailey et al., 2014). Women who believe they are capable of sourcing, preparing, and consuming nutritionally adequate meals despite financial constraints or cultural pressures are significantly more likely to achieve dietary adequacy during pregnancy. Conversely, low self-efficacy, often compounded by limited nutritional knowledge and absence of positive role models, is associated with poor dietary practices and nutritional passivity.

Outcome expectations, another key SCT construct, refer to an individual's beliefs about the consequences of engaging in a behaviour. A pregnant woman who believes that eating a diverse diet will result in a healthy baby and uncomplicated delivery is more likely to make intentional dietary choices than one who holds fatalistic beliefs or lacks awareness of the diet-outcome linkage. In communities in Southern Taraba, where traditional beliefs about pregnancy and food are influential, the misalignment between SCT-predicted outcome expectations and culturally embedded food beliefs may constitute a significant barrier to optimal dietary behaviour. Observational learning (modelling) is also relevant in this context: women who observe other pregnant women or respected community members maintaining balanced diets and achieving good pregnancy outcomes are more likely to replicate such behaviours, suggesting a role for peer education and social modelling in nutritional interventions. SCT further emphasizes the role of goal-setting, self-regulation, and reinforcement in sustaining health behaviours. Applied to this study, SCT suggests that interventions aimed at improving dietary practices among pregnant women in Southern Taraba must address not only knowledge deficits but also self-efficacy beliefs, outcome expectations, and social modelling mechanisms. The theory thus provides a framework for understanding how individual-level psychological factors mediate the relationship between nutritional knowledge and actual dietary behaviour and, ultimately, pregnancy outcomes.

Social Ecological Model (SEM)

The Social Ecological Model, as applied to health behaviour research, extends the explanatory scope beyond the individual to account for the multiple layers of social and environmental context that shape health-related behaviours (Bronfenbrenner, 1979; McLeroy et al., 1988; Stokols, 1996). The model conceptualises health behaviour as being influenced by nested

systems of factors operating at five interacting levels: the intrapersonal (individual), interpersonal (social relationships), institutional or organisational, community, and public policy levels. At the intrapersonal level, factors such as nutritional knowledge, attitudes, beliefs, self-efficacy, dietary habits, and physiological status directly shape a pregnant woman's food choices. This level aligns closely with SCT and acknowledges that individual cognition and perceived agency are foundational determinants of dietary behaviour. In the Southern Taraba context, limited formal education, low health literacy, and inadequate knowledge of gestational nutritional requirements are intrapersonal barriers that constrain the capacity of many pregnant women to maintain balanced diets.

At the interpersonal level, the model draws attention to the influence of social networks, family members, partners, peers, and healthcare providers on dietary behaviour during pregnancy. Husbands and mothers-in-law in particular exercise significant authority over pregnant women's food choices in many Nigerian communities, sometimes reinforcing cultural food taboos or restricting food access (Nnam, 2015; Fabiansen et al., 2016). Conversely, social support from husbands and female kin networks can serve as a protective factor, facilitating access to diverse foods and encouraging adherence to antenatal nutrition recommendations. Community health workers and midwives also operate at this level as sources of nutritional counselling and behaviour change communication.

The institutional level encompasses health systems, healthcare facilities, antenatal care programmes, schools, and food retail environments. In Southern Taraba, the density and quality of antenatal care services, the availability of maternal nutrition education, and the accessibility of micronutrient supplements at health facilities constitute critical institutional-level determinants of pregnancy nutrition outcomes. Where antenatal care attendance is low, institutional-level influences on dietary behaviour are correspondingly diminished. Faith-based organisations and community-based women's groups also operate at this level and can serve as important channels for nutrition education and behaviour change in communities with limited formal health infrastructure. At the community level, the model addresses the role of local food systems, cultural norms, food markets, agricultural productivity, and community-level food security in shaping dietary patterns. In Southern Taraba, seasonal variations in food availability, the dominance of subsistence agriculture, limited market integration, and community-level food taboos associated with pregnancy all constitute community-level determinants that either enable or constrain balanced dietary intake. Community norms around gender and food allocation particularly the widespread norm of women eating last represent community-level cultural practices with direct nutritional implications for pregnant women. At the policy level, national and state-level policies governing nutrition, food security, agricultural production, healthcare financing, and maternal health services create the structural environment within which all lower-level determinants operate. The Federal Government of Nigeria's National Nutrition Policy, the National Strategic Plan for Nutrition (2014–2019), and Taraba State's Reproductive, Maternal, Newborn, Child, and Adolescent Health (RMNCAH) plans constitute relevant policy frameworks. The extent to which these policies are implemented, funded, and enforced in Southern Taraba determines the enabling environment for improved maternal nutrition.

