AFRICAN JOURNAL OF PUBLIC HEALTH AND HEALTH SYSTEMS

AJOPHA | ISSN: XXXX-XXXX | Open Access | Peer-Reviewed | Pan-African Research Journals (PARJ)

DOI: 110.5281/zenodo.19181089 | Received: January 2026 | Accepted: February 2026 | Published: March 2025

Infant and Young Child Feeding Practices Among Mothers with Children Below 24 Months in Ikotos County, Eastern Equatoria, South Sudan: A Community-Based Cross-Sectional Study

Lemi Robert Albert[1]

[1] Faculty of Health Sciences, Uganda Christian University, Mukono, Uganda

Correspondence: lemi.albert@ucu.ac.ug | ORCID: 0000-0000-0000-0000

ABSTRACT

Background: Inappropriate Infant and Young Child Feeding (IYCF) practices remain a critical public health concern in sub-Saharan Africa, with significant short- and long-term consequences on child morbidity and mortality. South Sudan, burdened by protracted conflict and food insecurity, reports among the worst child nutrition indicators on the continent. Despite national policies on Maternal, Infant and Young Child Nutrition (MIYCN), IYCF practices remain largely suboptimal and understudied at the community level, particularly in Ikotos County, Eastern Equatoria.

Methods: A community-based cross-sectional study employing quantitative methods was conducted in March 2020. Using systematic random sampling, 317 mothers or caregivers of children below 24 months were recruited from 12 villages across four payams in Ikotos County. Data were collected via structured, pre-tested questionnaires administered through face-to-face interviews and analysed using descriptive statistics and chi-square tests in SPSS version 21.

Results: Only 35.0% (n=111) of infants were initiated to breastfeeding within one hour of birth; 65.0% experienced delayed initiation. Exclusive breastfeeding (EBF) prevalence among children under six months was 75.0%. Prelacteal feeds were administered to 44.8% of newborns, with honey being the most common (48.0%). Complementary feeding commenced before six months in 58.9% of children, while only 22.0% were introduced at the recommended age of six months. Continued breastfeeding beyond 18 months was practised by 45.0% of mothers. Cereals constituted the dominant complementary food (54.9%), with dietary diversity remaining critically low.

Conclusion: IYCF practices in Ikotos County are suboptimal across most WHO-recommended indicators. Targeted health education campaigns, support for maternal nutrition literacy, and community-based IYCF counselling are urgently required. Policy alignment between the South Sudan Ministry of Health and implementing partners must be strengthened to translate guidelines into measurable improvements in feeding practices.

Keywords: infant and young child feeding, breastfeeding, complementary feeding, South Sudan, Ikotos County, exclusive breastfeeding, prelacteal feeding, nutrition, sub-Saharan Africa

1. Introduction

Infant and Young Child Feeding (IYCF) practices are among the most powerful determinants of child survival, growth, and cognitive development. The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) jointly recommend a continuum of feeding practices spanning the first 1,000 days of life: initiation of breastfeeding within one hour of birth, exclusive breastfeeding (EBF) for the first six months, introduction of safe and nutritionally adequate complementary foods at six months, and continued breastfeeding up to 24 months and beyond ((Ba et al., 2004)). These evidence-based recommendations have been shown to prevent a substantial proportion of under-five deaths and to safeguard children from malnutrition-related diseases ((Jones et al., 2003); (Shaw, 2005)).

Despite decades of advocacy, inappropriate IYCF practices remain pervasive across low-income countries, particularly in sub-Saharan Africa. (Shaw, 2005) reported that less than one-third of children under six months of age in sub-Saharan Africa were exclusively breastfed, and fewer than 20% of children aged six months received appropriately diverse complementary foods. The Lancet Nutrition Series (2009) estimated that suboptimal breastfeeding alone accounted for over 800,000 child deaths annually, while inappropriate complementary feeding contributed to widespread stunting, wasting, and micronutrient deficiencies.

South Sudan presents a particularly acute case. Classified as one of the 33 countries globally with sub-optimal IYCF practices ((Forsyth, 2010)), the country endures a triple burden of food insecurity, ongoing armed conflict, and fragile health systems. According to the UNICEF South Sudan nutrition brief (), only 15% of children aged 6–23 months received the minimum dietary diversity, and a mere 5% achieved the minimum acceptable diet. The global acute malnutrition (GAM) rate in Ikotos County stood at 13.5% exceeding the WHO emergency threshold of 10% ((Boerema et al., 2021); (Perfect et al., 2010)). Despite the South Sudan government's development of the MIYCN Policy Guideline, implementation at the community level in remote counties like Ikotos remains critically limited.

A review of existing literature reveals a near-total absence of community-based IYCF data from Ikotos County. The two published South Sudan studies by J. (Bruno Tongun et al., 2018) on delayed breastfeeding initiation in Juba Teaching Hospital, and E.B. (Author, 2017) on EBF knowledge in Al Sabah Children's Hospital were both facility-based, limiting their applicability to rural community settings. This study was therefore designed to fill this critical knowledge gap by comprehensively describing IYCF practices among mothers and caregivers of children below 24 months in Ikotos County.

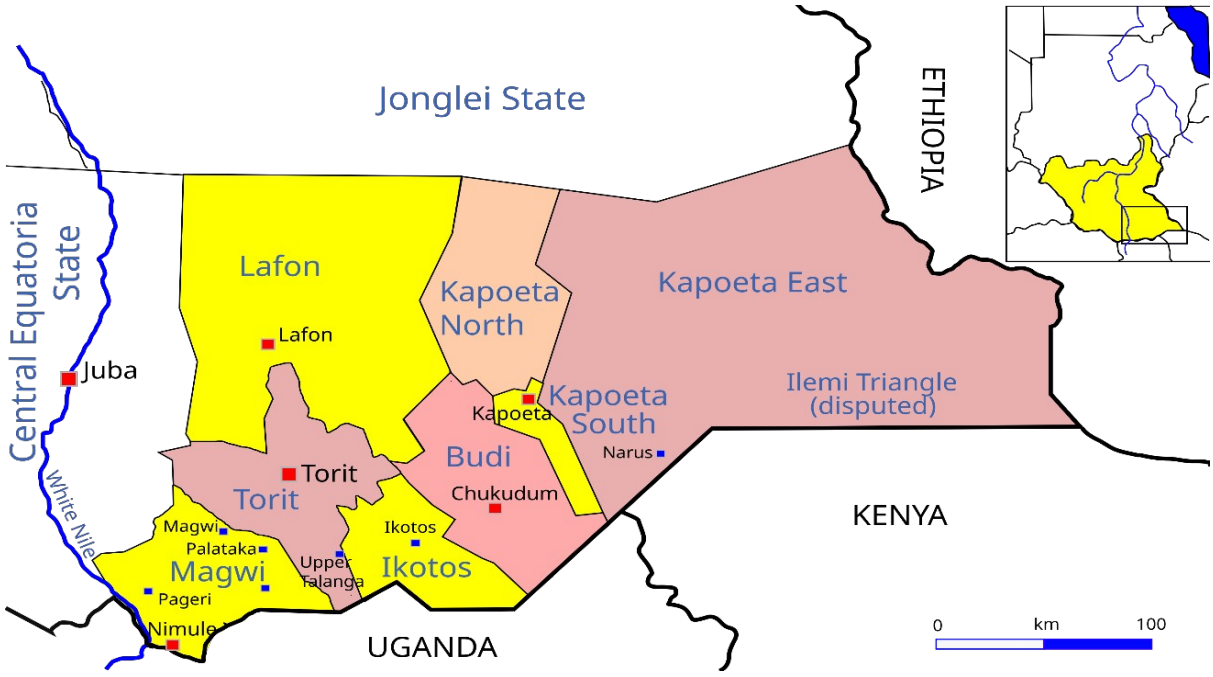

Figure 7: Map of Eastern Equatoria State showing the location of Ikotos County, South Sudan. Coordinates: 4°4'42"N, 33°6'32"E. Source: Study adaptation, 2020.

1.1 Study Objectives

The specific objective addressed in this paper is:

- To determine the Infant and Young Child Feeding practices among mothers with children below 24 months in Ikotos County, Eastern Equatoria, South Sudan.

1.2 Conceptual Framework

The study was grounded in a conceptual framework (Figure 5) that situates IYCF practices at the intersection of sociodemographic determinants (maternal age, education, marital status, occupation, income source), child and paternal characteristics, healthcare access, and moderating cultural and religious variables. These independent and moderating factors interact to shape four core IYCF outcomes: early breastfeeding initiation, exclusive breastfeeding, complementary feeding, and continued breastfeeding which in turn determine child nutritional status, morbidity, and mortality.

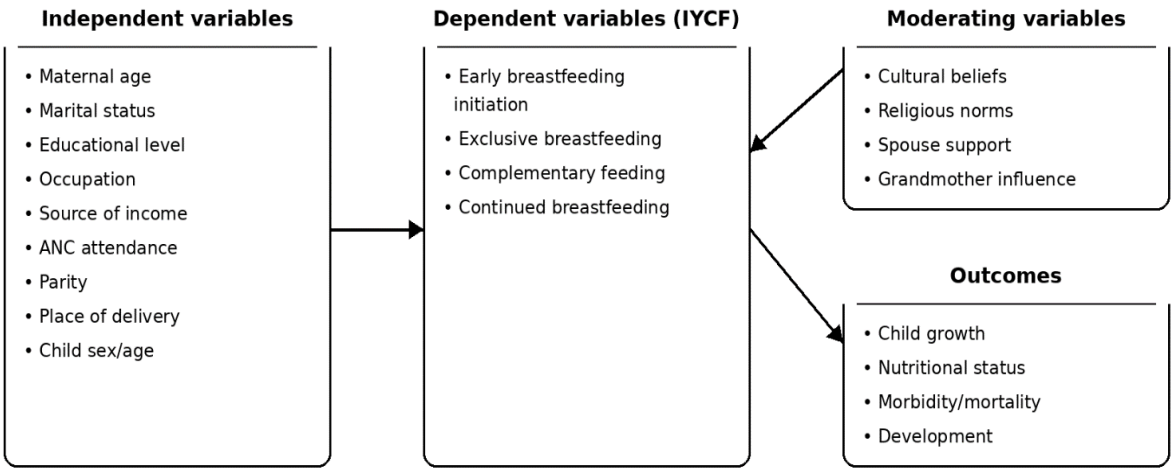

Figure 5: Conceptual framework illustrating determinants and outcomes of IYCF practices in Ikotos County. Source: Adapted from study conceptual framework, 2020.

