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Uncovering the drivers of food insecurity in Cameroon: insights from a nationwide cross-sectional analysis

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Abstract

Background Despite global efforts to achieve zero hunger, food insecurity remains a critical challenge in several African countries, including Cameroon. This study aims to identify sociodemographic predictors of food insecurity across Cameroon through a comprehensive, nationwide cross-sectional analysis.

Methods Data for this study were drawn from the 2018 Cameroon Demographic and Health Survey (CDHS). Food insecurity levels were evaluated using the Food Insecurity Experience Scale (FIES). To estimate the probabilities of moderate and severe food insecurity among different sociodemographic groups, logistic regression models were applied, with results expressed as average marginal effects (AME).

Results The findings reveal that approximately 24.86% of participants experienced moderate food insecurity, while 28.96% faced severe food insecurity. Among men, the proportion experiencing severe food insecurity was 38.8%, compared to 24.3% for women. Multivariable regression analysis showed that severe food insecurity was less likely among women [AME = 0.84, 95% CI = 0.83,0.86], Muslims [AME = 0.91, 95%CI = 0.90,0.93], individuals with higher education levels (secondary education: AME = 0.93, 95%CI = 0.90,0.95; higher education: AME = 0.87, 95%CI = 0.85,0.90), those owning land (either alone or jointly) [AME = 0.92, 95%CI = 0.89,0.96], wealthiest households (moderate food insecurity: AME = 0.91, 95%CI = 0.88,0.93; severe food insecurity: AME = 0.73, 95%CI = 0.70,0.75), female-headed households [AME = 0.97, 95%CI = 0.96,0.99], and rural residents [AME = 0.97, 95%CI = 0.95,0.98].

Conclusions These findings underscore that food insecurity affects a substantial portion of the Cameroonian population, with certain sociodemographic groups more vulnerable than others. This study proposes targeted policy recommendations to address food insecurity in Cameroon, including social assistance programs for at-risk groups, investments in socioeconomic empowerment, improvements in agricultural productivity, and ongoing research to guide evidence-based interventions.

Keywords Food insecurity, Food insecurity experience scale, Health, Demographic and health survey, Cameroon

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Introduction

Cameroon is located in the Central African region and has a population of about 27 million (2021 estimate). The country struggles with the persistently high rates of poverty, food insecurity, hunger, and malnutrition with approximately one-third of the population living below the national poverty line. Food insecurity, defined as the limited or uncertain availability of nutritionally adequate and safe foods, as well as the lack of access to an adequate diet, is a complex issue with profound implications for population health and national development at large [1–4]. The FAO defines hunger as an uncomfortable or painful sensation caused by insufficient consumption of dietary energy, and malnutrition as the result of deficiencies, excess or imbalances in energy and nutrients consumption [5]. The outcomes of food insecurity extend far beyond undernutrition and involve a wide range of physical, mental, and socioeconomic outcomes [6]. It is estimated that over 690 million people worldwide suffer from chronic food shortage, and the number is projected to reach 840 by 2030 if the situation continues at current rate [7]. The situation is particularly challenging in countries that are struggling with frequent natural disasters, armed conflict, and unstable governance [8–12].

In Cameroon, food insecurity and malnutrition are major public concerns which stem from a complex interplay of various socioeconomic, agricultural, political issues. Given a large number of population living below poverty line, many households lack the purchasing power to afford adequate and nutritious food to maintain good health. According to the 2023 Cadre Harmonisé report, 11% of the Cameroonian population suffers from acute food insecurity [12]. Previous statistics by the Nutrient Gap study (2021) have painted an even more concerning picture, with 48% of Cameroonian households unable to afford a nutritious diet (70% in the Far North and East regions) [13]. The situation is exacerbated by the conflict and refugee crisis, especially in the Northern region where more than half of the poor live [14]. The agricultural sector, which employs a substantial portion of the population, is constrained by challenges such as limited access to capital, frequent droughts and floods, and poor farming practices [15]. These challenges undermine the nation's food production, food self-sufficiency and exacerbate food insecurity and malnutrition especially among the vulnerable communities. In addition to this, the Northern region also experiences devastating floods that result in the displacement of thousands of individuals that worsen the food crisis [16].