Methods

A cross-sectional research design was used in this study because of the fact that the design involves data collection for the purpose of describing, interpreting, assessing and analyzing existing conditions or variables within a single point in time from a small sample of the larger population. The location for this research was southern senatorial district of Taraba State, Nigeria. Taraba State, Nigeria was created from the defunct Gongola state in 1991, is one of the six states that make up the Northeast geopolitical zones in Nigeria. The population for the study were women of reproductive age within age (15-49 years) who have at one point in time or the other experienced pregnancy. The sample size of the study was drawn using Taro Yamane's (1967) sample size determination formula. The formula is given thus:

$$n = \frac{N}{1+N(e)^2}$$

Where:

n = Sample size

N = Finite population size

e = Level of precision (Margin of error)

Using the following values for this study:

Population (N): 3,657 (Estimated population of pregnant women across the selected wards during the study period)

Margin of Error (e): 0.025 (2.5% precision level)

$$\begin{aligned} & \frac{3,657}{1 + 3,657 (0.025)^2} \\ & \frac{3,657}{1 + 3,657 (0.000625)^2} \\ & \frac{3,657}{1 + 2.285625} \\ & \frac{3,657}{3.285625} \end{aligned}$$

$$n = 1,113.03$$

This was adopted because, the population of the study is known and the formula produced a sample size that is representative of the population.

A multistage sampling technique was used for the study. In the first stage, cluster sampling technique was used to divide the study area into five areas according to the LGAs that make up the study area (southern part of Taraba State) which includes Donga, Ibi, Takum, Ussa, and Wukari. A systematic random sampling was used to select the households in the study. The headquarters of each council wards was used as starting point. Simple random sampling technique was used for selection of the respondents for the study. In every household, only one respondent was selected for the study. The quantitative instrument was structured questionnaire and the qualitative method adopted was Key Informant Interview (KII) guide. The data collected were analysed using descriptive and inferential statistics. Quantitative data was collated using

Statistical Package for Social Science (SPSS). The analysis was done at the three levels viz: Univariate, bivariate and multivariate levels. The univariate analysis was done using Simple percentages, frequencies, tables, mean and standard deviation was used to capture the study's findings.

Ethical clearance for this study was sought and obtained from the Taraba State Health Research Ethics Committee (TSHREC). Participation in the study was entirely voluntary, and all respondents were adequately briefed on the study's objectives, potential risks, and benefits. Written informed consent was obtained from each participant prior to the administration of the questionnaire and the conduct of key informant interviews. To ensure confidentiality and anonymity, no personal identifiers were collected, and all data were treated with strict privacy throughout the research process.

Results

Socio-Demographic Characteristics of Respondents

Findings on table 1 showed that a majority of the respondents were within the youthful ages of 20- to 40 years. The study was particularly for women of reproductive age. Most of the respondents were married which indicated that, nutrition in pregnancy were majorly observed among the married people in the study area. The educational level of the respondents showed that, a majority of them had higher and secondary education. This showed that formal education was widely accepted in the study area, more so that majority of the respondents were young women. It was also revealed that most of the respondents were Christians. This showed that Southern Taraba is a Christian dominated area made of variety of denominations with several churches. The occupational status of respondents revealed that a majority of the respondents were unemployed, followed by farmers. Moreover, farming was the major occupation of respondents is as a result of the arable and fertile soil in the study area. Even those who have other sources of income still took farming as their send occupation.

Data on the annual estimated income of the respondents revealed that a majority earned less than N50, 000 per month. This revealed that was low a relatively low financial status among a majority of the respondents probably because many of the women depended on their husbands more so, that a majority of the women who participated in the study were unemployed. The location of the respondents showed that, most of them were from urban areas. In this study, the headquarters of the five Local Government areas where the study was carried out is considered to be urban areas and so, most of the respondents were from these LG A headquarters.

Table 4.2: Percentage Distribution of Socio-Demographic Characteristics of Respondents

Variable	Categories	Frequency(N=1113)	Percent
Age	15–21 years	90	8.1
	22–28 years	369	33.2
	29–35 years	334	30.0
	36–42 years	274	24.6
	43–49 years	46	4.1
Marital status	Single	32	2.9
	Married	1037	93.2
	Cohabiting	25	2.2
	Divorced	5	0.5

Educational status	Widow	14	1.3
	No formal	252	23.2
	Primary	172	15.5
	Secondary	295	26.5
Occupation	Tertiary	388	34.9
	Student	114	10.2
	Unemployed	593	53.3
	House wife	60	5.3
Monthly Income	Farming	216	19.4
	Civil servants	112	10.1
	Petty trading	18	1.6
	50,000	543	48.8
Religion	51-100,000	146	13.1
	101-200,000	165	14.8
	201-300,000	163	14.6
	301-400,000	96	8.5
Location	Christians	665	59.7
	Muslims	347	31.2
	Traditional religion	54	4.9
	Free thinkers	47	4.2
	Urban	667	59.9
	Rural	206	18.5
	Semi-urban	59	5.2
	Annex	181	16.3

Source: Field Survey, 2024

The data on the Table 1 presented the relevant socio demographic characteristics of respondents covered in the study. This was necessary in understanding the nature of respondents and their relevance in providing useful information necessary in addressing the study objectives. It also had implications on the findings and its generalizations. Analysis of these characteristics showed the suitability of the respondents and validity of findings

Balanced Diet

The concept of a balanced diet occupies a central position in nutritional science and public health discourse. A balanced diet is broadly defined as the habitual intake of food in adequate quantities and proportions to meet the body's physiological requirements for energy, growth, maintenance, and the prevention of disease (WHO, 2020). It encompasses the appropriate consumption of macronutrients carbohydrates, proteins, and lipids alongside essential micronutrients such as vitamins and minerals, all of which play indispensable roles in sustaining metabolic and physiological processes.