2. Literature Review

2.1 Global and Regional Context of IYCF Practices

Globally, sub-optimal IYCF practices persist as a leading contributor to child undernutrition. (Perfect et al., 2010) and (Caetano et al., 2010) documented that delayed breastfeeding initiation, prelacteal feeding, and both early and late introduction of complementary foods remain the most common departures from optimal practice. In developing countries, these behaviours are compounded by cultural beliefs, low maternal education, poverty, and insufficient health system support ((Sanlier & Unusan, 2009)).

(Hawkes et al., 2017) reported a global daily death toll of 17,000 children under five, with over 70% of under-five deaths occurring in Africa and East Asia. (Jones et al., 2003) ranked exclusive breastfeeding and continued breastfeeding among the top child survival interventions globally. (Semahegn et al., 2014) estimated that optimal exclusive breastfeeding could prevent 1.4 million under-five deaths annually worldwide.

2.2 Breastfeeding Initiation

Early initiation of breastfeeding defined as putting the newborn to the breast within one hour of birth is critical for neonatal survival. Linkages (Sachs et al., 2004) established that colostrum, the thick yellowish early breast milk produced in the first days postpartum, provides passive immunological protection against neonatal infections. A study in rural

Ghana ((Kumar et al., 2006)) demonstrated that initiation within the first hour of birth could prevent 22% of neonatal deaths; initiation within the first day reduced deaths by 16%. The Nigeria Demographic Health (Say et al., 2014) reported that 59% of mothers offered prelacteal feeds to their newborns, a practice associated with delayed lactation onset and increased infection risk ((McFadden et al., 2017)).

2.3 Exclusive Breastfeeding

Exclusive breastfeeding defined as provision of breast milk only, with no other liquids or solids except prescribed medications for the first six months of life is the single most effective nutritional intervention for infant health. (Bekere, 2014) in Ethiopia found that while 93.8% of caregivers were knowledgeable about EBF, only 82.2% actually practised it, illustrating the persistent knowledge-practice gap. In India, EBF prevalence stood at 48%, with minimum dietary diversity at 27.4% and minimum meal frequency at 29% among children aged 6–23 months. Ethiopia's DHS (2016) reported EBF at 58% nationally, while the 2011 DHS found early initiation at only 38% in Amhara region.

2.4 Complementary Feeding

Complementary feeding the provision of safe, adequate, and age-appropriate solid or semi-solid foods beginning at six months bridges the growing nutritional gap between breast milk and a child's escalating energy and micronutrient requirements ((Ba et al., 2004)). (Hawkes, 2005) emphasized that the frequency of complementary feeding must be adapted to the child's gastric capacity: at least twice daily for breastfed infants aged 6–8 months, three times for those aged 9–23 months, and four times for non-breastfed children.

Studies across Africa consistently document early introduction of complementary foods as the norm rather than the exception. A study by (Roberts et al., 2008) in an IDP camp in northern Uganda found that 38.8% of children under six months had been introduced to complementary foods. In Kenya, Kimathi et al. (2010) found that complementary foods were introduced too early despite two-thirds of mothers being aware of WHO timing recommendations. (Gewa & Chepkemboi, 2015) in Ghana attributed high stunting prevalence in children aged 12–24 months to both late complementary food introduction and inadequate dietary diversity.

2.5 IYCF in the South Sudanese Context

South Sudan's protracted conflict since its independence in 2011 has severely disrupted household food security, health infrastructure, and child care capacities. According to (Mavalankar et al., 2016), South Sudan data showed that only 55% of children were initiated to breastfeeding within one hour of birth, 5% of children under six months were exclusively breastfed, 18% received prelacteal feeds, and 17% of children aged 6–9 months did not receive complementary semi-solid foods. These figures underscore the urgent need for community-based IYCF research in conflict-affected settings like Ikotos County, where no such data previously existed.

3. Methodology

3.1 Study Design and Setting

A community-based, cross-sectional study employing quantitative methods was conducted in Ikotos County, Eastern Equatoria State, Republic of South Sudan, in March 2020. Ikotos County lies at coordinates 4°4'42"N, 33°6'32"E and shares borders with Magwi County to the West, Torit County to the North, and Budi County to the East. Eastern Equatoria borders Uganda to the south, Kenya to the southeast, and Ethiopia to the northeast. The county is subdivided into six payams (sub-county equivalents) Ikotos Central, Lomohidang South, Lomohidang North, Losite, Hatire, and Imotong containing 33 bomas (parishes) and 154 villages. Ikotos is home to approximately 35,319 people ((Suzuki, 2019)), predominantly agro-pastoralist communities speaking Langi, Dongotono, and Lotuho languages.

The healthcare infrastructure comprises nine facilities including St. Theresa Mission Hospital and eight Primary Health Care Centres and Units (PHCCs/PHCUs). The choice of a cross-sectional design was justified by its efficiency in describing the prevalence of IYCF practices and associated factors at a defined point in time, and by its suitability for generating baseline data in settings with no prior community IYCF studies.

3.2 Population and Sample Size

The target population comprised 2,532 mothers or caregivers with children below 24 months residing in Ikotos County ((Suzuki, 2019)). The accessible population was 1,279 mothers from the 12 selected villages. The study population was 317 mothers who met the inclusion criteria and formally consented to participate.

Sample size was calculated using the Kish-Leslie formula ((Author, 1998)):

$$n = Z^2 \times P(1 - P) / d^2 \text{ (Equation 1)}$$

Where Z = 1.96 (95% confidence interval), P = 0.75 (prevalence of EBF in South Sudan per GoSS MIYCN Strategy 2009–2012), and d = 0.05 (margin of error). Substituting:

$$n = (1.96)^2 \times 0.75 \times (1 - 0.75) / (0.05)^2 = 288.12 \approx 288 \text{ (Equation 2)}$$

A 10% non-response adjustment was added per (Pence et al., 1998): 0.10 × 288 = 28.8 ≈ 29 additional respondents, yielding a final sample of n = 317.

3.3 Sampling Procedure

A multi-stage sampling approach was employed. First, Ikotos County was selected from five Eastern Equatoria counties using simple random sampling (draw without replacement). Second, four of the six payams Ikotos Central (n=80), Losite (n=79), Lomohidang North (n=79), and Lomohidang South (n=79) were randomly selected. Third, three villages per payam (12 villages total) were randomly drawn. Finally, within each village, mothers were identified using village health worker registers and selected through systematic random sampling with a calculated sampling interval.

Inclusion criteria required mothers or caregivers aged ≥18 years with children below 24 months who had resided in Ikotos for at least 24 months and who gave informed consent. Very sick mothers and those who did not meet inclusion criteria were excluded. Where multiple eligible mothers resided in one household, the mother with the youngest child was selected.

3.4 Data Collection and Management

A structured questionnaire, developed per the specific objectives and validated by subject matter experts, was used to collect primary data through face-to-face interviews. The tool was pre-tested on 10 mothers and translated into Langi language to ensure linguistic accessibility. Five trained research assistants fluent in both Langi and English conducted 30-minute interviews at respondents' homes. Data quality was assured through daily field editing by the principal investigator, test-retest reliability assessment, and double entry verification in Microsoft Excel before export to SPSS version 21.

3.5 Data Analysis

Descriptive statistics (frequencies, percentages, means, medians, and standard deviations) summarised participant characteristics. Graphical representations including bar charts and pie charts were used to depict IYCF practice distributions. All analyses were performed at a 95% confidence interval. Ethical clearance was obtained from the Uganda Christian University Research and Ethics Committee, with additional permissions from the Ikotos County Health Officer. Informed consent was obtained from all participants in their preferred language.

4. Results

4.1 Sociodemographic Characteristics of Respondents

A total of 317 mothers or caregivers of children below 24 months participated in the study, yielding a 100% response rate. Table 1 presents the sociodemographic profile of participants.

Table 1: Sociodemographic Characteristics of Study Participants (n=317)

Variable	Frequency (n=317)	Percentage (%)
Age of Mother (Years)		
18–23 years	88	27.8
24–29 years	118	37.2
30–34 years	66	20.8
≥35 years	45	14.2
Marital Status		
Married	253	79.8
Single	56	17.7
Divorced	8	2.5
Maternal Education Level		
No Formal Education	159	50.2
Primary Education	114	36.0
Secondary Education	44	13.8
Maternal Occupation		
Housewife	109	34.4
Informal Employment	149	47.0

Formal Employment	59	18.6
Place of Delivery		
Home	67	21.1
Primary Health Care Centre	195	61.5
Hospital	55	17.4
Head of Household		
Male	255	80.4
Female	62	19.6
Sex of Child		
Male	135	42.6
Female	182	57.4
Age of Child (Months)		
0–6 months	212	66.9
>6–24 months	105	33.1
Primary Caregiver		
Both Biological Parents	187	59.0
Mother Only	130	41.0

Note. Data source: Primary data, Ikotos County, March 2020. PHCC = Primary Health Care Centre.

The majority of respondents (37.2%, n=118) were aged 24–29 years, while only 14.2% (n=45) were aged 35 years or above. Most participants were married (79.8%, n=253). Half of all mothers (50.2%, n=159) had no formal education, and 36.0% had completed primary schooling. Informal employment was the most common occupation (47.0%, n=149). Female children constituted 57.4% (n=182) of the study group. Male-headed households dominated at 80.4% (n=255), and 59.0% of children were cared for by both biological parents.

4.2 Infant and Young Child Feeding Practices

Table 2 summarises the prevalence of key IYCF practices among the study population. Figure 1 provides a visual overview of all core IYCF indicators.

