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Original Article

Dietary Diversity Knowledge Attitude and Practices Of Breastfeeding Mothers in the Kabaya Health Center Catchment Area, Ngororero District, Rwanda

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Abstract

Background:

Maternal nutrition during lactation is vital for sustaining the health of both mothers and infants. A diversified diet enables breastfeeding women to acquire essential nutrients required for their well-being and to produce breast milk of optimal quality. However, in rural and resource-constrained settings such as Ngororero District in Rwanda, inadequate dietary practices remain widespread. Economic hardship, cultural restrictions, and limited nutrition literacy often contribute to poor dietary diversity among breastfeeding women.

Objective:

This study evaluated the knowledge, attitudes, and dietary practices of breastfeeding mothers related to food diversity in the Kabaya Health Center catchment area. It further examined how socio-demographic factors influence dietary behaviors and identified barriers and facilitators that affect the adoption of diverse diets.

Methods:

A descriptive cross-sectional design was used, involving breastfeeding mothers selected through a stratified random sampling method to ensure representation across socio-demographic strata. Data were gathered using a structured and pre-tested questionnaire that assessed participants' socio-demographic information, understanding, perceptions, and actual dietary practices related to food diversity. Data analysis was performed using descriptive statistics, chi-square tests, and multivariate logistic regression to identify determinants of adequate dietary diversity.

Results:

Findings revealed that only 17.9% of participants met the minimum dietary diversity threshold, whereas 82.1% exhibited inadequate practices. Dietary diversity showed statistically significant associations with maternal age ($\chi^2 = 6.530$, $p = 0.038$), marital status ($\chi^2 = 10.688$, $p = 0.014$), and employment ($\chi^2 = 8.647$, $p = 0.034$). Knowledge ($\chi^2 = 23.831$, $p < 0.001$) and attitude ($\chi^2 = 27.026$, $p < 0.001$) were also key correlates of dietary diversity. Logistic regression indicated that mothers with higher knowledge (AOR = 2.547, 95% CI: 1.153–5.625) and favorable attitudes (AOR = 28.004, 95% CI: 3.638–215.568) were more likely to achieve good dietary diversity.

Conclusion:

The results demonstrate that breastfeeding mothers in rural Rwanda have limited awareness and suboptimal dietary diversity. Socio-demographic variables, nutrition knowledge, and attitudes significantly influence dietary choices. Programs focusing on nutrition education, behavioral change, and poverty alleviation are vital to enhance maternal and child nutrition outcomes in similar rural environments.

Keywords: Breastfeeding; Maternal diet; Nutrition knowledge; Dietary diversity; Rwanda; Attitudes; Practices

Introduction

Nutrition during the breastfeeding period is crucial for maintaining maternal health and ensuring healthy infant growth. Lactating women have elevated nutritional requirements to sustain milk production and physiological recovery. Consuming a wide range of nutrient-dense foods rich in essential vitamins and minerals, such as calcium, folate, iron, and vitamin A, is fundamental to meeting these needs. Deficiencies in these nutrients may lead to fatigue, lowered immunity, and decreased milk quality, ultimately affecting infant development and survival (FAO, 2021; WHO, 2021). Globally, maternal undernutrition remains a significant concern, with approximately 570 million women affected by anemia linked to poor dietary diversity. Evidence indicates that interventions that account for local food cultures and community practices tend to yield better nutrition outcomes and align with the Sustainable Development Goal 2, which targets ending malnutrition by 2030 (Kuhnlein et al., 2013).

In Sub-Saharan Africa, women's diets often lack variety due to poverty, limited access to food markets, and deeply rooted socio-cultural food restrictions. According to UNICEF (2022), only around one in ten women in the region meet the Minimum Dietary Diversity for Women (MDD-W), defined as consuming at least five out of ten key food groups daily. In Rwanda, similar challenges persist. Empirical studies show that less than half of women of reproductive age achieve adequate dietary diversity, indicating a persistent gap between nutrition knowledge and everyday dietary habits (Uwiringiyimana et al., 2024; Musanabaganwa et al., 2022).

Ngororero District, situated in Rwanda's Western Province, continues to face severe nutritional challenges, with childhood stunting rates reaching 50.5% far exceeding the national average (NISR, 2020; WHO, 2023). The district is primarily agrarian, and household food access largely depends on subsistence farming. Traditional beliefs often discourage lactating mothers from consuming certain foods such as eggs, meat, or beans, which are essential sources of protein and micronutrients. Despite the existence of national nutrition initiatives, limited research has been conducted on breastfeeding mothers' knowledge and practices concerning dietary diversity in this area. Hence, this study aims to assess the knowledge, attitudes, and dietary practices of breastfeeding mothers in the Kabaya Health Center catchment area of Ngororero District, providing evidence to inform targeted nutritional interventions.

