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Analysis of Factors Associated with Low Scores for Household Food Consumption and Diversity in the Yangambi City in the Democratic Republic of the Congo

Hervé Tshiosha Mutombo[1,2*], Joris Losimba Likwela[1], Alliance Tagoto Tepungipame[1]

[1]Department of Public Health, Faculty of Medicine and Pharmacy, University of Kisangani, Kisangani, Democratic Republic of the Congo
[2]Department of Nutrition, Water, and Health, Center for International Forestry Research-World Agroforestry (CIFOR-ICRAF), Kisangani, Democratic Republic of the Congo
Email: *herveabrahamtshiosha79@gmail.com

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Abstract

Introduction: Food and nutritional security remain major public health concerns worldwide. The DRC is among the countries most affected, despite its resource potential. In Tshopo Province, particularly in Yangambi, poverty and adverse socioeconomic conditions contribute to inadequate, undiversified diets, according to the 2023 IPC analysis. Although the relationship between these factors and dietary scores has been documented internationally and in some African countries, there are few studies that specifically explore the determinants of food consumption and dietary diversity in local contexts in the DRC. This study aimed to analyze the factors associated with low household dietary intake and diversity scores in the City of Yangambi, Democratic Republic of the Congo. **Methods**: The study was conducted in the City of Yangambi, located in Tshopo Province in the Democratic Republic of the Congo. It was a cross-sectional analytical study aimed at analyzing the factors associated with low dietary intake and dietary diversity scores among households in Yangambi. It was conducted between January and April 2026 among 614 households selected using two-stage probability cluster sampling. Data were collected using a structured questionnaire and analyzed using STATA software version 13. Factors associated with low dietary scores were assessed using multivariate logistic regression at a significance level of $p < 0.05$. **Results**: The majority of households in Yangambi had a borderline or poor food consumption score (71.5%) and an average dietary diversity score (75.4%). After adjustment using multivariate logistic regression, the age of the household

head, educational level, household size, average monthly household income, and the household's village of origin remained significantly associated with food consumption and diversity scores. Households headed by older, more educated heads of household with higher incomes, as well as smaller households, were more likely to have better dietary scores compared to other categories. **Conclusion**: This study shows that several sociodemographic and socioeconomic factors, including the age and educational level of the head of household, household size, average monthly household income, and village of origin, were associated with household food security scores in the city of Yangambi. These results underscore the need to focus multisectoral food security interventions on improving the socioeconomic and dietary conditions of households in rural areas of the Democratic Republic of the Congo.

Keywords

Food Security, Food Consumption Score, Household Dietary Diversity Score, Households, Yangambi, Democratic Republic of the Congo

1. Introduction

Food and nutritional security remain a major public health concern worldwide, particularly in the face of the current economic crisis and climate-related disruptions [1]-[3]. Despite the synergy among the food programs and policies discussed in the context of SDG 2, which aims to ensure food and nutritional security, a portion of the world's population still struggles to obtain sufficient and well-diversified food [4] [5].

Food insecurity is not merely a matter of insufficient food intake [6], but also due to poor-quality and undiversified diets [7] [8]. Limited dietary diversity and inadequate food intake are major determinants of malnutrition, particularly among vulnerable groups such as children under 5 and women of reproductive age, with a 45% increase in the risk of mortality and morbidity in 2011 and a 75% increase in 2019, especially among pregnant and breastfeeding women in developing countries [9]-[12]. Several indicators, including the Food Consumption Score (FCS) and the Household Dietary Diversity Score (HDDS), are used by various international organizations such as the WFP, the FAO, the WHO, and UNICEF [13].

In sub-Saharan Africa, many households continue to face food insecurity and a lack of dietary diversity [1] [14]-[16]. The DRC is among the hardest-hit countries, despite its resource potential. In 2023, the IPC assessment found that 40% of the population was vulnerable to chronic food and nutrition insecurity, including 25.1 million people facing moderate food insecurity and 15.7 million facing severe food insecurity [1] [17]. And in 2016, more than 55% of households had a food consumption score that was borderline or poor [18].