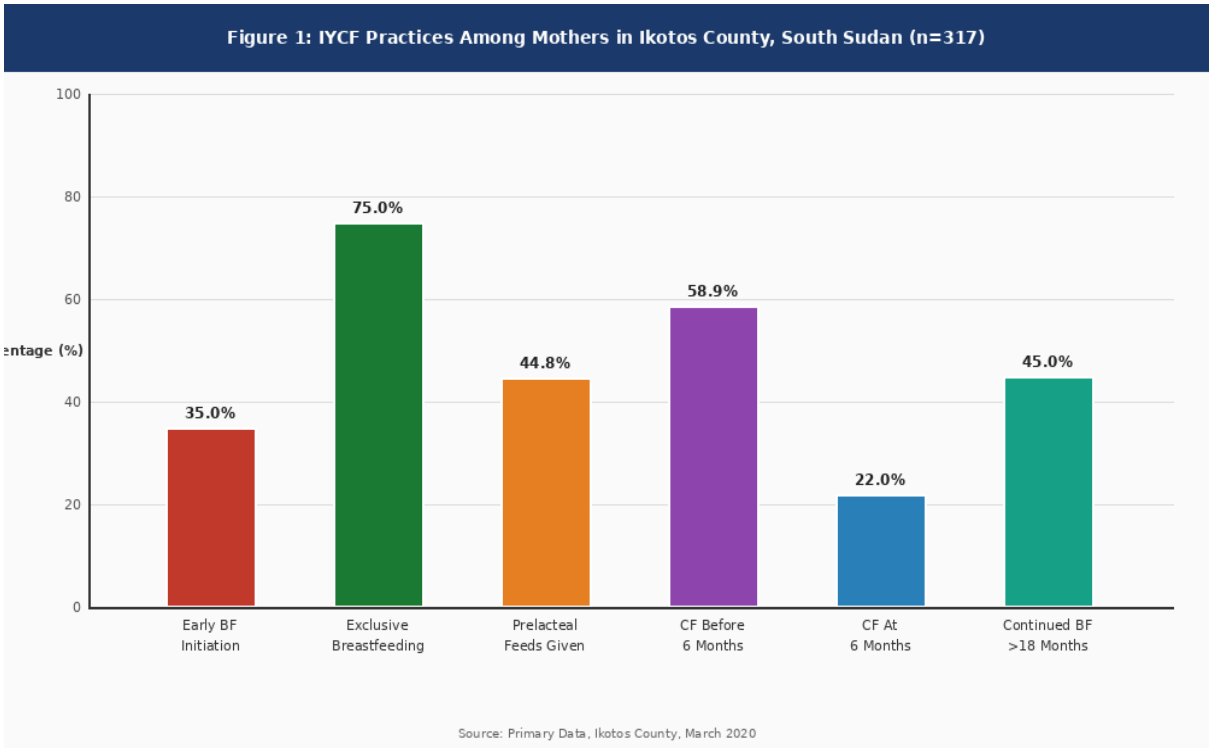

Figure 1: Overview of IYCF practices among mothers with children below 24 months, Ikotos County (n=317). BF = Breastfeeding; CF = Complementary Feeding. Source: Primary data, 2020.

Table 2: Infant and Young Child Feeding Practices Among Study Participants (n=317)

IYCF Variable	Frequency	Percentage (%)
Early Breastfeeding Initiation (within 1 hour)		
Yes Initiated within 1 hour	111	35.0
No Delayed initiation	206	65.0
Time of Delayed Initiation (n=206)		
After 2 hours	25	12.1
After 24 hours	128	62.1
After >24 hours	53	25.8
Prelacteal Feeds Administered		
Yes Prelacteal feeds given	142	44.8
No No prelacteal feeds	175	55.2
Exclusive Breastfeeding (children <6 months, n=212)		
Exclusively Breastfed	238	75.0
Not Exclusively Breastfed	79	25.0
Breastfeeding Frequency (last 24 hours)		
4 times per day	119	37.5
5–9 times per day	85	26.8

10–14 times per day	72	22.7
>14 times On demand	12	13.0
Age at Introduction of Complementary Feeding		
Before 6 months	187	58.9
At 6 months (recommended)	92	22.0 *
After 6 months	38	19.1
Continued Breastfeeding Duration		
Stopped at 6 months	75	23.6
7–12 months	67	21.3
13–18 months	32	10.1
>18 months	143	45.0

Note. * Indicates WHO-recommended practice. Data source: Primary data, Ikotos County, March 2020.

4.2.1 Early Initiation of Breastfeeding

Only 35.0% (n=111) of infants were initiated to breastfeeding within one hour of birth, while a majority 65.0% (n=206) experienced delayed initiation. Among those with delayed initiation, the largest proportion (62.1%, n=128) did not commence breastfeeding until 24 hours after delivery, 25.8% (n=53) waited longer than 24 hours, and 12.1% (n=25) initiated within 2–24 hours. Figure 4 illustrates the distribution of breastfeeding initiation timing among mothers who delayed.

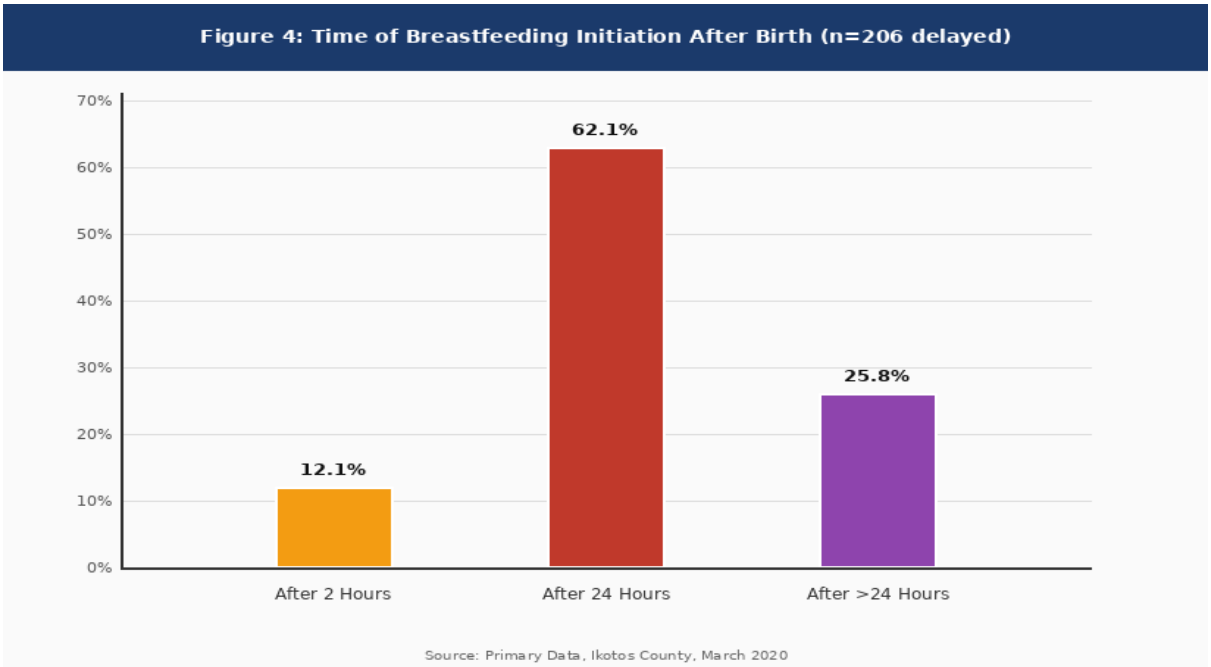

Figure 4: Distribution of breastfeeding initiation timing among mothers who did not initiate within one hour of birth (n=206). Source: Primary data, Ikotos County, March 2020.

These findings reveal a severe gap against the WHO recommendation of universal breastfeeding initiation within one hour a practice shown to reduce neonatal mortality by 22% ((Kumar et al., 2006); (Martorell & Zongrone, 2012)). The high prevalence of delayed initiation in Ikotos County (65.0%) substantially exceeds the 45% delayed initiation figure reported for South Sudan nationally ((Mavalankar et al., 2016)).

4.2.2 Prelacteal Feeds

Prelacteal feeds defined as any substance other than breast milk given to newborns within the first three days of life were administered to 44.8% (n=142) of babies. As shown in Figure 2, honey was the most common prelacteal feed (48.0%), followed by goat's milk (23.0%), plain water (15.0%), glucose water (9.0%), and other substances (5.0%). These findings are consistent with documented sub-Saharan African practices where prelacteal feeding is often rooted in cultural beliefs about colostrum being impure or insufficient for newborns ((Muyinda et al., 2001)).

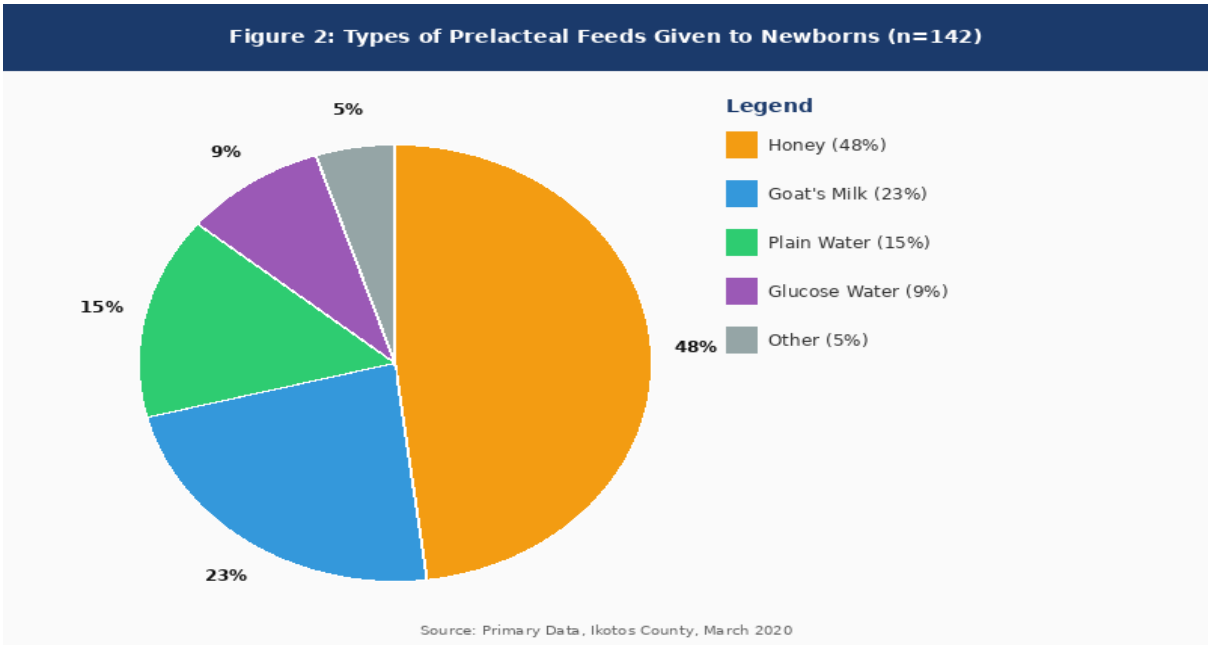

Figure 2: Distribution of types of prelacteal feeds given to newborns in Ikotos County (n=142). Source: Primary data, Ikotos County, March 2020.