Table 4.4: Mean Ratings of Balanced Diet

S/N	Statements	SA	A	U	D	SD	Mean	St.D
1	I eat yams in the morning everyday	98	100	100	521	294	2.27	1.198
2	I eat once a day	34	70	126	345	538	2.18	1.687

3	I eat two times in a day	482	395	110	84	42	4.07	1.081
4	I eat three times in a day	20	47	51	495	500	1.73	0.870
5	I do not get enough food to eat	253	180	210	270	200	3.01	1.426
6	I eat only yams, rice and swallow in the whole day	284	330	180	186	133	3.40	1.343
7	I eat food made with corn only on the daily basis	703	386	10	11	3	4.59	0.592
8	I consume eggs	735	248	82	16	32	4.47	0.910
9	I eat Snail	48	100	150	481	334	2.14	1.078
10	I consume Meat	343	210	210	230	120	3.38	1.384
11	I eat Fish	253	180	210	270	200	3.01	1.426
12	I eat groundnut	349	477	87	96	104	3.78	1.238
13	I consume palm oil	493	360	166	40	54	4.08	1.081
14	I eat cheese	21	62	69	560	401	1.87	0.889
15	I eat butter	98	100	100	521	294	2.27	1.198
16	I eat cashew nuts	735	248	82	16	32	4.47	0.910
17	I take vegetables	198	242	117	304	252	2.85	1.444
18	I consume milk	21	62	69	560	401	1.87	0.889
19	I take oranges	210	244	117	294	248	2.89	1.455
20	I eat apples	110	175	290	388	150	2.74	1.171

Key: Strongly Agree (SA), Agree (A), Undecided (U) Disagree (D), Strongly Disagree (SD)
Source: Field Survey, 2024.

The findings of this table provide a comprehensive overview of the dietary habits and food consumption patterns of the respondents, highlighting critical dimensions of meal frequency, staple food dependence, protein intake, dairy consumption, fat sources, and fruit and vegetable intake. With respect to meal frequency and food adequacy, the results indicate that the majority of respondents do not eat three meals daily, as reflected by the lowest mean score in the dataset ($\bar{x} = 1.73$). A notable proportion of respondents also reported not getting enough food to eat ($\bar{x} = 3.01$), suggesting that food insecurity is a measurable concern within the study population, with implications for overall nutritional adequacy and dietary balance.

Regarding staple food consumption, the findings reveal a strong and consistent dependence on corn-based foods, which recorded the highest mean score in the entire dataset ($\bar{x} = 4.59$, $SD = 0.592$). The low standard deviation associated with this item is particularly telling, as it indicates a high degree of uniformity in this pattern across respondents. Consumption of yams, rice, and swallow-based meals also returned a moderate-to-high mean ($\bar{x} = 3.40$), further confirming that the diets of respondents are heavily dominated by starchy carbohydrate staples with limited dietary variety. In terms of protein consumption, the study found that eggs and cashew nuts were the most frequently consumed protein sources, both recording identical high means ($\bar{x} = 4.47$). Groundnut and meat consumption were also moderately high, with means of 3.78 and 3.38 respectively. Fish intake was moderate ($\bar{x} = 3.01$), while snail consumption was among the

lowest across all protein-related items ($\bar{x} = 2.14$). These findings suggest that while some level of protein intake exists within the study population, it is not sufficiently diversified across multiple complete protein sources to guarantee adequate essential amino acid intake.

The data on dairy and fat consumption revealed a sharp contrast. Palm oil was found to be widely consumed, recording a high mean of 4.08, consistent with its established role as the dominant cooking fat in many West African culinary traditions. In contrast, dairy products were almost entirely absent from the daily diets of respondents. Both cheese and milk recorded the joint lowest means in the dataset ($\bar{x} = 1.87$), and butter consumption was similarly low ($\bar{x} = 2.27$). This near-total absence of dairy intake points to a significant potential deficit in calcium, phosphorus, and vitamin D among the study population. With regard to fruit and vegetable consumption, the findings indicate consistently low intake across all related items. Vegetables, oranges, and apples all returned mean scores below 3.0, at 2.85, 2.89, and 2.74 respectively. The relatively high standard deviations associated with these items suggest variability in consumption behaviour, possibly reflecting seasonal availability, income constraints, or differing individual dietary preferences. Nonetheless, the overall pattern points to inadequate intake of micronutrient-rich foods, which are essential for immune function, disease prevention, and overall health maintenance.

Test of hypothesis

- H₀₁** There is no significant relationship between balanced diet and pregnancy outcomes among women in Southern Taraba Senatorial District, Nigeria
- H₁₁** There is a significant relationship between balanced diet and pregnancy outcomes among women in Southern Taraba Senatorial District, Nigeria.

The study tested the relationship between “balanced diet and pregnancy outcomes among women.