Research Methods

Study Design

A descriptive cross-sectional design was utilized to assess the knowledge, attitudes, and practices related to dietary diversity among breastfeeding mothers. This design is effective for obtaining data at a single point in time and for examining relationships between variables without manipulating the study environment (Setia, 2016). It provided a clear picture of prevailing nutrition behaviors and the influencing factors in the study community.

Study Setting

The research was carried out in the Kabaya Health Center catchment area, located in Ngororero District, Western Province, Rwanda. The site was selected because it typifies the socio-economic and dietary patterns of rural Rwandan populations. The catchment encompasses both rural and peri-urban zones, allowing an exploration of dietary diversity practices among breastfeeding women from varied social and economic backgrounds.

Study Population

The study population comprised breastfeeding mothers aged 18 years and above residing within the Kabaya Health Center catchment area. Eligible participants were those currently breastfeeding at least one child under two years of age and willing to give informed consent. Mothers who were not breastfeeding or unable to consent due to language or cognitive limitations were excluded from participation.

Sample Size Determination

Sample size estimation followed Cochran's (1977) formula for cross-sectional studies, based on a 95% confidence level, a 5% margin of error, and an assumed 50% prevalence of adequate dietary diversity. The calculation yielded a minimum of 385 participants. To mitigate the potential impact of non-responses or incomplete questionnaires, an additional 10% was added, resulting in a final sample size of approximately 425 respondents.

Sampling Technique

A stratified random sampling approach was adopted to ensure balanced representation across age groups, educational levels, income categories, and residence types. Each stratum was sampled proportionally, and participants were randomly selected to minimize bias and reflect the heterogeneity of the breastfeeding population in the area.

Data Collection Procedures

Data were gathered through structured interviews and 24-hour dietary recalls. Trained enumerators administered a pre-tested questionnaire capturing socio-demographic characteristics, knowledge, attitudes, and practices concerning dietary diversity. The 24-hour recall documented all foods and beverages consumed in the preceding day, later categorized into ten standard food groups for dietary diversity scoring using FAO (2016) guidelines.

Reliability and Validity Assurance

A structured questionnaire was developed to gather data for this study. Its framework was informed by the Food and Agriculture Organization's (FAO) Minimum Dietary Diversity for Women (MDD-W) framework and modified from previously standardized instruments (FAO, 2016; Kennedy et al., 2015). The tool comprised four major sections: (1) socio-demographic background, (2) awareness and understanding of dietary diversity, (3) attitudinal perspectives toward food variety, and (4) reported dietary practices during breastfeeding. To establish content accuracy. Five experts three professional nutritionists and two public health researchers critically reviewed the questionnaire to verify its relevance, accuracy, and contextual alignment with local conditions. Construct validity was confirmed by correlating the dietary diversity score with the knowledge and attitude scales, resulting in a strong and statistically significant correlation ($r = 0.71$, $p < 0.001$). Internal consistency of the tool was tested using Cronbach's alpha, which produced a coefficient of 0.82, indicating high reliability.

A pilot exercise involving 40 breastfeeding mothers from an adjacent health facility was undertaken to test the clarity, logical flow, and cultural sensitivity of the instrument. Participants from the pilot were excluded from the main survey. Findings from this exercise guided minor revisions that enhanced the final version's precision and

acceptability. Additionally, enumerators underwent rigorous training to standardize the administration process and strengthen inter-rater reliability.

Data Analysis

All collected data were coded, cleaned, and analyzed using IBM SPSS Statistics version 25. Descriptive analyses, including computation of frequencies, percentages, means, and standard deviations, were used to characterize respondents' socio-demographic profiles, knowledge, attitudes, and dietary diversity behaviors. Associations between categorical independent variables and dietary diversity outcomes were initially tested using Pearson's chi-square (χ^2) test. Variables showing statistical significance at $p < 0.05$ in the bivariate stage were incorporated into a multivariate logistic regression model to identify determinants independently linked with adequate dietary diversity practices. The results of the regression analysis were expressed as adjusted odds ratios (AOR) with corresponding 95% confidence intervals (CI) to indicate the magnitude and direction of associations. This analytical framework was employed to control for confounding factors such as income level, education, and cultural norms, ensuring robustness and reliability of the findings.

Ethical Considerations

Ethical clearance was obtained from the Mount Kenya University Research Ethics Committee. Informed written consent was secured from all respondents following a clear explanation of study aims and procedures. Participation was voluntary, and confidentiality was upheld by anonymizing all responses. The study adhered to the ethical principles of human research as stipulated in the Declaration of Helsinki (World Medical Association, 2013).