Evidently, government authorities find it hard to address the consequences of mass displacement, loss of property and agricultural resources for the vulnerable communities, which further limits food availability and accessibility. Thus, both the local population and government authorities struggle to mitigate the impacts of these challenges that pose significant threats for the health, security, and well-being in the long run. Insufficient access to nutritious foods can lead to inadequate intake of essential nutrients such as vitamins, minerals, and proteins, which are essential for proper physiological functioning. Chronic exposure to inadequate intake of micronutrients can result in undernutrition or deficiency disease such as anemia, and can slowly impair the body's ability to function optimally e.g. lower immunity [17, 18]. Malnutrition not only weakens the immune system but also stunts growth and impairs cognitive development in children.

Despite Cameroon's abundant agricultural capacity and rich natural resources [19], food production is suboptimal and the country's prospect of achieving Zero Hunger remains bleak. Various national and international organizations, non-governmental organizations are actively working to promote food security and achieve the target of Zero Hunger. Previous studies have shed light on the drivers of food insecurity at household and individual levels and explored the sociodemographic factors that are associated with the experience of food insecurity [20, 21]. However, no such study has been done on a national scale in the context of Cameroon. The main challenge in conducting large-scale research is a lack of resources to collect quality data. This study therefore aims to address this research gap by using nationally representative data from the latest Demographic and Health Survey conducted in Cameroon in 2018. The survey also provides valuable insights on various demographic, regional and socioeconomic factors including education and income that allows comparing the relative severity of food insecurity among different population sub-groups. The findings will be crucial for policymakers and healthcare professionals in making effective strategies to reduce food insecurity and malnutrition.

Methods

Data source

Data were obtained from the Cameroon DHS-2018 survey which was conducted on individuals living in households across Cameroon using a stratified, two-stage area sampling approach [22]. The sample included 13,160 households distributed across urban and rural areas in 12 study regions. At the first stage, 470 clusters were systematically selected based on probability proportional to size. Household mapping and counting operations were conducted from December 2017 to March 2018 to create updated household lists for the second stage sampling. At the second stage, 28 households were systematically selected from each cluster. Data collection began in June 2018 and concluded in January 2019, covering 432 of 470 intended clusters. Due to security issues, 13

of 41 intended clusters were not covered in the Northwest region. In the Southwest region, only 16 out of 40 intended clusters were covered, mainly in urban areas, so results should be interpreted cautiously. Data were collected among eligible men and women using a standard questionnaire by face-to-face interviews.

Description of variables

The outcome variable was food insecurity which was assessed by the scores based on the food Insecurity Experience Scale (FIES) [23]. The FIES is an experience-based measures of household or individual food security that consists of eight questions regarding the experiences associated with difficulties in accessing food [24]. The Cronbach's alpha value for the 8 FIES items was 0.91, indicating a strong internal consistency for the sample population. The aggregate scores ranged from 0 to 8, and were classified into 3 categories based on the global standard; (1) food secure (0–3), (2) moderately FI (4–6), and (3) severely FI (7, 8) [2]. The sociodemographic variables included in the analysis were as follows: age in 5-year groups (15–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45–49, 50–54, 55–59, 60–64); sex (male, female); current marital status (never in union, married, living with partner, other); type of residence (urban, rural); region (Adamawa, Centre (without Yaounde), Douala, East, Far-north, Littoral (without Douala), North, North-west, West, South, South-west, Yaounde); religion (Catholic, Muslim, other); highest educational level (no education, primary, secondary, higher); occupation (unemployed, blue collar, white collar); and wealth index (poorest, poorer, middle, richer, richest).

Statistical analyses

The datasets for individual men's and women's surveys were initially checked to ensure that the study population was correctly defined in the combined dataset: men and women aged between 15 and 64 years. All variables were screened for missing values and outliers. At first, the dataset was defined as survey data (*svy* command) to account for the clustered nature of the surveys. We checked for internal consistency of the FIES items using the alpha (Cronbach's alpha) command. Descriptive analyses were used to report the percentages of the individual FIES items for male and female participants. Bivariate tests were conducted to check the significant association between each explanatory variable and the outcome variable. At the next step, we performed multinomial logistic regression analysis to estimate the association between the outcome variable (food insecurity) and the explanatory variables. The strength of the associations was presented as Average Marginal Effects (AMEs) with 95% confidence intervals (95% CI). A value of $p<0.05$ was considered statistically significant for all analyses. The postestimation command *vif* was used to check for multicollinearity among the variables. The statistical analysis for this study was performed using Stata 16.

Results

Table 1 presents data on the sex difference in food security, along with various demographic and socio-economic variables. A higher proportion of women (67.8%) compared to men (32.2%) are represented in the study. Among men, 38.8% experience severe food insecurity, while 24.3% of women experience severe food insecurity.