In Tshopo Province, particularly in Yangambi, poverty and difficult socioeconomic conditions contribute to inadequate and undiversified diets, according to

the 2023 CPI analysis [17]. These conditions directly affect the dietary habits of households, women, and children by leading to low food intake and limited dietary diversity. Several studies have shown that greater dietary diversity is associated with higher socioeconomic status, higher levels of household food security, and better living conditions for households [19]-[22].

Although the relationship between these factors and dietary scores has been documented internationally and in some African countries, there are almost no studies that specifically explore the factors determining food consumption and dietary diversity in local contexts within the DRC. Many studies are conducted in different contexts and do not take into account the specific local conditions of the DRC.

The same is true for Tshopo Province, particularly in the City of Yangambi, where socioeconomic conditions remain difficult, limiting households' access to a good, diverse, and high-quality diet. This results in low food consumption and diversity scores, with 55% of households having a borderline or poor FCS, and 80% of children aged 6 - 23 months who have never achieved their minimum dietary diversity [18] [23].

Few studies have thoroughly analyzed the determinants of dietary intake and diversity scores in the specific context of Yangambi. Knowledge and understanding of these factors are essential for guiding nutrition research, interventions, and public health policies appropriate to the local context. This study therefore aims to analyze the factors associated with low dietary intake and diversity scores among households in the city of Yangambi, in the Democratic Republic of the Congo.

2. Methods

Scope of the Study: The study was conducted in the City of Yangambi, located in Tshopo Province in the Democratic Republic of the Congo [24]. The city is primarily agricultural, and the population relies mainly on subsistence farming, livestock raising, fishing, and small-scale trade [25].

Study population: The study population consisted mainly of households in the Yangambi city.

Study Period: The study was conducted between January and April 2026.

Types of studies: This was a cross-sectional analytical study designed to examine the factors associated with low scores for dietary intake and dietary diversity among households in Yangambi.

Sampling: A two-stage probability cluster sampling method was used. The various accessible villages in the City of Yangambi, selected at random, were treated as clusters.

Sample size: The sample size was calculated using Cochran's formula, based on a prevalence of 41% for chronic food insecurity reported by the 2023 IPC in the DRC [17], a precision of 5%, and a 95% confidence interval. After accounting for a cluster effect of 1.5 and a nonresponse rate of 10%, the final sample size was 614

households. A two-stage cluster sampling method was used, with 31 clusters surveyed. Thirty clusters contained 20 households each, whereas the final cluster contained 14 households, yielding a total of 614 households.

Inclusion and exclusion criteria: The study included households selected from the Yangambi city whose heads had agreed to participate in the study. Households whose heads had not given their consent to participate in the study were excluded from the study.

Data Collection: Data were collected using a structured questionnaire that covered the sociodemographic, socioeconomic, environmental, and dietary characteristics of households.

Processing techniques and statistical analysis: The data were entered into Excel and analyzed using STATA version 13. Categorical variables were presented as frequencies and percentages, while quantitative variables were summarized as means ± standard deviations or medians with interquartile ranges. Associations between dependent and independent variables were assessed using Pearson's chi-square test, Student's t-test, ANOVA with Bonferroni correction, and binary logistic regression. The results were expressed as crude and adjusted odds ratios (OR) with their 95% confidence intervals. The threshold for statistical significance was set at $p < 0.05$. Variables associated with the outcomes in bivariate analyses were initially considered for inclusion in the multivariable logistic regression models. Preliminary models revealed collinearity and unstable estimates for some variables and catégories. Consequently, model refinement was performed by removing variables contributing to collinearity or generating excessively large odds ratios and wide confidence intervals. Multicollinearity among variables retained in the final models was assessed using variance inflation factors (VIF). The maximum VIF values were 2.84 and 2.75 for the household dietary diversity and food consumption models, respectively, indicating no evidence of problematic multicollinearity. For logistic regression analysis, the food consumption score (FCS) was dichotomized into acceptable (>35) and unacceptable (poor and borderline ≤ 35) categories according to the World Food Programme (WFP) classification. The household dietary diversity score (HDDS) was also dichotomized into high dietary diversity and low to moderate dietary diversity categories. Households with acceptable food consumption scores and high dietary diversity scores were considered as having favorable outcomes in the regression models.

Ethical considerations: The study was approved by the Ethics Committee of the Faculty of Medicine at the University of Kisangani. Administrative approvals were obtained from local authorities. Informed consent was obtained from participants before the start of data collection. The data were anonymized and treated confidentially. The authors declare that they have not conflict of interest.