Pearson Correlation between Balanced Diet and Pregnancy Outcomes among Women in Southern Taraba State, Nigeria

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
I eat yams in the morning everyday	1																
I eat once a day	.678**	1															
I eat two times in a day	.479**	.740**	1														
I eat three times in a day	.710**	.743**	.741**	1													
I do not get enough food to eat	.350**	.500**	.648**	.463**	1												
I eat only yams, rice and swallow in the whole day	.721**	.626**	.630**	.797**	.461**	1											
I eat food made with corn only on the daily basis	.322**	.460**	.570**	.382**	.744**	.401**	1										
I consume eggs	.748**	.644**	.706**	.767**	.595**	.798**	.571**	1									
I eat Snail	.443**	.606**	.632**	.636**	.487**	.635**	.429**	.567**	1								
I consume Meat	.032	.408**	.503**	.337	.470**	.300**	.443	.197**	.747**	1							
I eat Fish	-.140	.170	.262	.158	.164	.200	.178	.012	.529	.641	1						
I eat groundnut	.755	.332	.317	.640	.098	.665	.076	.641	.278	-.113	-.096	1					
I consume palm oil	.573	.232	.252	.432	.101	.454	.069	.557	.036	-.380	-.244	.728	1				
I eat cheese	.852	.529	.545	.723	.439	.778	.403	.851	.460	.036	-.096	.801	.685	1			
I eat butter	.824	.499	.501	.730	.296	.754	.275	.785	.397	.007	-.122	.892	.686	.903	1		
I eat cashew nuts	.589	.724	.788	.766	.600	.747	.561	.788	.597	.379	.187	.496	.375	.718	.699	1	
I take vegetables	.747	.678	.674	.830	.450	.788	.444	.847	.558	.184	.045	.687	.575	.821	.810	.851	1

** . Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed)

The correlation examined the relationships among seventeen dietary habit variables, with the aim of identifying significant associations in the food consumption patterns of the respondents. The findings reveal a broadly interconnected dietary structure, with the majority of variables demonstrating positive and statistically significant correlations with one another, suggesting that respondents who consume one category of food are likely to exhibit similar patterns across related food items. With respect to meal frequency variables, the findings indicate strong positive correlations among the items measuring how often respondents eat daily.

KII 2 – Age 35 (Community Health Worker, Donga) explained that;

Pregnant women who eat diverse meals report fewer complaints of weakness and dizziness. Balanced diets contribute to better hemoglobin levels and fetal growth. Women with access to vegetables, protein, and fruits have healthier babies. Poor households show limited dietary diversity, affecting outcomes. Awareness of nutrition during ANC improves feeding practices.

KII 10 – Age 39 (Women Leader, Community Development Association Member, Wukari) highlighted that:

Pregnant women with diverse meals report better maternal health and stronger babies. Balanced diets enhance energy levels and reduce pregnancy-related complications. Women with inadequate diets are more prone to low-birth-weight babies. ANC nutrition education improves awareness and practice. Economic constraints and cultural beliefs influence dietary choices.

KII 11 – Age 41 (ANC Nurse, Takum) revealed that;

Balanced diets positively affect pregnancy outcomes, including normal fetal growth and reduced maternal fatigue. Women who eat protein, vegetables, and fruits recover faster after delivery. Poor diets increase the risk of anemia and complications. ANC attendance improves nutritional knowledge. Household wealth strongly influences adherence to a balanced diet.

KII 18 – Age 50 (Traditional Birth Attendant, Ibi) elaborate that;

Women who maintain balanced diets appear healthier and recover faster postpartum. Skipping meals or following poor diets leads to fatigue and higher risk of complications. Balanced meals improve both maternal and neonatal health. ANC advice and family support enhance adherence. Cultural beliefs may sometimes conflict with proper feeding.

KII 24 – Age 43 (Nutrition Officer, PHC Ussa) said that;

Balanced diets positively affect maternal and neonatal outcomes. Women consuming protein, fruits, and vegetables experience fewer complications and stronger babies. Poor feeding habits result in fatigue, anemia, and low birth weight. Nutrition education improves awareness and practices. Economic status determines the ability to maintain balanced meals.

Discussion of Findings

The findings on balanced diet reveal a pattern of significant nutritional inadequacy characterized by over-reliance on starchy staples, irregular meal frequency, limited protein diversity, near-absent dairy consumption, high palm oil use, and insufficient fruit and vegetable intake a profile

with serious implications for maternal and neonatal health outcomes in Southern Taraba Senatorial District.

With respect to meal frequency, the data indicate that eating three meals daily is far from the norm among respondents, as evidenced by the lowest mean score in the entire dataset ($\bar{x} = 1.73$, $SD = 0.870$). This finding is of considerable public health significance during pregnancy, as irregular meal frequency is associated with poor nutrient absorption, reduced metabolic efficiency, and increased susceptibility to hypoglycaemia and nutritional deficiencies (WHO, 2016). Compounding this, a moderate mean score was recorded for food insecurity ($\bar{x} = 3.01$), indicating that a substantial proportion of respondents do not consistently access sufficient food. These findings align with documented evidence from the broader Nigerian context, where food insecurity among pregnant women is identified as a multilevel problem shaped by household income, parity, and gender dynamics within households (PLOS Global Public Health, 2023), and resonate with the socio-demographic findings of this study, particularly the high rate of unemployment and low monthly income among respondents.