4.2.3 Exclusive Breastfeeding

Among the 212 infants below six months of age, 75.0% (n=238) were exclusively breastfed at the time of data collection. While this prevalence appears relatively high, it is important to contextualise these figures critically. Only 4.3% (n=12) of all breastfeeding mothers reported feeding their infants on demand the WHO-recommended approach to sustain adequate milk supply and infant satiety. The overwhelming majority (37.5%, n=119) breastfed only four times per day, well below the minimum frequency recommended for optimal infant nutrition. This points to a quality dimension of EBF that crude prevalence figures do not capture.

The 75.0% EBF rate in Ikotos County substantially exceeds the South Sudan national figure of 5% reported by (Mavalankar et al., 2016) for children under six months, though this discrepancy may reflect differences in measurement methodology, urban-rural distribution, or self-reporting bias. The Ethiopia DHS (2016) reported national EBF at 58%, while the India National Family Health Survey reported 48%, offering useful regional benchmarks.

4.2.4 Complementary Feeding

The introduction of complementary foods before the recommended age of six months was alarmingly prevalent, affecting 58.9% (n=187) of children. Only 22.0% (n=92) of mothers introduced complementary feeding at the WHO-recommended age of six months, while 19.1% (n=38) delayed introduction beyond six months both early and late introduction being harmful to child nutritional outcomes. Figure 3 presents the distribution of complementary food types given to children.

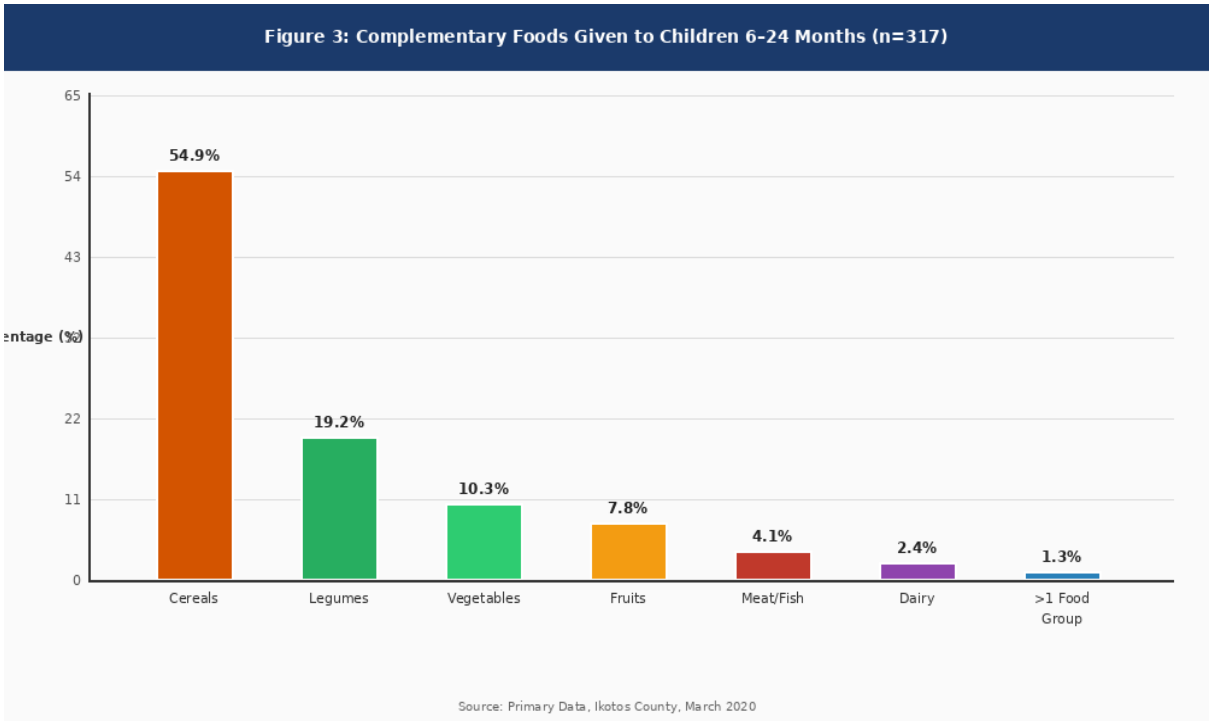

Figure 3: Types of complementary foods given to children aged 6–24 months in Ikotos County (n=317). Source: Primary data, Ikotos County, March 2020.

Cereals dominated the complementary diet of children (54.9%, n=174), followed by legumes (19.2%, n=61), vegetables (10.3%), fruits (7.8%), meat/fish (4.1%), and dairy products (2.4%). A critically low proportion just 1.3% of children received foods from more than one food group, indicating near-absent dietary diversity. This finding is consistent with (Mokori & Orikushaba, 2012) who documented limited dietary diversity as the most common inappropriate complementary feeding practice among caregivers of children below 24 months in Uganda.

The WHO minimum dietary diversity standard requires children aged 6–23 months to receive foods from at least four of eight defined food groups. The near-total reliance on cereals in Ikotos County places the vast majority of children at risk of micronutrient deficiencies particularly iron, zinc, vitamin A, calcium, and riboflavin which are associated with stunting, anaemia, and impaired neurodevelopment ((Hawkes, 2005); (Ijarotimi et al., 2010)).

4.2.5 Continued Breastfeeding

Continued breastfeeding beyond 18 months was practised by 45.0% (n=143) of mothers, representing the single largest category. However, 23.6% (n=75) had already stopped breastfeeding by six months, and 21.3% (n=67) ceased between 7 and 12 months well below the WHO recommendation to continue breastfeeding through at least 24 months. Figure 6 illustrates continued breastfeeding patterns stratified by maternal age group.

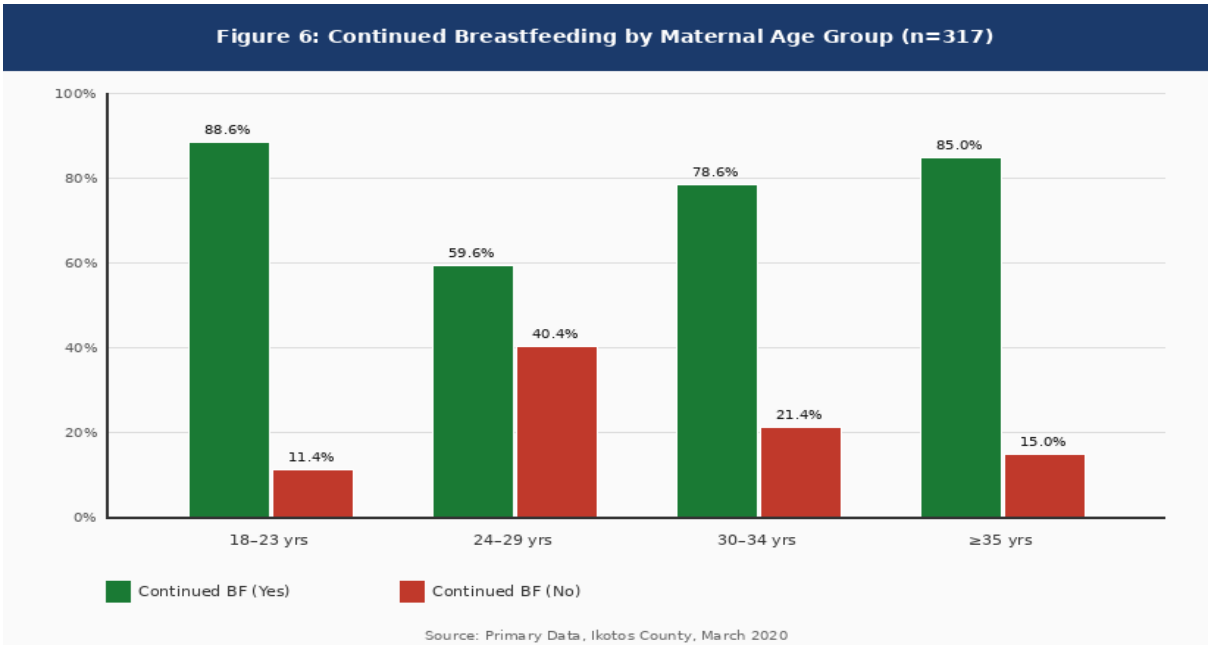

Figure 6: Continued breastfeeding practices by maternal age group, Ikotos County (n=317). Green = Continued BF; Red = Ceased BF. Source: Primary data, 2020.

Younger mothers (18–23 years) demonstrated the highest continuation rate (88.6%) compared to mothers aged 24–29 years (59.6%), 30–34 years (78.6%), and ≥35 years (85.0%). The lowest continued breastfeeding rates among mothers aged 24–29 years may reflect greater competing demands from employment and household responsibilities in this age cohort.

Table 3: Summary of Participants Selected per Payam and Village (Sampling Frame)

Payam	Participants Selected	Villages	Children per Village
Ikotos Central	80	Tseretenya, Ifune, Momoria	27, 27, 26
Losite	79	Lofus, Ateda, Lotome	27, 26, 26
Lomohidang North	79	Ibunyak, Nimra Talata, Woroworo	27, 26, 26
Lomohidang South	79	Okorohore, Lodwara, Chorokol	26, 27, 26
TOTAL	**317**	12 Villages	317

Note. Data source: (Suzuki, 2019); Study design, 2020. Payam = second-lowest administrative division in South Sudan.

Table 4: Comparison of WHO-Recommended IYCF Benchmarks Against Ikotos County Study Findings

WHO-Recommended IYCF Indicator	WHO Target/Benchmark	Ikotos County Finding	Gap Assessment
Early BF Initiation (within 1 hr)	≥90%	35.0%	CRITICAL 55 pp below target
Exclusive Breastfeeding (<6 months)	≥50%	75.0%	POSITIVE above target
Breastfeeding on Demand	≥80%	4.3%	CRITICAL 75.7 pp below target
Prelacteal Feed-Free Newborns	≥90%	55.2%	POOR 34.8 pp below target
Complementary Feeding at 6 Months	≥80%	22.0%	CRITICAL 58 pp below target
Minimum Dietary Diversity	≥25%	1.3%	VERY POOR near zero
Continued BF to ≥24 Months	≥80%	45.0%	POOR 35 pp below target

Note. pp = percentage points. BF = breastfeeding. Data sources: (Brown et al., 2019); Primary data, 2020.

5. Discussion

5.1 Early Breastfeeding Initiation

The finding that only 35.0% of infants in Ikotos County were initiated to breastfeeding within one hour of birth is deeply concerning. This figure is substantially below the WHO target of near-universal early initiation and compares unfavourably with the South Sudan national figure of 55% ((Mavalankar et al., 2016)), suggesting that Ikotos County is among the worst-performing areas even within South Sudan. It falls far below figures reported in Ethiopia (38–50%), Ghana (54%), and Nigeria (41%).