As shown in Fig. 1, the questions with the highest percentage of "yes" responses among both and women were "Unable to eat healthy", while the questions with the lowest percentage of "yes" responses were "No eating whole day". Men had higher percentage of reporting "yes" to all the eight items.

Table 2 presents the probabilities (Average marginal effects) of the three categories of food insecurity (Food secure/ Moderately insecure/ Severely insecure) by the sociodemographic factors. The table shows that, in general, higher age is associated with a higher predicted probability of moderate and severe food insecurity. For example, those aged 45–49 had a predicted probability of severe food insecurity of 1.07 (95% CI: [1.04, 1.11]). Women had 84% points lower probability of experiencing severe food insecurity [AME=0.84, 95% CI=0.83,0.86] insecurity compared to men. Those who were widowed had a 5% points lower probability of food security compared to those never in union [AME=1.05, 95%CI=1.03,1.08]. Muslims had 9% points higher probability of severe food insecurity compared to Christians [AME=0.91, 95%CI=0.90,0.93].

Compared to those with no education, those with primary education had a 4% points lower probability of severe food insecurity [AME=0.96, 95%CI=0.94,0.99], while those with secondary and higher education had 7% points [AME=0.93, 95%CI=0.90,0.95] and 13% points [AME=0.87, 95%CI=0.85,0.90] lower probabilities of severe food insecurity respectively. Compared to the unemployed, those in blue collar jobs had a 4% points higher probability of moderate food insecurity [AME=1.04, 95%CI=1.02,1.05] but 3% points lower probability of severe food insecurity [AME=0.97, 95%CI=0.96,0.99]. Similarly, those in white collar jobs had a 5% points higher probability of moderate food insecurity [AME=1.05, 95%CI=1.03,1.07] but 3% points lower probability of severe food insecurity [AME=0.97, 95%CI=0.95,0.99]. Households headed by females had a 3% lower probability of severe food insecurity [AME=0.97, 95%CI=0.96,0.99].

Participants who owned land both alone and jointly had a lower predicted probability of severe food insecurity compared to those that owned land alone only

Table 1 Percentage of moderate and severe food insecurity by participants' sociodemographic characteristics

	Men	Women	Total
Food insecurity level			
Food Secure	2,439 (35.0%)	7,561 (51.5%)	10,000 (46.2%)
Moderately Food insecure	1,833 (26.3%)	3,551 (24.2%)	5,384 (24.9%)
Severely Food insecure	2,706 (38.8%)	3,565 (24.3%)	6,271 (29.0%)
Age groups			
15–19	1,531 (21.9%)	3,349 (22.8%)	4,880 (22.5%)
20–24	1,117 (16.0%)	2,463 (16.8%)	3,580 (16.5%)
25–29	978 (14.0%)	2,345 (16.0%)	3,323 (15.3%)
30–34	779 (11.2%)	1,884 (12.8%)	2,663 (12.3%)
35–39	674 (9.7%)	1,485 (10.1%)	2,159 (10.0%)
40–44	552 (7.9%)	1,091 (7.4%)	1,643 (7.6%)
45–49	432 (6.2%)	910 (6.2%)	1,342 (6.2%)
50–54	372 (5.3%)	496 (3.4%)	868 (4.0%)
55–59	305 (4.4%)	340 (2.3%)	645 (3.0%)
60–64	238 (3.4%)	314 (2.1%)	552 (2.5%)
Current marital status			
Never In Union	3,380 (48.4%)	4,915 (33.5%)	8,295 (38.3%)
Married	2,277 (32.6%)	6,055 (41.3%)	8,332 (38.5%)
Living With Partner	938 (13.4%)	2,005 (13.7%)	2,943 (13.6%)
Widowed	383 (5.5%)	1,702 (11.6%)	2,085 (9.6%)
Type of place of residence			
Urban	3,702 (53.1%)	7,839 (53.4%)	11,541 (53.3%)
Rural	3,276 (46.9%)	6,838 (46.6%)	10,114 (46.7%)
Region			
Adamawa	438 (6.3%)	1,066 (7.3%)	1,504 (6.9%)
Centre (Without Yaounde)	884 (12.7%)	1,560 (10.6%)	2,444 (11.3%)
Douala	636 (9.1%)	1,255 (8.6%)	1,891 (8.7%)
East	563 (8.1%)	1,245 (8.5%)	1,808 (8.3%)
Far-North	688 (9.9%)	1,542 (10.5%)	2,230 (10.3%)
Littoral (Without Douala)	518 (7.4%)	959 (6.5%)	1,477 (6.8%)
North	700 (10.0%)	1,471 (10.0%)	2,171 (10.0%)
North-West	288 (4.1%)	806 (5.5%)	1,094 (5.1%)
West	670 (9.6%)	1,455 (9.9%)	2,125 (9.8%)
South	779 (11.2%)	1,567 (10.7%)	2,346 (10.8%)
South-West	156 (2.2%)	403 (2.7%)	559 (2.6%)
Yaounde	658 (9.4%)	1,348 (9.2%)	2,006 (9.3%)
Religion			
Catholic	4,935 (70.7%)	10,888 (74.2%)	15,823 (73.1%)
Muslim	1,566 (22.4%)	3,272 (22.3%)	4,838 (22.3%)
Other	477 (6.8%)	517 (3.5%)	994 (4.6%)
Highest educational level			
No Education	687 (9.8%)	2,767 (18.9%)	3,454 (16.0%)
Primary	1,877 (26.9%)	4,301 (29.3%)	6,178 (28.5%)
Secondary	3,679 (52.7%)	6,615 (45.1%)	10,294 (47.5%)
Higher	735 (10.5%)	994 (6.8%)	1,729 (8.0%)
Occupationn			
Unemployed	1,095 (15.7%)	4,994 (34.0%)	6,089 (28.1%)
Blue Collar	3,789 (54.3%)	7,614 (51.9%)	11,403 (52.7%)
White Collar	2,094 (30.0%)	2,069 (14.1%)	4,163 (19.2%)
Household head's sex			
Male	5,887 (84.4%)	10,341 (70.5%)	16,228 (74.9%)
Female	1,091 (15.6%)	4,333 (29.5%)	5,424 (25.1%)
Land ownership status			