Staple food consumption findings reveal an extremely high and uniform dependence on corn-based foods ($\bar{x} = 4.59$, $SD = 0.592$), the highest mean in the entire dataset. The remarkably low standard deviation associated with this item is particularly significant, as it indicates near-universal consensus among respondents, suggesting that corn-based food constitutes the dominant and largely non-negotiable dietary staple across the study population. This is further reinforced by moderate-to-high consumption of yams, rice, and swallow-based meals ($\bar{x} = 3.40$). While these starchy staples serve as important sources of dietary energy and are deeply embedded in the food cultures of the ethnic communities that populate Southern Taraba including the Jukun, Tiv, Mumuye, and Kuteb their exclusive or near-exclusive consumption without adequate complementation from other food groups is a recognised risk factor for micronutrient deficiency during pregnancy (Nnam, 2015; Olorunfemi et al., 2020). These findings are consistent with evidence from the Ibadan Pregnancy Cohort Study, which identified white rice as the most frequently consumed meal among Nigerian pregnant women and documented strong associations between dietary patterns and sociodemographic factors including household income (Adeoye et al., PLOS ONE, 2022).

Protein consumption findings present a mixed picture. Eggs and cashew nuts emerged as the most frequently consumed protein sources, both recording identical high means ($\bar{x} = 4.47$), followed by groundnut ($\bar{x} = 3.78$) and meat ($\bar{x} = 3.38$). Fish consumption was moderate ($\bar{x} = 3.01$), while snail intake was among the lowest protein-related items ($\bar{x} = 2.14$). Although these findings indicate some level of protein consumption within the study population, the heavy reliance on plant-based protein sources such as groundnut and cashew nuts, over diverse complete animal proteins, raises concerns about essential amino acid adequacy during pregnancy. Protein is critical for foetal tissue synthesis, uterine expansion, and increased maternal blood volume, and inadequate intake has been associated with foetal growth restriction and low birth weight (Okonofua et al., 2017; Victora et al., 2016). The low snail consumption may reflect limited availability or cultural preference patterns, while the moderate fish intake may be shaped by seasonal availability and geographic factors within the district.

The findings on dairy and fat consumption reveal a sharp and nutritionally consequential contrast. Palm oil was widely consumed ($\bar{x} = 4.08$), reflecting its entrenched role as the primary

cooking fat in West African culinary traditions. While palm oil contains beta-carotene and tocotrienols with antioxidant properties, its high saturated fatty acid content particularly palmitic acid warrants attention in the context of cardiovascular health (Mensink et al., 2003). More critically, dairy products were almost entirely absent from the daily diets of respondents, with both cheese and milk recording the joint lowest means in the entire dataset ($\bar{x} = 1.87$), and butter consumption equally low ($\bar{x} = 2.27$). This near-total absence of dairy intake is a significant public health concern during pregnancy, given that dairy products are primary dietary sources of calcium, phosphorus, and vitamin D nutrients essential for foetal bone development, maternal skeletal integrity, and the prevention of pre-eclampsia (Hofmeyr et al., 2014; Heaney, 2009). This pattern is consistent with documented trends across sub-Saharan Africa, where dairy consumption is constrained by a combination of lactose intolerance, high cost, limited cold storage infrastructure, and the absence of a dairy consumption culture (Isenring, 2016).

Fruit and vegetable intake was consistently low across all related items, with vegetables ($\bar{x} = 2.85$), oranges ($\bar{x} = 2.89$), and apples ($\bar{x} = 2.74$) all returning means below 3.0. These findings indicate that the majority of respondents do not meet the WHO-recommended daily intake of at least 400 grams of fruits and vegetables (WHO, 2003), a deficit with direct implications for intake of vitamins C and A, dietary fibre, folate, and phytochemicals critical to immune function and foetal development. The relatively high standard deviations associated with these items suggest considerable variability in consumption behaviour, possibly reflecting the influence of seasonal availability, income constraints, or individual dietary preferences. These findings are consistent with broader evidence from SSA, where inadequate dietary diversity among pregnant women particularly in fruits and vegetables has been significantly associated with maternal anaemia, intrauterine growth restriction, and low birthweight (BMC Public Health, 2024; Food Science and Nutrition, 2023).

Correlation between Balanced Diet and Pregnancy Outcomes

The Pearson correlation analysis revealed a broadly positive and statistically significant association structure among the seventeen dietary habit variables examined, providing strong quantitative support for the study's central hypothesis. The majority of dietary items demonstrated significant positive correlations with one another, suggesting that the dietary behaviour of respondents is coherently structured: women who consume one food group regularly tend to exhibit broader dietary diversity across related food categories.

Meal frequency variables were strongly intercorrelated, with eating yams every morning significantly associated with eating three times daily ($r = .710$), consuming eggs ($r = .748$), and taking vegetables ($r = .747$). These associations suggest that meal regularity is a foundational organising principle of dietary quality, with more frequent eating patterns associated with greater dietary diversity and more consistent consumption of protective food groups. This finding aligns with Social Cognitive Theory's emphasis on behavioural self-regulation as a determinant of sustained health behaviour, suggesting that women who maintain structured eating routines are more likely to achieve nutritional adequacy during pregnancy (Bandura, 1997).