The dominant reason for delayed initiation with 62.1% of delaying mothers waiting a full 24 hours likely reflects deeply entrenched cultural beliefs about colostrum being harmful or unclean, as documented by (Muyinda et al., 2001) in Uganda and by (Hoffman & Pype, 2016) across East African settings. The data further suggests that home delivery, which accounted for 21.1% of births in the study, is associated with reduced access to skilled birth attendants who would otherwise facilitate early breastfeeding counselling. Mothers who delivered in Primary Health Care Centres demonstrated meaningfully higher early initiation rates, reinforcing the importance of facility-based delivery and postnatal support.

The prelacteal feeding rate of 44.8% with honey being the predominant substance administered exposes newborns to risk of infections, gastric disruption, and interference with the establishment of lactation. Honey in particular carries risk of Clostridium botulinum infection in neonates ((Sachs et al., 2004)). These practices are consistent with Ogunlesi's (2010) documentation of prelacteal feeding as a culturally normalised yet harmful behaviour across low-income African settings.

5.2 Exclusive Breastfeeding

The 75.0% EBF prevalence among children below six months is one of the more encouraging findings of this study. This substantially exceeds the national South Sudan average of 5% ((Mavalankar et al., 2016)) and is comparable to the 82.2% reported by (Bekere, 2014) in Ethiopia, despite Ikotos County's considerably more adverse socioeconomic context. This relatively high EBF rate may reflect the county's limited access to breast milk substitutes a consequence of economic poverty and poor market connectivity rather than informed nutritional decision-making.

However, the finding that only 4.3% of breastfeeding mothers fed on demand reveals a critical gap in breastfeeding quality. The dominant pattern of four feeds per day is likely to be insufficient for maintaining adequate milk supply and meeting the caloric needs of rapidly growing infants, particularly in the second and third months of life. Saxena and Kumari (2014) identified mothers' misperception of inadequate milk production as the most common driver of supplementary feeding; this study's findings suggest that a similar dynamic may be operating in Ikotos County.

5.3 Complementary Feeding

The 58.9% early introduction of complementary foods combined with the near-total absence of dietary diversity (only 1.3% receiving foods from more than one food group) constitutes perhaps the most alarming finding of this study. Early introduction of complementary foods before six months exposes infants to elevated risks of diarrhoeal diseases due to immature gut immunity ((Hawkes, 2005)), while the monotonous reliance on cereals creates severe micronutrient deficits that are directly linked to stunting, wasting, and compromised neurocognitive development ((Gewa & Chepkemboi, 2015)).

These findings are consistent with (Ijarotimi et al., 2010), who documented that plant-based complementary diets in resource-poor settings fail to meet children's iron, zinc, and vitamin A requirements. The near-complete absence of animal-source foods (meat/fish at 4.1%, dairy at 2.4%) reflects both economic constraints and cultural food taboos, as reported by (Hlaing et al., 2015) and Vaahtera et al. (2001) in comparable African settings.

The high proportion (19.1%) of mothers delaying complementary feeding beyond six months adds a further dimension of nutritional risk late introduction being associated with deficiencies in iron and zinc at a critical period of brain development.

The concurrent burden of early complementary food introduction (58.9%) and late introduction (19.1%) reflects a profound absence of correct knowledge and practical guidance on complementary feeding among mothers in Ikotos County. This is consistent with (Mokori & Orikushaba, 2012) and (Asemahagn, 2016) in their Ethiopian studies, where high maternal knowledge coexisted with widespread suboptimal complementary feeding practice.

5.4 Continued Breastfeeding

While 45.0% of mothers continued breastfeeding beyond 18 months approaching but not reaching the 24-month WHO target the cessation of breastfeeding by six months in 23.6% of mothers represents a significant gap. Thulier (2009) and Lande (2003) identified marital status and social support as key drivers of continued breastfeeding; the 17.7% single-mother rate in this study sample likely contributes to earlier cessation through reduced spousal support. Kimani (2011) similarly found that women outside the marital union were more likely to cease breastfeeding early in urban Nairobi.

The relatively higher continued breastfeeding rates among the youngest (18–23 years, 88.6%) and oldest (≥35 years, 85.0%) maternal age groups, compared to the 24–29 year group (59.6%), may reflect different employment patterns, parity levels, and social expectations across age cohorts. Older mothers likely benefit from accumulated breastfeeding experience (Meedya et al., 2010; Raffle, 2011), while younger mothers may receive stronger community support given cultural norms around infant care.

6. Conclusions and Recommendations

6.1 Conclusions

This community-based cross-sectional study provides the first comprehensive profile of IYCF practices among mothers of children below 24 months in Ikotos County, Eastern Equatoria, South Sudan. The findings reveal that IYCF practices are broadly suboptimal across nearly all WHO-recommended indicators. While exclusive breastfeeding prevalence was relatively encouraging at 75.0%, early breastfeeding initiation (35.0%), on-demand feeding (4.3%), optimal complementary feeding timing (22.0%), and dietary diversity (1.3%) all fall critically below international benchmarks. The high prevalence of prelacteal feeding (44.8%) and early complementary food introduction (58.9%) expose children to elevated risks of infection, stunting, and micronutrient deficiency.

The 13.5% Global Acute Malnutrition rate in Ikotos County, exceeding the WHO emergency threshold of 10%, is consistent with and likely driven in part by these suboptimal feeding practices. Taken together, the evidence points to an urgent need for integrated, multi-level IYCF interventions targeting community knowledge, facility-based counselling, and policy implementation.

6.2 Recommendations

- Health education and counselling: The County Health Department, Health Link South Sudan, AVSI, and UNICEF should implement structured, community-level IYCF education programmes targeting mothers, fathers, grandmothers, and community leaders, delivered in Langi, Dongotono, and Lotuho languages.
- Facility-based support: All nine health facilities in Ikotos County should implement WHO Baby-Friendly Hospital Initiative (BFHI) protocols, ensuring skilled birth attendants facilitate breastfeeding initiation within one hour of all deliveries.
- Dietary diversity promotion: Agricultural agencies and food security partners should promote kitchen gardens, small livestock keeping, and food diversification strategies to increase household access to animal-source foods and micronutrient-rich vegetables.
- Male engagement: Community-based programmes should actively engage fathers and male community leaders in IYCF education, given evidence that paternal knowledge significantly influences feeding practices ((Thuita et al., 2015); (Bhatta, 2013)).
- National policy implementation: The South Sudan Ministry of Health should strengthen accountability mechanisms for the MIYCN Policy Guideline, with specific targets, monitoring indicators, and dedicated funding for Ikotos County.
- Longitudinal research: Given the cross-sectional design's limitation in establishing causality, longitudinal cohort studies and qualitative research are recommended to explore the deeper cultural and socioeconomic drivers of IYCF practices in Ikotos County.

Declarations

Ethical Approval: Ethical clearance was obtained from the Uganda Christian University Research and Ethics Committee. Permission was also granted by the Ikotos County Health Officer. All participants provided written informed consent in their preferred language.

Funding: This study was self-funded by the principal investigator as part of a Master of Science in Human Nutrition dissertation at Uganda Christian University.

Conflict of Interest: The author declares no conflict of interest.

Data Availability: Data are available from the corresponding author upon reasonable request.

Acknowledgements: The author thanks Dr. Gloria Kirungi (Supervisor), Dr. Edward Mukooza, Dr. Akule Patrick, the five research assistants, the Boma Health Workers of Ikotos County, and all mothers who participated in this study.

References

Arabi, Mandana; Frongillo, Edward A; Avula, Rasmi; Mangasaryan, Nuné (2012). Infant and Young Child Feeding in Developing Countries. *Child Development*, *83*(1), 32-45. https://doi.org/10.1111/j.1467-8624.2011.01675.x [Link]

Omoniyi-Esan, Olutoyin; Dinyain, Amatare; Olaofe, Olaejirinde; Komolafe; Sabageh; Ojo (2013). Autopsy-certified maternal mortality at Ile-Ife, Nigeria. *International Journal of Women's Health*, 41. https://doi.org/10.2147/ijwh.s39863 [Link]

Tesfaye Setegn; Mulusew Gerbaba; Tefera Belachew (2011). Determinants of timely initiation of breastfeeding among mothers in Goba Woreda, South East Ethiopia: A cross sectional study. *BMC Public Health*, *11*(1), 217-217. https://doi.org/10.1186/1471-2458-11-217 [Link]

Ijarotimi, O. Steve; Ekeh, Ogechi; Ajayi, O. Philip (2010). Nutrient Composition of Selected Medicinal Leafy Vegetables in Western Nigeria. *Journal of Medicinal Food*, *13*(2), 476-479. https://doi.org/10.1089/jmf.2009.0023 [Link]

FM Thuita; S. Espigares Martín; K Ndegwa; Allison Bingham; Mukuria Ag; PATH, Nairobi, Kenya; AG Mukuria; Independent consultant, formerly with the Infant & Young Child Nutrition (IYCN) Project (2015). Engaging fathers and grandmothers to improve maternal and child dietary practices: Planning a community-based study in western Kenya.. *African Journal of Food Agriculture Nutrition and Development*, *15*(72), 10386-10405. https://doi.org/10.18697/ajfand.72.15455 [Link]

Hoffman, Jaco; Pype, Katrien (2016). Introduction: Spaces and practices of care for older people in Sub-Saharan Africa. *Ageing in Sub-Saharan Africa*, 1-20. https://doi.org/10.1332/policypress/9781447325253.003.0001 [Link]

Bhatta, Dharma Nand (2013). Involvement of males in antenatal care, birth preparedness, exclusive breast feeding and immunizations for children in Kathmandu, Nepal. *BMC Pregnancy and Childbirth*, *13*(1). https://doi.org/10.1186/1471-2393-13-14 [Link]

Bruno Tongun, Justin; Sebit, Mohammed Boy; Mukunya, David; Ndeezi, Grace; Nankabirwa, Victoria; Tylleskar, Thorkild; Tumwine, James K. (2018). Factors associated with delayed initiation of breastfeeding: a cross-sectional study in South Sudan. *International Breastfeeding Journal*, *13*(1). https://doi.org/10.1186/s13006-018-0170-0 [Link]

Caetano, Michelle Cavalcante; Ortiz, Thaís Tobaruela Ortiz; Silva, Simone Guerra Lopes da; Souza, Fabíola Isabel Suano de; Sarni, Roseli Oselka Saccardo (2010). Complementary feeding: inappropriate practices in infants. *Jornal de Pediatria*, *0*(0). https://doi.org/10.2223/jped.1994 [Link]