Table 1 (continued)

	Men	Women	Total
Alone Only	1,621 (23.2%)	619 (4.2%)	2,240 (10.3%)
Both Alone And Jointly	274 (3.9%)	273 (1.9%)	547 (2.5%)
Does Not Own	4,682 (67.1%)	12,692 (86.5%)	17,374 (80.2%)
Jointly Only	401 (5.7%)	1,093 (7.4%)	1,494 (6.9%)
Wealth index			
Poorest	859 (12.3%)	2,001 (13.6%)	2,860 (13.2%)
Poorer	1,379 (19.8%)	2,881 (19.6%)	4,260 (19.7%)
Middle	1,703 (24.4%)	3,479 (23.7%)	5,182 (23.9%)
Richer	1,457 (20.9%)	3,158 (21.5%)	4,615 (21.3%)
Richest	1,580 (22.6%)	3,158 (21.5%)	4,738 (21.9%)

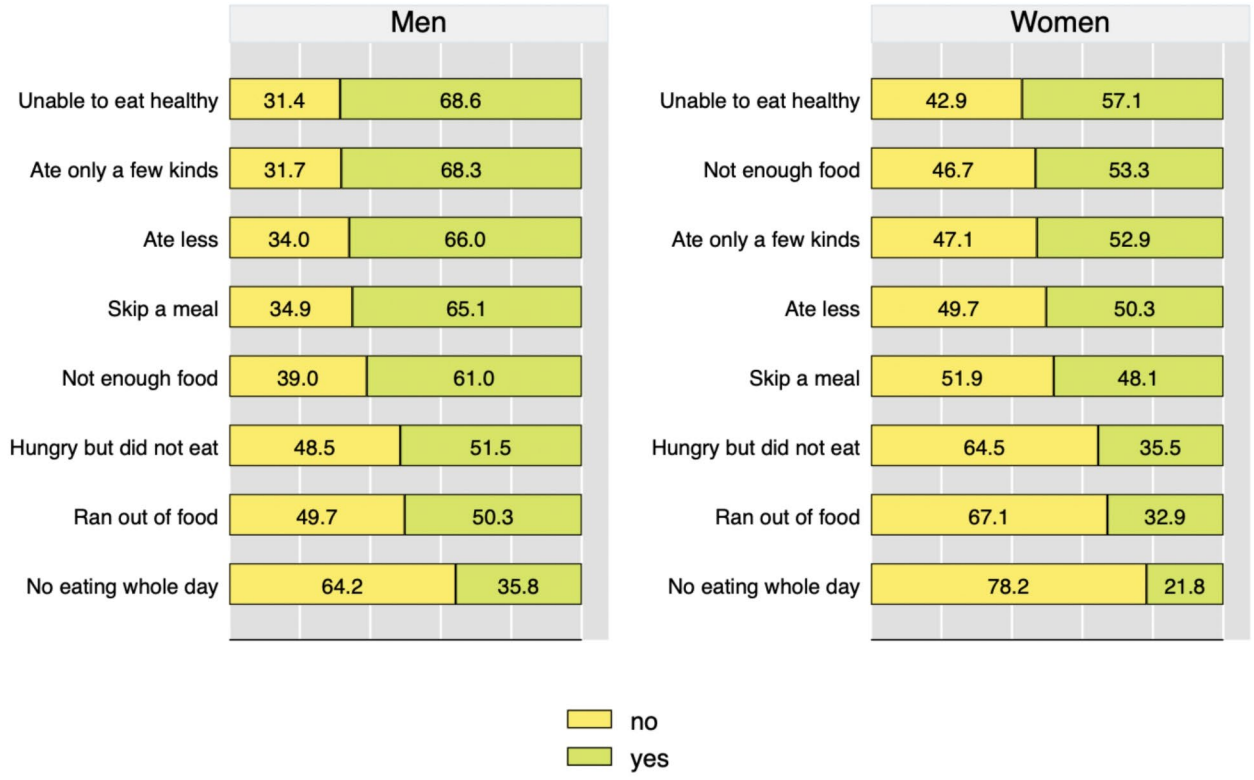

Fig. 1 Sex differences in the percentage of responses to the individual FIES questions

[AME=0.92, 95%CI=0.89,0.96]. Households that did not own land showed a slightly higher probability of severe food insecurity [AME=1.02, 95%CI=1.00,1.04]. The probabilities of both moderate and severe food insecurity decreased with increasing wealth, with the richest households showing a 9% points lower probability of moderate food insecurity [AME=0.91, 95%CI=0.88,0.93] and 27% points lower probability of severe food insecurity [AME=0.73, 95%CI=0.70,0.75]. Rural residents had a 3% lower probability of severe food insecurity [AME=0.97, 95%CI=0.95,0.98]. Compared to Adamawa region, households in most regions had significantly higher probabilities of both moderate and severe food insecurity, with the largest differences seen in the Centre region and Douala for moderate food insecurity, and in Littoral and South regions for severe food insecurity. Households in Far North region had a lower probability of severe food insecurity only [AME=0.90 95%CI=0.88,0.92].