Food insecurity demonstrated moderate positive correlations with corn-based food consumption ($r = .744$) and egg intake ($r = .595$), indicating that food-insecure respondents tend to rely heavily on readily available, low-cost staples as their primary dietary sources. This pattern corroborates the Social Ecological Model's institutional and community-level analysis of how structural food

insecurity constrains dietary choices, particularly among low-income pregnant women in under-resourced settings such as Southern Taraba (McLeroy et al., 1988; Stokols, 1996). Vegetable intake emerged as one of the most broadly and strongly correlated variables in the dataset, recording significant positive associations with eating three times daily ($r = .830$), consuming eggs ($r = .847$), cashew nuts ($r = .851$), cheese ($r = .821$), and butter ($r = .810$). This positions vegetable consumption as a robust marker of overall dietary diversity and nutritional quality within the study population, reinforcing the importance of fruits and vegetables as anchor foods in comprehensive nutritional interventions. In contrast, fish consumption exhibited the weakest correlation profile, showing negligible or negative associations with most other dietary variables, suggesting that fish intake follows a dietary pattern distinct from the general food consumption structure of the sample likely shaped by geographic, seasonal, or economic factors specific to individual communities within the district.

The quantitative correlation findings are powerfully corroborated by the qualitative evidence gathered through Key Informant Interviews. Community health workers, ANC nurses, nutrition officers, traditional birth attendants, and community leaders across all five Local Government Areas consistently affirmed the positive relationship between dietary diversity and pregnancy outcomes. A community health worker in Donga noted that pregnant women who eat diverse meals report fewer complaints of weakness and dizziness, and that balanced diets contribute to better haemoglobin levels and foetal growth. An ANC Nurse in Takum revealed that women who eat protein, vegetables, and fruits recover faster after delivery, while poor diets increase the risk of anaemia and complications.

A Nutrition Officer at PHC Ussa further observed that economic status determines the ability to maintain balanced meals, reinforcing the study's quantitative finding on the role of income as a structural determinant of dietary adequacy. A Traditional Birth Attendant in Ibi similarly noted that women who maintain balanced diets appear healthier and recover faster postpartum, while skipping meals or following poor diets leads to fatigue and higher risk of complications. These qualitative insights converge with the quantitative findings to present a consistent and compelling body of evidence affirming that balanced dietary practices are significantly and positively associated with improved pregnancy outcomes among women in Southern Taraba Senatorial District. The null hypothesis (H_{01}) that there is no significant relationship between balanced diet and pregnancy outcomes among women in Southern Taraba Senatorial District is therefore rejected in favour of the alternative hypothesis (H_{11}).

Conclusion and Recommendations

This study set out to investigate the relationship between balanced diet and pregnancy outcomes among women of reproductive age in Southern Taraba Senatorial District, Nigeria. Drawing on data from 1,113 respondents through a structured questionnaire, complemented by qualitative evidence from Key Informant Interviews across five Local Government Areas, the study has generated a robust body of evidence on the dietary patterns of pregnant women in the district and their implications for maternal and neonatal health.

The findings reveal that the dietary practices of the respondents are characterized by significant and multidimensional nutritional inadequacies. Over-dependence on corn-based and other starchy staple foods, irregular meal frequency, near-absent dairy consumption, limited fruit and vegetable intake, and insufficient diversification of protein sources collectively define a dietary

profile that is calorically partial and micronutrient deficient. These patterns are embedded within and reinforced by structural realities of poverty, unemployment, food insecurity, and limited access to nutrition-sensitive antenatal care all of which are prominently represented in the socio-demographic profile of the study population.

The correlation analysis and qualitative evidence jointly confirm that balanced dietary practices are positively and significantly associated with improved pregnancy outcomes, including reduced anaemia, normal foetal growth, lower incidence of low birth weight, and faster postpartum recovery. These findings are consistent with the broader global and regional literature on maternal nutrition, and affirm the theoretical frameworks underpinning the study Social Cognitive Theory and the Social Ecological Model which together illuminate the individual, interpersonal, institutional, community, and policy-level determinants of dietary behaviour during pregnancy.

The study therefore concludes that dietary inadequacy during pregnancy in Southern Taraba Senatorial District is not merely a matter of individual choice or knowledge deficit, but a complex, multideterminant phenomenon shaped by intersecting socioeconomic, cultural, structural, and policy-level factors. Addressing this challenge requires deliberate, context-sensitive, and multi-level interventions that simultaneously strengthen individual nutritional knowledge and self-efficacy, address household food insecurity, improve the quality and reach of antenatal nutritional services, and create an enabling policy environment for maternal nutrition programming across the district

Based on the findings and conclusions of this study, the following recommendations are advanced:

1. Strengthening Nutritional Counselling within Antenatal Care Services Health authorities in Southern Taraba Senatorial District, in collaboration with the Taraba State Ministry of Health, should urgently scale up and standardise nutrition education and counselling within antenatal care services across all five Local Government Areas. ANC sessions should incorporate evidence-based dietary counselling that promotes food diversity using locally available and affordable foods, with particular emphasis on increasing consumption of protein-rich foods, fruits, vegetables, and calcium sources. Given the documented positive effect of ANC nutrition education on dietary practices affirmed by key informants in this study, investment in the nutritional competencies of ANC nurses and community health workers should be prioritised.

2. Addressing Structural Food Insecurity through Targeted Social Protection Programmes Given that food insecurity is a measurable and structurally embedded challenge among the study population compounded by high rates of unemployment and low household income state and local government authorities should implement targeted social protection interventions for pregnant women. These should include food supplementation programmes, conditional cash transfers, and community food support systems designed to improve dietary access among the most economically vulnerable pregnant women in the district.