3. Results

Sociodemographic, socioeconomic, environmental, and dietary characteristics of the households surveyed.

Table 1 presents the sociodemographic, socioeconomic, environmental, and dietary characteristics of the households surveyed. The average age of household heads is 40.70 ± 11.71 years, with the youngest being 18 years old and the oldest 71 years old. The 30 - 44 age group is the most represented, at 43.81%, and households are generally headed by men, at 88.27%. Half of the heads of households (50.00%) have a primary school education, and agriculture is the main occupation of half of the heads of households (50.2%). Most heads of households are predominantly monogamous (70.03%).

Table 1. Sociodemographic, socioeconomic, environmental, and dietary characteristics of the households surveyed.

Variables		N = 614	(%)
Sociodemographic characteristics of the households surveyed			
Age of head of household (year) Mean ± SD	40.7 ± 11.7 (18 - 71)		
	<29	117	19.06
	30 - 44	269	43.81
	45 - 59	183	29.80
	≥60	43	7.33
Gender of the head of household			
	Female	72	11.73
	Male	542	88.27
Educational level of the head of household			
	None	104	16.94
	Primary	307	50.00
	Secondary	172	28.01
	Higher	31	5.05
Marital status of the head of household			
	Monogamous	430	70.03
	Polygamous	111	18.08
	Separated	39	6.35
	Widowed	34	5.54
Age of Women (years) Median, P75, P25	32 (25 - 41)		
	<29	255	41.53
	30 - 44	249	40.55
	45 - 59	91	14.82
	≥60	19	2.09
A woman's physiological state	Pregnant	115	18.729
	Breastfeeding	184	29.967
	NPNL	315	51.302

Continued

Child's age under 5 years (P25-75 median)	29 (8 - 47)		
	6 - 11 Month	48	9.82
	12 - 23 Month	100	20.45
	24 - 59 Month	341	69.73
Household size	6118 ± 1665 (2 - 10)		
	≤4	154	25.08
	5 - 7	323	52.61
	≥8	137	22.31
Household status			
	Non native	215	35.02
	Native	399	64.98
Village of origin for households			
	Yalikombo	164	26.71
	Yaselia	142	23.13
	Lilanda	114	18.57
	Weko	70	11.40
	Yaekama	69	11.24
	Yalisombo	55	8.96
Socioeconomic characteristics of the households surveyed			
Occupation of the Head of Household			
	Agriculture	308	50.16
	Public sector employee	65	10.59
	Retailer	64	10.42
	Fishing	49	7.98
	Crafts	39	6.35
	Livestock farmer	31	5.05
	Hunting	28	4.56
	Forestry Operator	23	3.75
	Public sector retiree	7	1.14
Average monthly household income	75,000 [50,000 - 150,000] (30,000 - 350,000)		
	<75,000 FC	325	52.93
	76,000 - 200,000 FC	257	41.86
	>201,000 FC	32	5.21
Child contributing to the household income	No	261	42.51
	Yes	353	57.49

Continued

Main source of household income			
	Agricoles products	307	50.00
	Wage	65	10.59
	Products sales	64	10.42
	Fishing	49	7.98
	Handicrafts	39	6.35
	Livestock farming	32	5.21
	Hunting	28	4.56
	Foraging + Timber	23	3.75
	Donations	7	1.14
Changes in annual household income	Decrease	539	87.79
	Constant	63	10.26
	Increase	12	1.95
Estimated amount for food	40,000 [23,000 - 60,000] (10,000 - 130,000)		
	<20,000 FC	117	19.06
	20,000 - 50,000 FC	275	44.79
	>50,000 FC	222	36.16
Primary use of income	Direct food consumption	228	37.13
	Selling to buy food	146	23.78
	Basic living expenses	60	9.77
	Children's education	46	7.49
	Sales to purchase Hh goods	43	7.00
	Health and family care	43	7.00
	Sales to purchase clothing	36	5.86
	Debt repayment	12	1.95
Environmental characteristics of the households surveyed			
Access to drinking water	No	397	64.66
	Yes	217	35.34
Type of water supply source	River water	220	35.83
	Pump-fed well	217	35.34
	Unprotected well	103	16.78
	Locally protected well	74	12.05