Belachew Etana; Wakgari Deressa (2012). Factors associated with complete immunization coverage in children aged 12–23 months in Ambo Woreda, Central Ethiopia. *BMC Public Health*, *12*(1), 566-566. https://doi.org/10.1186/1471-2458-12-566 [Link]

Pauline E. Osamor; Christine Grady (2016). Women's autonomy in health care decision-making in developing countries: a synthesis of the literature. *International Journal of Women s Health*, *8*, 191-191. https://doi.org/10.2147/ijwh.s105483 [Link]

Lwin Mar Hlaing; Umi Fahmida; Min Kyaw Htet; Budi Utomo; Agus Firmansyah; Elaine Ferguson (2015). Local food-based complementary feeding recommendations developed by the linear programming approach to improve the intake of problem nutrients among 12–23-month-old Myanmar children. *British Journal Of Nutrition*, *116*(S1), S16-S26. https://doi.org/10.1017/s000711451500481x [Link]

Johan Rockström; John Williams; Gretchen C. Daily; Andrew Noble; Nathanial Matthews; Line Gordon; Hanna Wetterstrand; Fabrice DeClerck; Mihir Shah; Pasquale Steduto; Charlotte de Fraiture; N. Hatibu; Olcay Ünver; Jeremy Bird; Lindiwe Majele Sibanda; Jimmy W. Smith (2016). Sustainable intensification of agriculture for human prosperity and global sustainability. *AMBIO*, *46*(1), 4-17. https://doi.org/10.1007/s13280-016-0793-6 [Link]

Gewa, Constance; Chepkemboi, Joan (2015). Psychosocial Determinants of Exclusive Breast-Feeding in Rural Kenya. *The FASEB Journal*, *29*(S1). https://doi.org/10.1096/fasebj.29.1_supplement.898.38 [Link]

Unknown Author (2009). Maternal mortality and morbidity. *Reproductive Health Matters*, *17*(33), 210-213. https://doi.org/10.1016/s0968-8080(09)33451-5 [Link]

Eelke Boerema; Charles C. Chapman; Cecile Kusters (2021). FNS-REPRO South Sudan key findings report : Key findings emerging from the FNS-REPRO generated studies and other sources as input for the sensemaking events and adaptive programming. https://doi.org/10.18174/551848 [Link]

Forsyth, J. S. (2010). International code of marketing of breast-milk substitutes--three decades later time for hostilities to be replaced by effective national and international governance. *Archives of Disease in Childhood*, *95*(10), 769-770. https://doi.org/10.1136/adc.2010.187294 [Link]

Agumasie Semahegn; Gezahegn Tesfaye; Alemayehu Bogale (2014). Complementary feeding practice of mothers and associated factors in Hiwot Fana Specialized Hospital, Eastern Ethiopia. *Pan African Medical Journal*, *18*, 143-143. https://doi.org/10.11604/pamj.2014.18.143.3496 [Link]

Jones, Gareth; Steketee, Richard W; Black, Robert E; Bhutta, Zulfiqar A; Morris, Saul S (2003). How many child deaths can we prevent this year?. *The Lancet*, *362*(9377), 65-71. https://doi.org/10.1016/s0140-6736(03)13811-1 [Link]

Kimani-Murage, Elizabeth W; Madise, Nyovani J; Fotso, Jean-Christophe; Kyobutungi, Catherine; Mutua, Martin K; Gitau, Tabither M; Yatich, Nelly (2011). Patterns and determinants of breastfeeding and complementary feeding practices in urban informal settlements, Nairobi Kenya. *BMC Public Health*, *11*(1). https://doi.org/10.1186/1471-2458-11-396 [Link]

Kumar, Dinesh; Goel, N. K.; Mittal, Poonam C.; Misra, Purnima (2006). Influence of infant-feeding practices on nutritional status of under-five children. *The Indian Journal of Pediatrics*, *73*(5), 417-421. https://doi.org/10.1007/bf02758565 [Link]

Sanlier, Nevin; Unusan, Nurhan (2009). Infant feeding practices in Central Anatolia, Turkey. *Early Child Development and Care*, *179*(1), 17-25. https://doi.org/10.1080/03004430600870389 [Link]

Reynaldo Martorell; Amanda Zongrone (2012). Intergenerational Influences on Child Growth and Undernutrition. *Paediatric and Perinatal Epidemiology*, *26*(s1), 302-314. https://doi.org/10.1111/j.1365-3016.2012.01298.x [Link]

Jeffrey D. Sachs; John W. McArthur; Guido Schmidt-Traub; Margaret E. Kruk; Chandrika Bahadur; Michael Faye; Gordon C. McCord (2004). Ending Africa's Poverty Trap. *Brookings Papers on Economic Activity*, *2004*(1), 117-240. https://doi.org/10.1353/eca.2004.0018 [Link]

Brian W. Pence; Carolyn Vogel; M Formerly; Dale Huntington; Annette Okai; M Gachara; D Bakouan; P Sebgo; I Askew; Y Ouedraogo; P Tapsoba; C Viadro; S Kanon; I Askew; B Mensch; A Adewuji; L Jolly; J Gribble; S Pariani; D Heer; M Van Arsdol; S Sinding; J Ross; A Rosenfield; I Askew; B Mensch; A Adewuji; I Askew; K Miller; B Mensch; L Brown; M Tyane; J Bertrand; D Lauro; M Abououakil; L Demaria; J Bruce; N Diop; A Cerulli; D Sanogo; A Fisher; A Fisher; K Miller; R Miller; K Hardee; B Janowitz; J Stanback; M Villinski; D Huntington; B Mensch; N Toubia; D Huntington; B Mensch; V Miller; A Jain; D Measham; K Stein; B Winikoff; B Mensch; M Arends-Kuenning; A Jain; R Miller; R Frerichs; R Miller; K Miller; L Ndhlovu; J Solo; O Achola; K Stein; I Tour; N Diop; A Diallo; D Sanogo; J Valadez; R Transgrud; M Mbugua; T Smith; J Bertrand; K Hardee; R Magnani; M Angle; J Bruce; S Haddad; P Fournier; A Jain; J Bruce; B Mensch; R Oliver; V Tsui; J Veney; R Magnani; P Gorbach; M Barberis; P Harvey; J Becker; E Leitman; M Fathalla; J Bertrand; R Magnani; J Knowles (1998). Clinic-Based Family Planning and Reproductive Health Services in Africa: Findings from Situation Analysis Studies. https://doi.org/10.31899/rh1998.1000 [Link]

Mokori, A.; Orikushaba, P. (2012). Nutritional status, complementary feeding practices and feasible strategies to promote nutrition in returnee children aged 6–23 months in northern Uganda. *South African Journal of Clinical Nutrition*, *25*(4), 173-179. https://doi.org/10.1080/16070658.2012.11734424 [Link]

Mututho, Leah N.; Kiboi, Willy K.; Mucheru, Patrick K. (2017). Factors associated with exclusive breastfeeding in Kenya: a systematic review. *International Journal Of Community Medicine And Public Health*, *4*(12), 4358. https://doi.org/10.18203/2394-6040.ijcmph20175305 [Link]

Lale Say; Doris Chou; Alison Gemmill; Özge Tunçalp; Ann-Beth Moller; Jane Daniels; A Metin Gülmezoglu; Marleen Temmerman; Leontine Alkema (2014). Global causes of maternal death: a WHO systematic analysis. *The Lancet Global Health*, *2*(6), e323-e333. https://doi.org/10.1016/s2214-109x(14)70227-x [Link]

Ogunlesi, Tinuade A. (2009). Maternal Socio-Demographic Factors Influencing the Initiation and Exclusivity of Breastfeeding in a Nigerian Semi-Urban Setting. *Maternal and Child Health Journal*, *14*(3), 459-465. https://doi.org/10.1007/s10995-008-0440-3 [Link]

Roberts, B; Ocaka, K Felix; Browne, J; Oyok, T; Sondorp, E (2008). Factors associated with the health status of internally displaced persons in northern Uganda. *Journal of Epidemiology and Community Health*, *63*(3), 227-232. https://doi.org/10.1136/jech.2008.076356 [Link]

Muyinda, Herbert; Kengeya, Jane; Pool, Robert; Whitworth, James (2001). Traditional sex counselling and STI/HIV prevention among young women in rural Uganda. *Culture, Health & Sexuality*, *3*(3), 353-361. https://doi.org/10.1080/13691050152484768 [Link]

Asemahagn, Mulusew Andualem (2016). Determinants of exclusive breastfeeding practices among mothers in azezo district, northwest Ethiopia. *International Breastfeeding Journal*, *11*(1). https://doi.org/10.1186/s13006-016-0081-x [Link]

Corinna Hawkes (2005). The role of foreign direct investment in the nutrition transition. *Public Health Nutrition*, *8*(4), 357-365. https://doi.org/10.1079/phn2004706 [Link]

Suzuki, Toru (2019). Population of Premodern Eastern Asia. *SpringerBriefs in Population Studies*, 9-22. https://doi.org/10.1007/978-981-13-3230-2_2 [Link]

Darren J. Shaw (2005). Dimensions of Poverty: Status and Solutions Towards the Millennium Development Goals. *Development Policy Review*, *23*(4), 499-523. https://doi.org/10.1111/j.1467-7679.2005.00300.x [Link]

Elizabeth Kimani-Murage; Nyovani Madise; Jean-Christophe Fotso; Catherine Kyobutungi; Martin Kavao Mutua; Tabither Gitau; Nelly Yatich (2011). Patterns and determinants of breastfeeding and complementary feeding practices in urban informal settlements, Nairobi

Kenya. *BMC Public Health*, *11*(1), 396-396. https://doi.org/10.1186/1471-2458-11-396 [Link]

Dileep Mavalankar; Shuby Puthussery; Kavitha Menon; Ritu Rana; Janine Bhandol; Sabuj Kanti Mistry; Anal Ravalia; Pei-Ching Tseng (2016). EFFECTIVENESS OF NUTRITION INTERVENTIONS IN LOW AND MIDDLEINCOME COUNTRIES: AN EVIDENCE SUMMARY. *University of Bedfordshire Repository (University of Bedfordshire)*. https://doi.org/10.13140/rg.2.2.10114.27848 [Link]