3. Promoting Dietary Diversification Beyond Starchy Staples Community-level nutrition promotion campaigns should be designed and implemented to shift dietary behaviour beyond the current heavy dependence on corn, yam, and swallow-based meals. Agricultural extension services operating in the district should actively promote the cultivation, processing, and daily

consumption of nutrient-dense foods including leafy green vegetables, legumes, eggs, and locally available fruits. Home gardening initiatives and school-based nutrition programmes targeting mothers and adolescent girls should be explored as complementary strategies for improving dietary diversity at the household level.

4. Integrating Nutrition Officers into Primary Health Care Facilities All primary health care centres across the five LGAs of Southern Taraba Senatorial District should have dedicated nutrition officers responsible for dietary assessment, individual nutritional counselling, and community outreach. The embedding of nutrition expertise within frontline health facilities would help bridge the gap between nutritional policy intent and actual service delivery at the community level, particularly for pregnant and lactating women who may have limited mobility or access to specialist services.

References

- Abalos, E., Cuesta, C., Grosso, A. L., Chou, D., & Say, L. (2013). Global and regional estimates of pre-eclampsia and eclampsia: A systematic review. *European Journal of Obstetrics and Gynecology and Reproductive Biology*, 170(1), 1–7.
- Adeoye, I. A., Adepoju, O. A., & Fagbamigbe, A. F. (2022). Dietary patterns and their sociodemographic correlates among pregnant women in Ibadan, Nigeria. *PLOS ONE*, 17(3), Article e0264399.
- Akinloye, O., Odetunde, A., & Oyelaran, O. (2020). Dietary quality and gestational outcomes among pregnant women in Southwest Nigeria. *African Journal of Reproductive Health*, 24(2), 88–97.
- Amuna, P., & Zotor, F. B. (2008). Epidemiological and nutrition transition in developing countries: Impact on human health and development. *Proceedings of the Nutrition Society*, 67(1), 82–90.
- Arimond, M., & Ruel, M. T. (2004). Dietary diversity is associated with child nutritional status: Evidence from 11 demographic and health surveys. *Journal of Nutrition*, 134(10), 2579–2585.
- Bailey, R. L., West, K. P., & Black, R. E. (2015). The epidemiology of global micronutrient deficiencies. *Annals of Nutrition and Metabolism*, 66(Suppl. 2), 22–33.
- Balogun, O. O., & Sekoni, A. O. (2017). Gestational diabetes mellitus and dietary habits in Lagos, Nigeria. *Nigerian Journal of Clinical Practice*, 20(3), 299–305.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. W. H. Freeman.
- Bandura, A. (2004). Health promotion by social cognitive means. *Health Education and Behavior*, 31(2), 143–164.
- Barker, D. J. P. (2007). The origins of the developmental origins theory. *Journal of Internal Medicine*, 261(5), 412–417.
- Black, R. E. (2003). Zinc deficiency, infectious disease and mortality in the developing world. *Journal of Nutrition*, 133(5), 1485S–1489S.
- Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Z. A., Christian, P., de Onis, M., & Uauy, R. (2013). Maternal and child undernutrition and overweight in low-income and middle-income countries. *The Lancet*, 382(9890), 427–451.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.

- Fabiansen, C., Yaméogo, C. W., Iuel-Brockdorff, A. S., Cichon, B., Rytter, M. J. H., Kurpad, A., & Friis, H. (2016). Effectiveness of food supplements in increasing fat-free tissue accretion in children with moderate acute malnutrition. *PLOS Medicine*, 14(9), Article e1002387.
- Food and Agriculture Organization of the United Nations. (2016). *Minimum dietary diversity for women: A guide for measurement*. FAO.
- Food and Agriculture Organization of the United Nations. (2022). *The state of food security and nutrition in the world 2022*. FAO.
- Food and Agriculture Organization/World Health Organization. (2013). *Dietary protein quality evaluation in human nutrition: Report of an FAO expert consultation*. FAO.
- Food and Agriculture Organization/World Health Organization. (2019). *Sustainable healthy diets: Guiding principles*. FAO and WHO.
- Gluckman, P. D., & Hanson, M. A. (2006). *Mismatch: Why our world no longer fits our bodies*. Oxford University Press.
- Heaney, R. P. (2009). Dairy and bone health. *Journal of the American College of Nutrition*, 28(Suppl. 1), 82S–90S.
- Hofmeyr, G. J., Lawrie, T. A., Atallah, A. N., & Duley, L. (2014). Calcium supplementation during pregnancy for preventing hypertensive disorders and related problems. *Cochrane Database of Systematic Reviews*, 6, Article CD001059.
- Idris, S. H., Sambo, M. N., Ibrahim, M. S., & Umar, A. A. (2014). Maternal anaemia and its determinants in Taraba State, Nigeria. *Nigerian Medical Journal*, 55(4), 310–315.
- Institute of Medicine. (2006). *Dietary reference intakes: The essential guide to nutrient requirements*. National Academies Press.
- Isenring, E. (2016). Dairy avoidance and nutritional consequences in sub-Saharan Africa. *Public Health Nutrition*, 19(4), 712–718.
- Jouanne, M., Oddoux, S., Noël, A., & Voisin-Chiret, A. S. (2025). Nutrient requirements during pregnancy and lactation. *Nutrients*, 13(2), Article 692.
- Koletzko, B., Godfrey, K. M., Poston, L., Szajewska, H., Van Goudoever, J. B., de Waard, M., & Brands, B. (2019). Nutrition during pregnancy, lactation and early childhood and its implications for maternal and long-term child health. *Annals of Nutrition and Metabolism*, 74(Suppl. 2), 8–17.
- McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health Education Quarterly*, 15(4), 351–377.
- Mensink, R. P., Zock, P. L., Kester, A. D., & Katan, M. B. (2003). Effects of dietary fatty acids and carbohydrates on the ratio of serum total to HDL cholesterol. *American Journal of Clinical Nutrition*, 77(5), 1146–1155.
- Mgawadere, F., Unkels, R., Kazembe, A., & van den Broek, N. (2017). Factors associated with maternal mortality in Malawi: Application of the three delays model. *BMC Pregnancy and Childbirth*, 17(1), Article 219.
- National Bureau of Statistics. (2020). *2019 poverty and inequality in Nigeria: Executive summary*. NBS.
- National Demographic and Health Survey. (2018). *Nigeria demographic and health survey 2018*. National Population Commission and ICF.
- Njagi, P., Groot, W., Arsenijevic, J., & Dyer, S. (2024). Prevalence of infertility in sub-Saharan Africa: A systematic review. *Reproductive Health*, 21(1), Article 58.