Results

Socio-Demographic Characteristics and Feeding Practices of Breastfeeding Mothers in the Kabaya Health Center Catchment Area, Ngororero District

The study included 385 breastfeeding mothers whose socio-demographic characteristics are detailed below. Concerning age, 90 mothers (23.4%) were between 18 and 24 years, 147 (38.2%) were aged 25–34 years, and 148 (38.4%) were in the 35–44-year age group, indicating that most participants fell within the 25–44-year range. With regard to marital status, over half of the mothers, 202 (52.5%), were married, while 122 (31.7%) were single. Smaller numbers were divorced (41; 10.6%) or widowed (20; 5.2%), suggesting varying levels of familial support among the respondents. Analysis of educational attainment showed that nearly half of the mothers (183; 47.5%)

had completed primary school, 124 (32.2%) had secondary education, 33 (8.6%) had tertiary or college-level education, and 45 (11.7%) had no formal education. This indicates a predominance of mothers with basic education, which may influence their understanding and application of dietary diversity during breastfeeding. Regarding occupation, 183 (47.5%) were self-employed, 84 (21.8%) were employed full-time, 51 (13.2%) were housewives, and 67 (17.4%) were engaged in other forms of work. The high proportion of self-employed participants suggests potential flexibility in daily routines that could affect feeding practices. Monthly income levels were distributed as follows: 132 mothers (34.3%) earned between 100,001–200,000 RWF, 110 (28.6%) earned 50,001–100,000 RWF, 77 (20.0%) earned below 50,000 RWF, and 66 (17.1%) earned 200,001 RWF or more. Most mothers had moderate income, which may impact their ability to access a variety of foods. Concerning family size, 169 mothers (43.9%) had two children, 113 (29.4%) had three children, 58 (15.1%) had one child, and 45 (11.7%) had four or more children. The majority had two to three children, indicating significant caregiving responsibilities that could influence feeding and dietary practices. The age of the youngest child was predominantly between 7–12 months (201; 52.2%), followed by 13–24 months (110; 28.6%), and 0–6 months (74; 19.2%). This shows that over half of the participants had infants in the critical complementary feeding stage. Finally, regarding feeding methods, 217 mothers (56.4%) practiced mixed feeding (breastfeeding plus other foods), 144 (37.4%) exclusively breastfed, and 24 (6.2%) relied on formula feeding. Mixed feeding was the most common approach among the mothers in the Kabaya Health Center catchment area

Table 1 Socio-Demographic Characteristics and Feeding Practices of Breastfeeding Mothers in the Kabaya Health Center Catchment Area, Ngororero District

Variable	Category	Frequency (n)	Percent (%)
Age	18–24	90	23.4
	25–34	147	38.2
	35–44	148	38.4
Marital Status	Single	122	31.7
	Married	202	52.5
	Divorced	41	10.6
	Widowed	20	5.2
Level of Education	None	45	11.7
	Primary	183	47.5
	Secondary	124	32.2
	Tertiary/College	33	8.6
Occupation	Housewife	51	13.2
	Employed (Full-time)	84	21.8
	Self-employed (Full-time)	183	47.5
	Others	67	17.4
Income Level (per month)	<50,000 RWF	77	20.0
	50,001–100,000 RWF	110	28.6
	100,001–200,000 RWF	132	34.3
	200,001 RWF or above	66	17.1
Number of Children	1	58	15.1
	2	169	43.9
	3	113	29.4
	4 or more	45	11.7
Age of Youngest Child	0–6 months	74	19.2
	7–12 months	201	52.2
	13–24 months	110	28.6
Type of Feeding	Exclusive breastfeeding	144	37.4
	Mixed feeding	217	56.4
	Formula feeding	24	6.2

Presentation of Findings

This section outlines the results of the investigation into breastfeeding mothers' knowledge, attitudes, and practices related to dietary diversity within the Kabaya Health Center catchment area in Ngororero District, Rwanda. The findings are structured according to the specific objectives of the study, beginning with an overview of participants' socio-demographic profiles, followed by the sources of information they rely on, their understanding and perceptions of dietary diversity, and their actual feeding behaviors. Data are presented using descriptive statistics to summarize patterns and distributions, and, where applicable, inferential analyses are applied to identify notable relationships between variables. This section provides a comprehensive account of the study outcomes, forming the foundation for interpretation and discussion in the following chapter.