Alison McFadden; Anna Gavine; Mary J. Renfrew; Angela Wade; Phyll Buchanan; Jane Taylor; Emma Veitch; Anne Marie Rennie; Susan Crowther; Sara Neiman; Stephen MacGillivray (2017). Support for healthy breastfeeding mothers with healthy term babies. *Cochrane Database of Systematic Reviews*, *2017*(2). https://doi.org/10.1002/14651858.cd001141.pub5 [Link]

Hamid El Bilali; C. Callenius; Carola Strassner; Lorenz Probst (2018). Food and nutrition security and sustainability transitions in food systems. *Food and Energy Security*, *8*(2). https://doi.org/10.1002/fes3.154 [Link]

Unknown Author (2017). The Associated Factors Hampering Mothers towards Exclusive Breastfeeding EBF through Knowledge, Attitude and Practice (KAP) Studies at Al-Sabah Children Hospital /Juba -South Sudan. *Journal of Community Medicine & Public Health*, *1*(1). https://doi.org/10.29011/2577-2228.100001 [Link]

Unknown Author (1998). Survey sampling methods. *Sampling and Statistical Methods for Behavioral Ecologists*, 85-147. https://doi.org/10.1017/cbo9780511612572.005 [Link]

Swinburn Ba; I D Caterson; Jacob C. Seidell; James WPT (2004). Diet, nutrition and the prevention of excess weight gain and obesity. *Public Health Nutrition*, *7*(1a), 123-146. https://doi.org/10.1079/phn2003585 [Link]

John R. Perfect; William E. Dismukes; Françoise Dromer; David L. Goldman; John R. Graybill; Richard J. Hamill; Thomas S. Harrison; Robert A. Larsen; Olivier Lortholary; Minh-Hong Nguyen; Peter G. Pappas; William G. Powderly; Nina Singh; Jack D. Sobel; Tania C. Sorrell (2010). Clinical Practice Guidelines for the Management of Cryptococcal Disease: 2010 Update by the Infectious Diseases Society of America. *Clinical Infectious Diseases*, *50*(3), 291-322. https://doi.org/10.1086/649858 [Link]

Corinna Hawkes; Sandro Demaio; Francesco Branca (2017). Double-duty actions for ending malnutrition within a decade. *The Lancet Global Health*, *5*(8), e745-e746. https://doi.org/10.1016/s2214-109x(17)30204-8 [Link]

Tamara Brown; Theresa HM Moore; Lee Hooper; Yang Gao; Amir Zayegh; Sharea Ijaz; Martha Elwenspoek; Sophie C Foxen; Lucia Magee; Claire O'Malley; Elizabeth Waters; Carolyn Summerbell (2019). Interventions for preventing obesity in children. *Cochrane Database of Systematic Reviews*, *2025*(8), CD001871-CD001871. https://doi.org/10.1002/14651858.cd001871.pub4 [Link]

Ian Darnton-Hill; Chizuru Nishida; WPT James (2004). A life course approach to diet, nutrition and the prevention of chronic diseases. *Public Health Nutrition*, *7*(1a), 101-121. https://doi.org/10.1079/phn2003584 [Link]

Elizabeth Kimani-Murage; Kathleen Kahn; John M. Pettifor; Stephen Tollman; David B. Dunger; F. Xavier Gómez-Olivé; Shane A. Norris (2010). The prevalence of stunting, overweight and obesity, and metabolic disease risk in rural South African children. *BMC Public Health*, *10*(1), 158-158. https://doi.org/10.1186/1471-2458-10-158 [Link]

Bekere, Abebe (2014). Exclusive Breastfeeding Practices of HIV Positive mothers and its Determinants in Selected Health Institution of West Oromia, Ethiopia. *Journal of Nutrition & Food Sciences*, *04*(06). https://doi.org/10.4172/2155-9600.1000319 [Link]

SANGWA, Sixbert (2025). Reimagining Public Health Education in Africa: Strategic Value of an Online Master of Public Health in Key African Markets. https://doi.org/10.2139/ssrn.5297228 [Link]

References

Arabi, Mandana; Frongillo, Edward A; Avula, Rasmi; Mangasaryan, Nuné (2012). Infant and Young Child Feeding in Developing Countries. *Child Development*, *83*(1), 32-45. https://doi.org/10.1111/j.1467-8624.2011.01675.x [Link]

Omoniyi-Esan, Olutoyin; Dinyain, Amatare; Olaofe, Olaejirinde; Komolafe; Sabageh; Ojo (2013). Autopsy-certified maternal mortality at Ile-Ife, Nigeria. *International Journal of Women's Health*, 41. https://doi.org/10.2147/ijwh.s39863 [Link]

Tesfaye Setegn; Mulusew Gerbaba; Tefera Belachew (2011). Determinants of timely initiation of breastfeeding among mothers in Goba Woreda, South East Ethiopia: A cross sectional study. *BMC Public Health*, *11*(1), 217-217. https://doi.org/10.1186/1471-2458-11-217 [Link]

Ijarotimi, O. Steve; Ekeh, Ogechi; Ajayi, O. Philip (2010). Nutrient Composition of Selected Medicinal Leafy Vegetables in Western Nigeria. *Journal of Medicinal Food*, *13*(2), 476-479. https://doi.org/10.1089/jmf.2009.0023 [Link]

FM Thuita; S. Espigares Martín; K Ndegwa; Allison Bingham; Mukuria Ag; PATH, Nairobi, Kenya; AG Mukuria; Independent consultant, formerly with the Infant & Young Child Nutrition (IYCN) Project (2015). Engaging fathers and grandmothers to improve maternal and child dietary practices: Planning a community-based study in western Kenya.. *African Journal of Food Agriculture Nutrition and Development*, *15*(72), 10386-10405. https://doi.org/10.18697/ajfand.72.15455 [Link]

Hoffman, Jaco; Pype, Katrien (2016). Introduction: Spaces and practices of care for older people in Sub-Saharan Africa. *Ageing in Sub-Saharan Africa*, 1-20. https://doi.org/10.1332/policypress/9781447325253.003.0001 [Link]

Bhatta, Dharma Nand (2013). Involvement of males in antenatal care, birth preparedness, exclusive breast feeding and immunizations for children in Kathmandu, Nepal. *BMC Pregnancy and Childbirth*, *13*(1). https://doi.org/10.1186/1471-2393-13-14 [Link]

Bruno Tongun, Justin; Sebit, Mohammed Boy; Mukunya, David; Ndeezi, Grace; Nankabirwa, Victoria; Tylleskar, Thorkild; Tumwine, James K. (2018). Factors associated with delayed initiation of breastfeeding: a cross-sectional study in South Sudan. *International Breastfeeding Journal*, *13*(1). https://doi.org/10.1186/s13006-018-0170-0 [Link]

Caetano, Michelle Cavalcante; Ortiz, Thaís Tobaruela Ortiz; Silva, Simone Guerra Lopes da; Souza, Fabíola Isabel Suano de; Sarni, Roseli Oselka Saccardo (2010). Complementary feeding: inappropriate practices in infants. *Jornal de Pediatria*, *0*(0). https://doi.org/10.2223/jped.1994 [Link]

Belachew Etana; Wakgari Deressa (2012). Factors associated with complete immunization coverage in children aged 12–23 months in Ambo Woreda, Central Ethiopia. *BMC Public Health*, *12*(1), 566-566. https://doi.org/10.1186/1471-2458-12-566 [Link]

Pauline E. Osamor; Christine Grady (2016). Women's autonomy in health care decision-making in developing countries: a synthesis of the literature. *International Journal of Women s Health*, *8*, 191-191. https://doi.org/10.2147/ijwh.s105483 [Link]

Lwin Mar Hlaing; Umi Fahmida; Min Kyaw Htet; Budi Utomo; Agus Firmansyah; Elaine Ferguson (2015). Local food-based complementary feeding recommendations developed by the linear programming approach to improve the intake of problem nutrients among 12–23-month-old Myanmar children. *British Journal Of Nutrition*, *116*(S1), S16-S26. https://doi.org/10.1017/s000711451500481x [Link]

Johan Rockström; John Williams; Gretchen C. Daily; Andrew Noble; Nathanial Matthews; Line Gordon; Hanna Wetterstrand; Fabrice DeClerck; Mihir Shah; Pasquale Steduto; Charlotte de Fraiture; N. Hatibu; Olcay Ünver; Jeremy Bird; Lindiwe Majele Sibanda; Jimmy W. Smith (2016). Sustainable intensification of agriculture for human prosperity and global sustainability. *AMBIO*, *46*(1), 4-17. https://doi.org/10.1007/s13280-016-0793-6 [Link]

Gewa, Constance; Chepkemboi, Joan (2015). Psychosocial Determinants of Exclusive Breast-Feeding in Rural Kenya. *The FASEB Journal*, *29*(S1). https://doi.org/10.1096/fasebj.29.1_supplement.898.38 [Link]

Unknown Author (2009). Maternal mortality and morbidity. *Reproductive Health Matters*, *17*(33), 210-213. https://doi.org/10.1016/s0968-8080(09)33451-5 [Link]

Eelke Boerema; Charles C. Chapman; Cecile Kusters (2021). FNS-REPRO South Sudan key findings report : Key findings emerging from the FNS-REPRO generated studies and other sources as input for the sensemaking events and adaptive programming. https://doi.org/10.18174/551848 [Link]

Forsyth, J. S. (2010). International code of marketing of breast-milk substitutes--three decades later time for hostilities to be replaced by effective national and international governance. *Archives of Disease in Childhood*, *95*(10), 769-770. https://doi.org/10.1136/adc.2010.187294 [Link]

Agumasie Semahegn; Gezahegn Tesfaye; Alemayehu Bogale (2014). Complementary feeding practice of mothers and associated factors in Hiwot Fana Specialized Hospital, Eastern Ethiopia. *Pan African Medical Journal*, *18*, 143-143. https://doi.org/10.11604/pamj.2014.18.143.3496 [Link]

Jones, Gareth; Steketee, Richard W; Black, Robert E; Bhutta, Zulfiqar A; Morris, Saul S (2003). How many child deaths can we prevent this year?. *The Lancet*, *362*(9377), 65-71. https://doi.org/10.1016/s0140-6736(03)13811-1 [Link]

Kimani-Murage, Elizabeth W; Madise, Nyovani J; Fotso, Jean-Christophe; Kyobutungi, Catherine; Mutua, Martin K; Gitau, Tabither M; Yatich, Nelly (2011). Patterns and determinants of breastfeeding and complementary feeding practices in urban informal settlements, Nairobi Kenya. *BMC Public Health*, *11*(1). https://doi.org/10.1186/1471-2458-11-396 [Link]