Continued

Dietary characteristics of the households surveyed			
Food Consumption Score (FCS)	26.5[24.5 - 37.5] (20.5 - 59.5)		
	Poor (≤21)	36	5.86
	Borderline (21.5 - 35)	403	65.64
	Acceptable (>35)	175	28.50
Household Dietary Diversity Score (HHDS)	5 [5 - 6] (4 - 11)		
	Low	0	0.00
	Moderate	463	75.41
	High	151	24.59
Household Hunger Scale (HHS)	1 [0 - 3] (0 - 6)		
	Little or no hunger (0 - 1)	340	55.37
	Moderate hunger (2 - 3)	130	21.17
	Severe hunger (4 - 6)	144	23.45

Women had a median age of 32, with two age ranges extending from 25 to 41, and two dominant age groups: those under 29 (41.53%) and those aged 30 - 44 (40.55%). Regarding their physiological status, 30.1% were breastfeeding, and 18.72% were pregnant. The majority of children under 5 years of age were in the 24 - 59-month age group (69.73%), and half of the households had 5 - 7 members (52.61%), with an average household size of 6.1 ± 1.6 members, ranging from 2 to 10 people.

More than half of the households were indigenous (64.73%), and many of the surveyed households were from Yalikombo (26.71%) and Yaselia (23.13%). More than half of households had a monthly income of less than 75,000 Congolese francs (52.93%), with a median monthly income of 75,000 Congolese francs and a range of 50,000 to 150,000 Congolese francs. Half of children under 18 contributed (57.49%), while many households reported that their income had decreased compared to the previous year (87.79%).

Agriculture was the primary source of household income for half of households (50.00%) and some households spent less than 20,000 Congolese francs per month on food (19.06%), with a median monthly food expenditure of 40,000 Congolese francs and interquartile ranges of 23,000 to 60,000 Congolese francs. 37.13% of households used their income primarily for food consumption.

More than half of households did not have access to safe drinking water (64.66%); the primary sources of water used by households were river water (35.83%) and pump wells (35.34%). Many households (71.5%) had an unacceptable food consumption score, with a median score of 26.5, an interquartile range of 24.5 to 37.5, and extremes ranging from 20.5 to 59.5. Most households had a moderate dietary diversity score (75.41%), with a median score of 5, an interquar-

tile range of 5 to 6, and extremes ranging from 4 to 11 food groups, whereas 24.59% had a high dietary diversity score. The household hunger index showed that 23.45% of households experienced severe hunger and 21.17% experienced moderate hunger, with a median score of 1.

Multivariate Logistic Regression of Factors Associated with the Household Food Consumption Score

Table 2 presents the factors associated with the household food consumption score following a multivariate logistic regression. After adjustment, the age of the household head remained significantly associated with the household food consumption score (<0.001). Households headed by heads aged 30 - 44, 45 - 59, and over 60 were 27 times (ORa = 27.04; 95% CI = 9.74 - 75.08; $p < 0.001$), 46 times (ORa = 45.74; 95% CI = 14.13 - 148.03; $p < 0.001$), and 105 times (ORa = 104.63; 95% CI = 21.49 - 509.41; $p < 0.001$) more likely to have a good dietary intake score compared to households headed by heads of household under the age of 29.

Table 2. Factors associated with the household food consumption score (Multivariate logistic regression).