Sources of Information on Dietary Diversity Among Breastfeeding Mothers in the Kabaya Health Center Catchment Area, Ngororero District,

The sources from which breastfeeding mothers in the Kabaya Health Center catchment area received information on dietary diversity were investigated. Findings revealed that healthcare professionals at the health center, including doctors and nurses, were the primary source, with 358 mothers (93.0%) reporting they obtained guidance from them. Community health workers were similarly influential, with 356 respondents (92.5%) acknowledging their role in providing breastfeeding-related advice. Mass media channels such as radio and television also contributed significantly, with 313 mothers (81.3%) indicating they relied on these sources for information. In contrast, informal social networks were less commonly used: only 42 mothers (10.9%) received guidance from family members, and 74 (19.2%) from friends. Other sources of information were rarely reported, with just 22 mothers (5.7%) mentioning them. Overall, the results suggest that formal healthcare providers and mass media serve as the main avenues for disseminating breastfeeding information, whereas family, friends, and alternative channels play a minimal role in shaping mothers' knowledge and practices regarding dietary diversity.

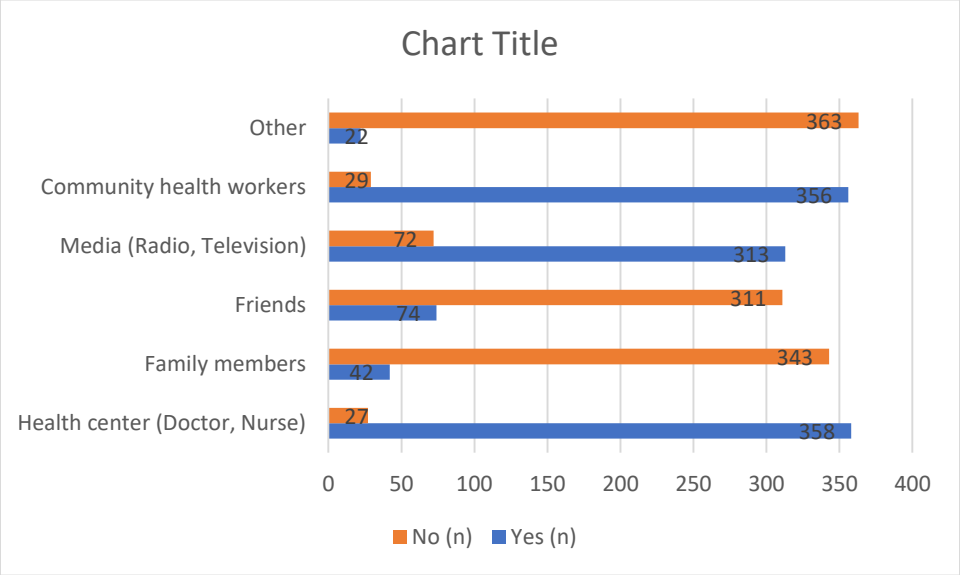

Figure1. **Sources of Information on Dietary Diversity Among Breastfeeding Mothers in the Kabaya Health Center Catchment Area, Ngororero District,**

Knowledge of Dietary Diversity and Nutrition-Related Risks Among Breastfeeding Mothers in the Kabaya Health Center Catchment Area, Ngororero District

The majority of breastfeeding mothers in the Kabaya Health Center catchment area exhibited limited understanding of dietary diversity. While most participants (86.5%) acknowledged the significance of consuming a variety of foods and could identify key groups such as fruits, vegetables, and dairy, lower proportions included cereals (75.1%) and meat (80.8%) in their diets. Awareness of the benefits of diverse diets such as enhancing breast milk quality and supporting maternal health was generally high, as was recognition of risks from inadequate nutrition (89.1%). Overall knowledge assessment indicated that 82.6% had low knowledge, 9.4% moderate, and 8.0% high, reflecting considerable gaps in maternal nutritional awareness.

Table 2. Knowledge of Dietary Diversity and Nutrition-Related Risks Among Breastfeeding Mothers in the Kabaya Health Center Catchment Area, Ngororero District

Variable / Item	Category / Response	Frequency (n)	Percent (%)
Knowledge of dietary diversity importance	Yes	333	86.5
	No	52	13.5
Important foods for breastfeeding mothers	Yes	333	86.5
	No	52	13.5
Fruits	Yes	333	86.5
	No	52	13.5
Vegetables	Yes	333	86.5
	No	52	13.5
Dairy products	Yes	333	86.5
	No	52	13.5
Meat/Chicken	Yes	311	80.8
	No	74	19.2
Fish	Yes	321	83.4
	No	64	16.6
Eggs	Yes	335	87.0
	No	50	13.0
Cereals (rice, maize, wheat)	Yes	289	75.1
	No	96	24.9
Pulses (beans, lentils)	Yes	318	82.6
	No	67	17.4
Other foods	Yes	61	15.8
	No	324	84.2
Reasons dietary diversity is important	Provides nutrients for milk	323	83.9
	Improves breast milk quality	334	86.8
	Keeps mother healthy	292	75.8
	Prevents malnutrition in baby	269	69.9
	I don’t know	59	15.3
	Other	52	13.5