Kumar, Dinesh; Goel, N. K.; Mittal, Poonam C.; Misra, Purnima (2006). Influence of infant-feeding practices on nutritional status of under-five children. *The Indian Journal of Pediatrics*, *73*(5), 417-421. https://doi.org/10.1007/bf02758565 [Link]

Sanlier, Nevin; Unusan, Nurhan (2009). Infant feeding practices in Central Anatolia, Turkey. *Early Child Development and Care*, *179*(1), 17-25. https://doi.org/10.1080/03004430600870389 [Link]

Reynaldo Martorell; Amanda Zongrone (2012). Intergenerational Influences on Child Growth and Undernutrition. *Paediatric and Perinatal Epidemiology*, *26*(s1), 302-314. https://doi.org/10.1111/j.1365-3016.2012.01298.x [Link]

Jeffrey D. Sachs; John W. McArthur; Guido Schmidt-Traub; Margaret E. Kruk; Chandrika Bahadur; Michael Faye; Gordon C. McCord (2004). Ending Africa's Poverty Trap. *Brookings Papers on Economic Activity*, *2004*(1), 117-240. https://doi.org/10.1353/eca.2004.0018 [Link]

Brian W. Pence; Carolyn Vogel; M Formerly; Dale Huntington; Annette Okai; M Gachara; D Bakouan; P Sebgo; I Askew; Y Ouedraogo; P Tapsoba; C Viadro; S Kanon; I Askew; B Mensch; A Adewuji; L Jolly; J Gribble; S Pariani; D Heer; M Van Arsdol; S Sinding; J Ross; A Rosenfield; I Askew; B Mensch; A Adewuji; I Askew; K Miller; B Mensch; L Brown; M Tyane; J Bertrand; D Lauro; M Abououakil; L Demaria; J Bruce; N Diop; A Cerulli; D Sanogo; A Fisher; A Fisher; K Miller; R Miller; K Hardee; B Janowitz; J Stanback; M Villinski; D Huntington; B Mensch; N Toubia; D Huntington; B Mensch; V Miller; A Jain; D Measham; K Stein; B Winikoff; B Mensch; M Arends-Kuenning; A Jain; R Miller; R Frerichs; R Miller; K Miller; L Ndhlovu; J Solo; O Achola; K Stein; I Tour; N Diop; A Diallo; D Sanogo; J Valadez; R Transgrud; M Mbugua; T Smith; J Bertrand; K Hardee; R Magnani; M Angle; J Bruce; S Haddad; P Fournier; A Jain; J Bruce; B Mensch; R Oliver; V Tsui; J Veney; R Magnani; P Gorbach; M Barberis; P Harvey; J Becker; E Leitman; M Fathalla; J Bertrand; R Magnani; J Knowles (1998). Clinic-Based Family Planning and Reproductive Health Services in Africa: Findings from Situation Analysis Studies. https://doi.org/10.31899/rh1998.1000 [Link]

Mokori, A.; Orikushaba, P. (2012). Nutritional status, complementary feeding practices and feasible strategies to promote nutrition in returnee children aged 6–23 months in northern Uganda. *South African Journal of Clinical Nutrition*, *25*(4), 173-179. https://doi.org/10.1080/16070658.2012.11734424 [Link]

Mututho, Leah N.; Kiboi, Willy K.; Mucheru, Patrick K. (2017). Factors associated with exclusive breastfeeding in Kenya: a systematic review. *International Journal Of Community Medicine And Public Health*, *4*(12), 4358. https://doi.org/10.18203/2394-6040.ijcmph20175305 [Link]

Lale Say; Doris Chou; Alison Gemmill; Özge Tunçalp; Ann-Beth Moller; Jane Daniels; A Metin Gülmezoglu; Marleen Temmerman; Leontine Alkema (2014). Global causes of maternal death: a WHO systematic analysis. *The Lancet Global Health*, *2*(6), e323-e333. https://doi.org/10.1016/s2214-109x(14)70227-x [Link]

Ogunlesi, Tinuade A. (2009). Maternal Socio-Demographic Factors Influencing the Initiation and Exclusivity of Breastfeeding in a Nigerian Semi-Urban Setting. *Maternal and Child Health Journal*, *14*(3), 459-465. https://doi.org/10.1007/s10995-008-0440-3 [Link]

Roberts, B; Ocaka, K Felix; Browne, J; Oyok, T; Sondorp, E (2008). Factors associated with the health status of internally displaced persons in northern Uganda. *Journal of Epidemiology and Community Health*, *63*(3), 227-232. https://doi.org/10.1136/jech.2008.076356 [Link]

Muyinda, Herbert; Kengeya, Jane; Pool, Robert; Whitworth, James (2001). Traditional sex counselling and STI/HIV prevention among young women in rural Uganda. *Culture, Health & Sexuality*, *3*(3), 353-361. https://doi.org/10.1080/13691050152484768 [Link]

Asemahagn, Mulusew Andualem (2016). Determinants of exclusive breastfeeding practices among mothers in azezo district, northwest Ethiopia. *International Breastfeeding Journal*, *11*(1). https://doi.org/10.1186/s13006-016-0081-x [Link]

Corinna Hawkes (2005). The role of foreign direct investment in the nutrition transition. *Public Health Nutrition*, *8*(4), 357-365. https://doi.org/10.1079/phn2004706 [Link]

Suzuki, Toru (2019). Population of Premodern Eastern Asia. *SpringerBriefs in Population Studies*, 9-22. https://doi.org/10.1007/978-981-13-3230-2_2 [Link]

Darren J. Shaw (2005). Dimensions of Poverty: Status and Solutions Towards the Millennium Development Goals. *Development Policy Review*, *23*(4), 499-523. https://doi.org/10.1111/j.1467-7679.2005.00300.x [Link]

Elizabeth Kimani-Murage; Nyovani Madise; Jean-Christophe Fotso; Catherine Kyobutungi; Martin Kavao Mutua; Tabither Gitau; Nelly Yatich (2011). Patterns and determinants of breastfeeding and complementary feeding practices in urban informal settlements, Nairobi Kenya. *BMC Public Health*, *11*(1), 396-396. https://doi.org/10.1186/1471-2458-11-396 [Link]

Dileep Mavalankar; Shuby Puthussery; Kavitha Menon; Ritu Rana; Janine Bhandol; Sabuj Kanti Mistry; Anal Ravalia; Pei-Ching Tseng (2016). EFFECTIVENESS OF NUTRITION INTERVENTIONS IN LOW AND MIDDLEINCOME COUNTRIES: AN EVIDENCE SUMMARY. *University of Bedfordshire Repository (University of Bedfordshire)*. https://doi.org/10.13140/rg.2.2.10114.27848 [Link]

Alison McFadden; Anna Gavine; Mary J. Renfrew; Angela Wade; Phyll Buchanan; Jane Taylor; Emma Veitch; Anne Marie Rennie; Susan Crowther; Sara Neiman; Stephen MacGillivray (2017). Support for healthy breastfeeding mothers with healthy term babies. *Cochrane Database of Systematic Reviews*, *2017*(2). https://doi.org/10.1002/14651858.cd001141.pub5 [Link]

Hamid El Bilali; C. Callenius; Carola Strassner; Lorenz Probst (2018). Food and nutrition security and sustainability transitions in food systems. *Food and Energy Security*, *8*(2). https://doi.org/10.1002/fes3.154 [Link]

Unknown Author (2017). The Associated Factors Hampering Mothers towards Exclusive Breastfeeding EBF through Knowledge, Attitude and Practice (KAP) Studies at Al-Sabah Children Hospital /Juba -South Sudan. *Journal of Community Medicine & Public Health*, *1*(1). https://doi.org/10.29011/2577-2228.100001 [Link]

Unknown Author (1998). Survey sampling methods. *Sampling and Statistical Methods for Behavioral Ecologists*, 85-147. https://doi.org/10.1017/cbo9780511612572.005 [Link]

Swinburn Ba; I D Caterson; Jacob C. Seidell; James WPT (2004). Diet, nutrition and the prevention of excess weight gain and obesity. *Public Health Nutrition*, *7*(1a), 123-146. https://doi.org/10.1079/phn2003585 [Link]

John R. Perfect; William E. Dismukes; Françoise Dromer; David L. Goldman; John R. Graybill; Richard J. Hamill; Thomas S. Harrison; Robert A. Larsen; Olivier Lortholary; Minh-Hong Nguyen; Peter G. Pappas; William G. Powderly; Nina Singh; Jack D. Sobel; Tania C. Sorrell (2010). Clinical Practice Guidelines for the Management of Cryptococcal Disease: 2010 Update by the Infectious Diseases Society of America. *Clinical Infectious Diseases*, *50*(3), 291-322. https://doi.org/10.1086/649858 [Link]

Corinna Hawkes; Sandro Demaio; Francesco Branca (2017). Double-duty actions for ending malnutrition within a decade. *The Lancet Global Health*, *5*(8), e745-e746. https://doi.org/10.1016/s2214-109x(17)30204-8 [Link]

Tamara Brown; Theresa HM Moore; Lee Hooper; Yang Gao; Amir Zayegh; Sharea Ijaz; Martha Elwenspoek; Sophie C Foxen; Lucia Magee; Claire O'Malley; Elizabeth Waters; Carolyn Summerbell (2019). Interventions for preventing obesity in children. *Cochrane Database of Systematic Reviews*, *2025*(8), CD001871-CD001871. https://doi.org/10.1002/14651858.cd001871.pub4 [Link]

Ian Darnton-Hill; Chizuru Nishida; WPT James (2004). A life course approach to diet, nutrition and the prevention of chronic diseases. *Public Health Nutrition*, *7*(1a), 101-121. https://doi.org/10.1079/phn2003584 [Link]

Elizabeth Kimani-Murage; Kathleen Kahn; John M. Pettifor; Stephen Tollman; David B. Dunger; F. Xavier Gómez-Olivé; Shane A. Norris (2010). The prevalence of stunting, overweight and obesity, and metabolic disease risk in rural South African children. *BMC Public Health*, *10*(1), 158-158. https://doi.org/10.1186/1471-2458-10-158 [Link]

Bekere, Abebe (2014). Exclusive Breastfeeding Practices of HIV Positive mothers and its Determinants in Selected Health Institution of West Oromia, Ethiopia. *Journal of Nutrition & Food Sciences*, *04*(06). https://doi.org/10.4172/2155-9600.1000319 [Link]

SANGWA, Sixbert (2025). Reimagining Public Health Education in Africa: Strategic Value of an Online Master of Public Health in Key African Markets. https://doi.org/10.2139/ssrn.5297228 [Link]