Variables	n (%)	Crude OR (IC95%)	p-Value	Adjusted OR (IC95%)	p-Value
Age of the head of household					
30 - 44	269 (43.81)	4.73 (2.28 - 9.81)	<0.001	27.04 (9.74 - 75.08)	<0.001
45 - 59	183 (43.81)	7.26 (3.46 - 15.27)	<0.001	45.74 (14.13 - 148.03)	<0.001
≥60	45 (7.33)	10.5 (4.28 - 25.76)	<0.001	104.63 (21.49 - 509.41)	<0.001
Level of education					
Elementary	307 (50.00)	1.56 (0.83 - 2.93)	0.165	1.12 (0.53 - 2.37)	0.774
Middle	172 (28.01)	4.41 (2.33 - 8.37)	<0.001	3.61 (1.64 - 7.94)	0.001
High	31 (5.05)	1		1	
A Woman's Physiological Condition					
Vulnerable (pregnant, breastfeeding)	299 (48.70)	0.65 (0.46 - 0.93)	0.018	0.84 (0.46 - 1.56)	0.585
Household size					
5 - 7	323 (52.61)	0.32 (0.21 - 0.49)	<0.001	0.07 (0.03 - 0.14)	<0.001
≥8	137 (22.31)	0.39 (0.23 - 0.64)	<0.001	0.04 (0.01 - 0.09)	<0.001
Village of origin					
Weko	70 (11.40)	0.35 (0.17 - 0.71)	0.004	0.24 (0.09 - 0.65)	0.005
Yaekama	69 (11.24)	0.23 (0.10 - 0.51)	<0.001	0.31 (0.11 - 0.82)	0.018
Yalikombo	164 (26.71)	0.82 (0.51 - 1.34)	0.422	0.74 (0.37 - 1.48)	0.395
Yalisombo	55 (8.96)	0.3 (0.13 - 0.67)	0.003	0.21 (0.06 - 0.69)	0.011
Yaselia	142 (23.13)	0.64 (0.38 - 1.08)	0.098	0.65 (0.31 - 1.34)	0.243
Average monthly household income					
76,000 - 200,000 FC	257 (41.86)	2.66 (1.80 - 3.92)	<0.001	2.71 (1.59 - 4.63)	<0.001
>201,000 FC	32 (5.21)	1		1	

Even after adjustment, educational level remained associated with the dietary intake score. Households headed by heads of household with a secondary education level were 4 times (ORa = 3.61; 95% CI = 1.64 - 7.94; p = 0.001) as likely to have a good dietary intake score compared to those without a secondary education. However, primary education remained non-significant after adjustment (p = 0.774), and the woman's physiological status also remained non-significantly associated with the dietary intake score (p = 0.585).

Household size and average monthly household income remained significantly associated with the household food consumption score (p < 0.005). Households with 5 to 7 members (ORa = 0.07; 95% CI = 0.03 - 0.14; p < 0.001) and those with more than 8 members (ORa = 0.04; 95% CI = 0.01 - 0.09; p < 0.001) were respectively less likely to have a good dietary intake score compared to households with fewer than 5 members.

Households with a monthly income of between 76,000 and 200,000 Congolese francs were three times more likely (ORa = 2.17; 95% CI = 1.59 - 4.63; p < 0.001) to have a good food consumption score, unlike households with an income of more than 201,000 Congolese francs.

Multivariate Logistic Regression of Factors Associated with the Household Food Diversity Score

Table 3 presents the factors associated with the household dietary diversity score following a multivariate logistic regression. The age of the head of household remains significantly associated with the household dietary diversity score after adjustment (<0.001).

Table 3. Factors associated with household dietary diversity scores (Multivariate logistic regression).

Variables	n (%)	Crude OR (IC95%)	p-Value	Adjusted OR (IC95%)	p-Value
Age of the head of household					
30 - 44	269 (43.81)	3.91 (1.50 - 10.19)	0.005	24.72 (7.57 - 80.70)	<0.001
45 - 59	183 (29.80)	19.86 (7.74 - 50.93)	<0.001	434.65 (102.10 - 1850.28)	<0.001
≥60	45 (7.33)	17.92 (6.14 - 52.33)	<0.001	611.65 (114.12 - 3278.26)	<0.001
Level of education					
Elementary	307 (50.00)	8.23 (2.93 - 23.11)	<0.001	9.84 (2.99 - 32.35)	<0.001
Middle	172 (28.01)	8.33 (2.89 - 23.99)	<0.001	10.51 (2.89 - 38.19)	<0.001
High	31 (5.05)	233.33 (49.30 - 1104)	<0.001	567.22 (80.92 - 3976.01)	<0.001
Household size					
5 - 7	323 (52.60)	0.24 (0.15 - 0.38)	<0.001	0.01 (0.01 - 0.04)	<0.001
≥8	137 (22.31)	0.77 (0.48 - 1.24)	0.287)	0.03 (0.01 - 0.08)	<0.001
Village origin					
Weko	70 (11.40)	0.07 (0.02 - 0.24)	<0.001	0.03 (0.01 - 0.15)	<0.001
Yaekama	69 (11.24)	0.11 (0.03 - 0.29)	<0.001	0.11 (0.03 - 0.38)	0.001