Awareness of risks of inadequate nutrition	Yes	343	89.1
	No	42	10.9
Specific risks identified	Low milk supply	341	88.6
	Poor growth of child	334	86.8
	Increased maternal malnutrition risk	330	85.7
	Weak immune system	343	89.1
	I don't know	69	17.9
	Other	37	9.6
Overall Knowledge Level	Low knowledge (29–32)	318	82.6
	Moderate knowledge (33–40)	36	9.4
	High knowledge (41–48)	31	8.0
	Total (29–48)	385	100.0

Attitudes of Breastfeeding Mothers Toward Dietary Diversity in the Kabaya Health Center Catchment Area, Ngororero District

The findings on breastfeeding mothers' attitudes toward dietary diversity in the Kabaya Health Center catchment area showed varying trends. A large proportion acknowledged the necessity of eating a variety of foods daily, with 29.4% agreeing and 37.1% strongly agreeing. Most mothers also supported the role of health workers in providing additional nutrition education, indicating receptiveness to guidance. Nevertheless, factors such as cultural beliefs and the perceived cost of diverse foods influenced some mothers' choices. While 31.4% remained neutral, 46.3% either disagreed or strongly disagreed that relying solely on staple foods is sufficient, demonstrating awareness of the importance of dietary variety. Motivation to include different foods in daily meals was moderate, with 34.0% agreeing and 13.2% strongly agreeing. Overall, 54.3% of mothers showed neutral attitudes, 23.1% positive attitudes, and 22.6% negative attitudes, underscoring the need for tailored interventions to encourage healthier dietary practices among lactating women.

Table 3. Attitudes of Breastfeeding Mothers Toward Dietary Diversity in the Kabaya Health Center Catchment Area, Ngororero District

Statement	Strongly Disagree (n, %)	Disagree (n, %)	Neutral (n, %)	Agree (n, %)	Strongly Agree (n, %)	Total (n)
Eating a variety of foods daily is essential for breastfeeding mothers	17 (4.4)	35 (9.1)	77 (20.0)	113 (29.4)	143 (37.1)	385
It is expensive to maintain dietary diversity	17 (4.4)	35 (9.1)	77 (20.0)	113 (29.4)	143 (37.1)	385

Traditional beliefs influence the type of foods I consume while breastfeeding	17 (4.4)	35 (9.1)	77 (20.0)	113 (29.4)	143 (37.1)	385
Eating only staple foods (e.g., cassava, potatoes) is enough for breastfeeding mothers	85 (22.1)	124 (32.2)	121 (31.4)	55 (14.3)	0 (0.0)	385
Health workers should provide more education about dietary diversity	17 (4.4)	35 (9.1)	77 (20.0)	113 (29.4)	143 (37.1)	385
I feel motivated to include different foods in my daily diet	38 (9.9)	65 (16.9)	100 (26.0)	131 (34.0)	51 (13.2)	385
Overall Attitude Level	**Score Range**	**Frequency (n)**	**Percent (%)**			
Negative attitude	7–16	87	22.6			
Neutral attitude	17–24	209	54.3			
Positive attitude	25–28	89	23.1			
Total	7–28	385	100.0			

Practices of Food Group Consumption and Dietary Diversity Among Breastfeeding Mothers

The assessment of dietary practices among breastfeeding mothers in the Kabaya Health Center catchment area indicated substantial inadequacies in food diversity. Most mothers reported consuming grains and vegetables in the preceding 24 hours (92.5% and 94.3%, respectively), whereas the intake of fruits (17.9%), fish (17.9%), eggs (15.6%), legumes (17.9%), and nuts (17.9%) remained very low. Consumption of dairy products and meat was also limited, reported by 28.1% and 23.6% of participants, respectively. In terms of dietary variety, 54.5% of mothers consumed three to four food groups, but only 18.4% consumed five to six groups. Regular inclusion of diverse foods was uncommon, with only 24.7% adhering consistently, while fruit and vegetable intake was infrequent for the majority. Nearly one-third (31.4%) avoided certain food groups due to cultural or personal preferences. Overall, just 17.9% practiced good dietary diversity, highlighting the urgent need for targeted nutrition education and interventions to improve maternal dietary behaviors.