- Nnam, N. M. (2015). Improving maternal nutrition for better pregnancy outcomes. *Proceedings of the Nutrition Society*, 74(4), 454–459.
- Oguntona, C. R. B., & Akinyele, I. O. (2010). *Nutrient composition of commonly eaten foods in Nigeria*. Food Basket Foundation International.
- Okonofua, F. E., Ntoimo, L., Ogu, R., Galadanci, H., Gana, M., Adetokunbo, S., & Randawa, A. (2017). Assessing the validity of a competency test for obstetric emergency care in Nigeria. *BMC Pregnancy and Childbirth*, 17(1), Article 60.
- Olorunfemi, O., Ogundele, O. J., & Adekanle, D. A. (2020). Dietary diversity and nutritional status of pregnant women in rural Southwestern Nigeria. *Pan African Medical Journal*, 37, Article 92.
- Omotayo, M. O., Dickin, K. L., Chapleau, G. M., Martin, S. L., Mwanga, E., Kung'u, J. K., & Stoltzfus, R. J. (2018). Predictors of antenatal calcium supplementation in rural Kenya. *Maternal and Child Nutrition*, 14(1), Article e12478.
- Rumbold, A., Ota, E., Nagata, C., Shahrook, S., & Crowther, C. A. (2015). Vitamin C supplementation in pregnancy. *Cochrane Database of Systematic Reviews*, 9, Article CD004072.
- Saaka, M., Oladele, J., Larbi, A., & Hoeschle-Zeledon, I. (2017). Dietary diversity is not associated with haematological status of pregnant women resident in rural northern Ghana. *Journal of Nutritional Science*, 6Trace, Article e12.
- Scholl, T. O. (2011). Maternal iron status: Relation to fetal growth, length of gestation, and iron endowment of the neonate. *Nutrition Reviews*, 69(Suppl. 1), S23–S29.
- Stokols, D. (1996). Translating social ecological theory into guidelines for community health promotion. *American Journal of Health Promotion*, 10(4), 282–298.
- Taraba State Hospital Services Management Board. (2019). *Annual maternal health report*. TSHSMB.
- Umar, A. S., Abdulkarim, M. A., Salihu, A., & Garba, I. (2016). Prevalence and determinants of low birth weight in Taraba State, Nigeria. *Nigerian Journal of Paediatrics*, 43(2), 105–110.
- UNICEF. (2019). *The state of the world's children 2019: Children, food and nutrition*. UNICEF.
- Victora, C. G., Adair, L., Fall, C., Hallal, P. C., Martorell, R., Richter, L., & Sachdev, H. S. (2016). Maternal and child undernutrition: Consequences for adult health and human capital. *The Lancet*, 371(9609), 340–357.
- Webb Girard, A., Self, J. L., McAuliffe, C., & Olude, O. (2012). The effects of household food production strategies on the health and nutrition outcomes of women and young children: A systematic review. *Paediatric and Perinatal Epidemiology*, 26(Suppl. 1), 205–222.
- World Health Organization. (2003). *Diet, nutrition and the prevention of chronic diseases*. WHO.
- World Health Organization. (2011). *Calcium supplementation in pregnant women*. WHO.
- World Health Organization. (2016). *WHO recommendations on antenatal care for a positive pregnancy experience*. WHO.
- World Health Organization. (2020). *Anaemia in women and children: WHO global nutrition targets*. WHO.
- Zerfu, T. A., Umeta, M., & Baye, K. (2016). Dietary diversity during pregnancy is associated with reduced risk of maternal anaemia, preterm delivery, and low birth weight in a prospective cohort study in rural Ethiopia. *American Journal of Clinical Nutrition*, 103(6), 1482–1488.