Continued

Yalikombo	164 (26.71)	0.78 (0.47 - 1.29)	0.331	0.70 (0.32 - 1.50)	0.362
Yalisombo	55 (8.96)	0.09 (0.03 - 0.31)	<0.001	0.03 (0.01 - 0.19)	<0.001
Yaselia	142 (23.13)	0.69 (0.41 - 1.16)	0.164)	0.69 (0.32 - 1.50)	0.351
Average monthly household income					
76,000 - 200,000 FC	257 (41.86)	0.81 (0.54 - 1.19)	0.266	0.38 (0.19 - 0.77)	0.01
>201,000 FC	32 (5.21)	8.23 (3.65 - 18.54)	<0.001	2.32 (0.81 - 6.77)	0.122

Thus, households headed by individuals aged 30 - 44, 45 - 59, and 60 or older are 25 times (ORa = 24.72; 95% CI = 7.57 - 80.70; $p < 0.001$), 435 times (ORa = 434.65; 95% CI = 102.10 - 1850.28; $p < 0.001$), and 612 times (ORa = 611.65; 95% CI = 114.12 - 3278.26; $p < 0.001$), respectively, compared to households headed by individuals under 29 years of age. The household head's educational level remained significantly associated with the household's diversity score after adjustment (<0.001); households whose heads were educated (primary, secondary, higher) were 10 times (ORa = 9.84; 95% CI = 2.99 - 32.35; $p < 0.001$), 11 times (ORa = 10.51; 95% CI = 2.89 - 38.19; $p < 0.001$), and 567 times (ORa = 567.22; 95% CI = 80.92 - 3976.01; $p < 0.001$) more likely to have a high dietary diversity score.

Household size remains significantly associated with the household dietary diversity score after adjustment (<0.001); specifically, households with 5 to 7 members (ORa = 0.01; 95% CI = 0.01 - 0.04; $p < 0.001$) and those with 8 or more members (ORa = 0.03; 95% CI = 0.01 - 0.08; $p < 0.001$) are less likely to have a high dietary diversity score compared to smaller households with fewer than 4 members.

The village (Weko, Yaekama, Yalisombo) was also significantly associated with the household dietary diversity score (<0.005); households in the villages of Weko (ORa = 0.03; 95% CI = 0.01 - 0.15; $p < 0.001$), Yaekama (ORa = 0.11; 95% CI = 0.03 - 0.38; $p < 0.005$), and Yalisombo (ORa = 0.03; 95% CI = 0.01 - 0.19; $p < 0.001$) had, respectively, a zero chance of achieving a high dietary diversity score compared to the village of Lilanda; however, the villages of Yalikombo ($p = 0.362$) and Yaselia ($p = 0.69$) did not, respectively, show a significant association after adjustment for household dietary diversity score.

Average monthly household income also remained a significant factor after adjustment (<0.05); households with incomes between 76,000 and 200,000 Congolese francs were less likely to achieve a high dietary diversity score (ORa = 0.38; 95% CI = 0.19 - 0.77) compared with households earning less than 75,000 congolese francs. However, households with a monthly income exceeding 201,000 Congolese francs showed no significant association with the dietary diversity score after adjustment ($p = 0.1$).

Households with incomes between 76,000 and 200,000 Congolese francs were less likely to achieve a high dietary diversity score compared with households

earning less than 75,000 Congolese francs.

4. Discussion

The objective of this study was to analyze the factors associated with low household food consumption and dietary diversity scores in the Yangambi city of the Democratic Republic of the Congo. The results show that many households had a borderline or poor food consumption score and also a low or moderate dietary diversity score. After adjustment using binary logistic regression in the multivariate analysis, several variables remained significantly associated with household food consumption and diversity scores. These include the age of the head of household, the head of household's educational level, household size, monthly household income, and the household's village of origin.

Age of the head of household: The age of the household head remained significantly associated with household dietary intake and diversity scores after multivariate logistic regression. Households headed by older heads (over 30 years old) were more likely to have high dietary intake and diversity scores compared to households headed by younger heads (under 30 years old).