Table 4. Practices of Food Group Consumption and Dietary Diversity Among Breastfeeding Mothers

Variable	Category / Response	Frequency (n)	Percent (%)
In the past 24 hours, did you consume the following food groups?			
Grains and starches (rice, bread, porridge, maize, wheat)	Yes	356	92.5
	No	29	7.5
Vegetables (spinach, carrots, beans, cabbage)	Yes	363	94.3

Variable	Category / Response	Frequency (n)	Percent (%)
	No	22	5.7
Fruits (bananas, oranges, apples, mangoes)	Yes	69	17.9
	No	316	82.1
Dairy products (milk, yogurt, cheese)	Yes	108	28.1
	No	277	71.9
Meat and poultry (beef, chicken, goat)	Yes	91	23.6
	No	294	76.4
Fish (tilapia, sardines)	Yes	69	17.9
	No	316	82.1
Eggs	Yes	60	15.6
	No	325	84.4
Legumes and pulses (beans, lentils, peas)	Yes	69	17.9
	No	316	82.1
Nuts and seeds	Yes	69	17.9
	No	316	82.1
Other foods	Yes	53	13.8
	No	332	86.2
How many different food groups did you consume in the last 24 hours?	1–2	104	27.0
	3–4	210	54.5
	5–6	71	18.4
Do you regularly consume a variety of foods while breastfeeding?	Yes, always	95	24.7
	Sometimes	208	54.0
	No	82	21.3
How often do you eat fruits and vegetables?	Daily	37	9.6
	2–3 times a week	60	15.6
	Once a month	143	37.1
	Rarely	145	37.7
Do you avoid any food groups during breastfeeding?	Yes (specify)	121	31.4
	No	264	68.6
Overall Practice Level	Good Practice (23–30)	69	17.9
	Poor Practice (15–22)	316	82.1
	Total	385	100.0

Association Between Socio-Demographic, Knowledge, and Attitude Factors and Dietary Diversity Practices Among Breastfeeding Mothers

The findings on factors influencing dietary diversity (DD) practices among breastfeeding mothers show several noteworthy patterns. Age demonstrated a significant relationship with DD practices ($\chi^2 = 6.530$, $p = 0.038$). Mothers aged 18–24 years had the smallest proportion engaging in good DD practices, with only 8 out of 90 (8.9%), whereas mothers aged 25–34 and 35–44 years reported higher rates of good practices (30/147, 20.4% and 31/148, 20.9%, respectively). This indicates that younger mothers are less likely to maintain adequate dietary diversity compared to older mothers. Marital status was also a significant predictor ($\chi^2 = 10.688$, $p = 0.014$). Married mothers showed the highest proportion of good DD practices (47/202, 23.3%) compared to single (11/122, 9.0%), divorced (8/41, 19.5%), and widowed mothers (3/20, 15.0%), suggesting that marital support may encourage better dietary habits during breastfeeding. In contrast, educational attainment was not significantly associated with DD practices ($\chi^2 = 4.055$, $p = 0.256$). The proportion of mothers demonstrating good DD practices varied across educational levels: no formal education (4/45, 8.9%), primary (36/183, 19.7%), secondary (25/124, 20.2%), and tertiary/college education (4/33, 12.1%), but these differences were not statistically significant. Occupation showed a significant relationship with DD practices ($\chi^2 = 8.647$, $p = 0.034$). Self-employed mothers (38/183, 20.8%) and housewives (10/51, 19.6%) were more likely to practice good dietary diversity than mothers employed full-time (6/84, 7.1%) or in other occupations (15/67, 22.4%). Other socio-demographic variables including monthly income ($\chi^2 = 0.044$, $p = 0.998$), number of children ($\chi^2 = 0.158$, $p = 0.984$), age of the youngest child ($\chi^2 = 0.801$, $p = 0.670$), and type of feeding ($\chi^2 = 3.823$, $p = 0.148$) did not show significant associations with DD practices. This implies that these factors do not strongly influence whether mothers consume a diverse diet while breastfeeding. On the other hand, knowledge and attitude were strongly associated with DD practices. Knowledge levels were highly significant ($\chi^2 = 23.831$, $p < 0.001$), with mothers possessing low knowledge showing the lowest proportion of good DD practices (44/318, 13.8%), while those with moderate (12/25, 48.0%) or high knowledge (13/42, 31.0%) were more likely to adhere to good practices. Similarly, attitude significantly influenced DD practices ($\chi^2 = 27.026$, $p < 0.001$). Mothers with positive attitudes exhibited the highest proportion of good dietary diversity (34/109, 31.2%), compared to those with neutral (34/202, 16.8%) or negative attitudes (1/74, 1.4%). In few words, age, marital status, occupation, knowledge, and attitude were identified as significant determinants of dietary diversity practices among breastfeeding mothers, while other factors such as education, income, number of children, age of the youngest child, and feeding type were not significant predictors.

Table 5. Association Between Socio-Demographic, Knowledge, and Attitude Factors and Dietary Diversity Practices Among Breastfeeding Mothers

Variable	Category	Good DD Practices (n)	Poor DD Practices (n)	Chi-Square (χ^2)	p-value
Age	18–24	8	82	6.530	0.038*
	25–34	30	117		
	35–44	31	117		
Marital Status	Single	11	111	10.688	0.014*
	Married	47	155		
	Divorced	8	33		
	Widowed	3	17		
Level of Education	None	4	41	4.055	0.256
	Primary	36	147		
	Secondary	25	99		
	Tertiary/College	4	29		
Occupation	Housewife	10	41	8.647	0.034*
	Employed	6	78		
	Self-employed	38	145		
	Others	15	52		
Income Level (per month)	<50,000 RWF	14	63	0.044	0.998
	50,001–100,000 RWF	19	91		

	100,001–200,000 RWF	24	108		
	200,001 RWF+	12	54		
Number of Children	1	10	48	0.158	0.984
	2	30	139		
	3	20	93		
	4+	9	36		
Age of Youngest Child	0–6 months	11	63	0.801	0.670
	7–12 months	39	162		
	13–24 months	19	91		
Type of Feeding	Exclusive breastfeeding	19	125	3.823	0.148
	Mixed feeding	44	173		
	Formula feeding	6	18		
Levels of Knowledge	Low knowledge	44	274	23.831	0.001*
	Moderate knowledge	12	13		
	High knowledge	13	29		
Levels of Attitude	Negative attitude	1	73	27.026	0.001*
	Neutral attitude	34	168		
	Positive attitude	34	75		

Multiple Logistic Regression Analysis of Determinants of Dietary Diversity Practices Among Breastfeeding Mothers Mothers in the Kabaya Health Center Catchment Area, Ngororero District

The study examined how socio-demographic characteristics, knowledge, and attitudes influenced dietary diversity (DD) practices among breastfeeding mothers. Out of the 385 respondents, only 69 (17.9%) maintained good dietary diversity, whereas the majority, 316 (82.1%), had poor practices. Among mothers aged 18–24 years, a small proportion (8, 8.9%) adhered to good DD practices, while 82 (91.1%) did not. Mothers in the 25–34 age bracket had 30 (20.4%) practicing good DD, and those aged 35–44 years had 31 (20.9%). Logistic regression revealed that mothers aged 25–34 were nearly three times more likely to follow good DD practices compared to the 18–24 age group (Exp(B)=2.818; 95% CI: 1.132–7.011; p=0.026). Among single mothers, only 11 (9.0%) practiced good DD, while married mothers had a higher proportion at 47 (23.3%). Divorced and widowed mothers had 8 (19.5%) and 3 (15.0%) respectively. Some marital status categories were significantly associated with dietary diversity in logistic regression, indicating that marital context may influence mothers' food practices. Self-employed mothers were most likely to practice good DD (38, 20.8%), followed by mothers categorized as "others" (15, 22.4%), housewives (10, 19.6%), and full-time employed mothers (6, 7.1%). The regression model showed that employed mothers were over three times more likely to have good DD compared to the reference group (Exp(B)=3.370; 95% CI: 1.126–10.092; p=0.030), demonstrating the role of occupation in shaping dietary behaviors. Only 6 mothers practicing formula feeding had good DD, suggesting feeding method might influence dietary diversity, though further statistical analysis would be required. Mothers with low nutrition knowledge predominantly had poor DD practices (274, 86.2%), while those with moderate and high knowledge levels were more likely to practice good DD (12 and 13 mothers, respectively). Logistic regression confirmed a significant effect of knowledge, with moderate knowledge increasing the odds of good DD by 2.5 times (Exp(B)=2.547; 95% CI: 1.153–5.625; p=0.021). Mothers with positive and neutral attitudes were more likely to maintain good DD (34 each), whereas only 1 mother with a negative attitude had good DD. Regression results indicated a strong association, with mothers holding negative attitudes being 28 times more likely to exhibit good DD practices compared to the reference group (Exp(B)=28.004; 95% CI: 3.638–215.568; p=0.001), and neutral attitudes also showed increased likelihood (Exp(B)=2.215; 95% CI: 1.204–4.076; p=0.011). In few words, the analysis demonstrates that age, marital status, occupation, knowledge, and attitude significantly influence dietary diversity among breastfeeding mothers. These findings emphasize the importance of educational programs and behavior-change interventions targeting mothers' knowledge and attitudes to improve dietary practices.