These results are consistent with those of Gebre T and Nkonde C where the older age of the household head also increases the likelihood of higher household food consumption and diversity scores [15] [26]. This may be explained by the fact that older heads of households have greater economic stability and more experience in managing food needs and allocating household income to food compared to younger heads.

Educational level of the head of household: After multivariate logistic regression, the head of household's level of education remained significantly associated with household food consumption and diversity scores; households headed by more educated heads (secondary, higher education) were more likely to have higher food consumption and diversity scores compared to households headed by heads with little or no education. Ouedraogo DS *et al.*, Gibson E *et al.* and Tanoh EF *et al.* confirmed the same results in their studies, where the risk of having an inadequate and undiversified diet was higher in households headed by uneducated heads compared to those headed by educated heads [12] [19] [27]. This would explain the role of education: a higher level of education enables households to consume a greater variety of foods. Furthermore, education improves nutritional knowledge, promotes the proper use of household income, and increases access to other economic opportunities.

Household size: After logistic regression, household size remained significantly associated with dietary intake and diversity scores; large households (more than 5 members) were less likely to have high dietary intake and diversity scores compared to smaller households. These results are consistent with those presented by Boulom S *et al.*, Nikièma V *et al.*, and Awoke W *et al.*, who emphasize that a one-unit increase in family size reduces household food security; the presence of a large number of members in a household tends to lead to food insecurity com-

pared to households with smaller families [3] [11] [28].

This observation may be linked to the fact that a household with multiple members has greater food needs, which are inevitably dependent on the household's economic status in terms of affordability.

Household's village of origin: The household's village of origin remained significantly associated with household dietary intake and diversity after adjustments based on multivariate logistic regression. Some villages had a lower probability of achieving high scores for dietary intake and diversity compared to others that had a high probability of achieving high dietary scores.

This could be influenced by local geographic, agricultural, and socioeconomic conditions that may affect household dietary intake and diversity in certain villages. Several studies conducted in the Yangambi region, including that by Mangaza L *et al.*, demonstrate the existence of these geographic, agricultural, and socioeconomic differences that impact households' nutritional and dietary conditions [17] [24] [25].

Average monthly household income: Average monthly household income remained significantly associated with household food consumption and dietary diversity scores after multivariate logistic regression. Households with a monthly income between 76,000 and 200,000 Congolese francs were more likely to achieve an acceptable food consumption score compared with households earning less than 75,000 Congolese francs. However, regarding dietary diversity, households in this income category showed lower odds of achieving a high dietary diversity score after adjustment. Similar associations between household income and dietary outcomes have been reported in other studies [20] [21] [29]. These findings may reflect differences in household expenditure priorities, food purchasing patterns, and access to diverse foods.

Strengths and limitations of the study: This study provides recent data on the factors associated with low household food consumption and dietary diversity scores in a rural city in the Democratic Republic of the Congo that has received little attention in the literature. The internationally recognized food indicators used in this study, combined with multivariate analysis, identified the main factors linked to low food consumption and dietary diversity scores in the City of Yangambi.

Nevertheless, the cross-sectional nature of the study does not allow for the establishment of a causal relationship between the factors studied and dietary scores. As a limitation, some of the information collected was based on self-reports from household heads and may have been subject to recall bias.

Additionally, certain categories were underrepresented, which may have contributed to the high odds ratios mentioned in this study. Despite this, this study provides important information that can help guide nutritional interventions and public health policies regarding food security in the Yangambi City, as well as in other similar contexts in the Democratic Republic of the Congo.

Residual confounding cannot be excluded in this study. Seasonal variations in

food availability, self-reported household income and food expenditure, as well as differences in market accessibility between villages, were not fully captured and may have influenced the associations observed in this study. In addition, some adjusted odds ratios were very large and associated with wide confidence intervals, possibly reflecting sparse data in certain categories and limited sample sizes for some subgroups. These factors should be considered when interpreting the findings with caution.

5. Conclusions

This study shows that several sociodemographic and socioeconomic factors, including the age and educational level of the head of household, household size, average monthly household income, and village of origin, were associated with household dietary intake and dietary diversity scores in the City of Yangambi.

These results support the need to focus and strengthen multisectoral food security interventions on improving the socioeconomic, sociodemographic, and dietary conditions of households in rural areas of the Democratic Republic of the Congo.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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