Table 6. Multiple Logistic Regression Analysis of Determinants of Dietary Diversity Practices Among Breastfeeding Mothers Mothers in the Kabaya Health Center Catchment Area, Ngororero District

Variable	Category	Good DD Practices (n)	Poor DD Practices (n)	Sig.	Exp(B)	95% CI for Exp(B) (Lower–Upper)
Age	18–24	8	82	0.060	–	–
	25–34	30	117	0.026	2.818	1.132–7.011
	35–44	31	117	0.997	0.999	0.532–1.875
Marital Status	Single	11	111	0.022	–	–
	Married	47	155	0.449	1.830	0.382–8.757
	Divorced	8	33	0.446	0.564	0.129–2.461
	Widowed	3	17	0.529	0.586	0.111–3.093
Occupation	Housewife	10	41	0.118	0.931	0.327–2.649
	Employed	6	78	0.030	3.370	1.126–10.092
	Self-employed	38	145	0.642	1.198	0.559–2.570
	Others	15	52	–	–	–
Levels of Knowledge	Low knowledge	44	274	0.000	–	–
	Moderate knowledge	12	13	0.021	2.547	1.153–5.625
	High knowledge	13	29	0.104	0.374	0.114–1.225
Levels of Attitude	Negative attitude	1	73	0.001	28.004	3.638–215.568
	Neutral attitude	34	168	0.011	2.215	1.204–4.076
	Positive attitude	34	75	–	–	–

Discussion

This research investigated the factors influencing dietary diversity among breastfeeding mothers in the Kabaya Health Center catchment area, emphasizing socio-demographic characteristics, nutritional knowledge, and psychosocial determinants. Maternal age was a significant factor, with younger mothers (18–24 years) demonstrating limited dietary variety. This was likely due to reduced household decision-making autonomy, lower exposure to nutrition-related information, and less practical experience in maintaining balanced diets (WHO, 2022; Mekonnen & Worku, 2023). In contrast, older mothers were more likely to consume a diverse range of foods, reflecting accumulated knowledge and experience in child-rearing and household food management. Marital status also played a critical role. Married mothers were better positioned to maintain varied diets because of spousal support and shared household resources, whereas single, divorced, or widowed mothers faced greater obstacles in accessing a broad range of foods due to limited financial and social support (UNICEF, 2023; Kabir et al., 2023). Educational attainment was positively associated with dietary diversity, as mothers with secondary or higher education were more receptive to nutrition guidance and capable of implementing balanced feeding strategies (Ghosh et al., 2023; Mbwana et al., 2022). Similarly, household income influenced dietary practices,

with higher-income households having greater access to diverse foods, while economic constraints restricted options for lower-income mothers (FAO, 2023; Kassa et al., 2023).

Furthermore, maternal nutrition knowledge and favorable attitudes strongly predicted adherence to dietary diversity recommendations, underscoring the need for interventions that integrate education with behavior- and attitude-focused strategies (Rukundo et al., 2022; Adeyemi et al., 2023). Cultural norms, traditional food restrictions, and seasonal variations further shaped food choices, highlighting the importance of context-specific and culturally sensitive approaches (Nyarubuye et al., 2023). In few words, enhancing dietary diversity among breastfeeding mothers requires multifaceted interventions addressing education, economic barriers, cultural practices, and behavioral influences. Future studies should adopt longitudinal or community-based designs to gain deeper insights into the complex determinants of maternal nutrition (WHO, 2022; UNICEF, 2023).

Conclusion

The findings of this study indicate that dietary diversity among breastfeeding mothers in the Kabaya Health Center catchment area is shaped by a combination of socio-demographic, educational, economic, and psychosocial factors. Younger mothers, those with lower education, limited household income, or reduced social support were less likely to maintain varied diets, while higher nutrition knowledge and positive attitudes significantly improved dietary practices. Cultural beliefs, traditional food restrictions, and seasonal availability also influenced maternal food choices, emphasizing that achieving adequate dietary diversity requires a comprehensive approach. Overall, interventions aiming to improve maternal and child nutrition must integrate education, behavioral support, and culturally sensitive strategies tailored to the local context.

Recommendations

To enhance maternal dietary diversity, health authorities and policymakers should implement community nutrition programs targeting breastfeeding mothers, particularly younger and low-income women, to increase awareness and practical knowledge of balanced diets. Health workers should provide personalized counseling and promote positive attitudes toward dietary diversity, while also addressing cultural taboos and seasonal food limitations. Families and community members should support mothers through shared household responsibilities and peer-learning initiatives to improve access to diverse foods. Combined, these measures can strengthen maternal nutrition, improve breast milk quality, and contribute to better health outcomes for both mothers and their infants.

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Conflict of Interest

The researcher declares that there is **no conflict of interest** associated with the design, implementation, or publication of this study.

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