Discussion

Using the Food Insecurity Experience Scale, the present study aimed to assess the sociodemographic predictors of food insecurity among adult men and women in Cameroon. By examining the sociodemographic characteristics of individuals, such as age, education level, marital status, and household wealth level, this study identified the predictors that can help policymakers develop targeted interventions. The results indicate that well over half of

Table 2 Average marginal effects of moderate and severe food insecurity by the sociodemographic variables

	Food secure	Moderately insecure	Severely insecure
Age groups (15–19)			
20–24	0.93***	1.01	1.07***
	[0.91,0.95]	[0.99,1.03]	[1.05,1.09]
25–29	0.92***	1.01	1.07***
	[0.90,0.94]	[0.99,1.04]	[1.05,1.09]
30–34	0.92***	1.02	1.07***
	[0.89,0.94]	[0.99,1.04]	[1.05,1.10]
35–39	0.93***	1.04**	1.04**
	[0.90,0.95]	[1.01,1.06]	[1.02,1.07]
40–44	0.93***	1.02	1.05**
	[0.90,0.96]	[1.00,1.05]	[1.02,1.08]
45–49	0.93***	1.01	1.07***
	[0.90,0.96]	[0.98,1.04]	[1.04,1.11]
50–54	0.96	1.00	1.04*
	[0.93,1.00]	[0.97,1.04]	[1.00,1.07]
55–59	0.98	1.01	1.02
	[0.93,1.02]	[0.97,1.05]	[0.98,1.06]
60–64	0.97	0.99	1.04*
	[0.93,1.02]	[0.95,1.03]	[1.00,1.08]
Sex (male)			
Female	1.21***	0.98	0.84***
	[1.19,1.22]	[0.97,1.00]	[0.83,0.86]
Marital status (never in union)			
Married	1.01	1.01	0.98**
	[0.99,1.04]	[0.99,1.03]	[0.96,0.99]
Living with partner	0.99	1.01	1.00
	[0.97,1.01]	[0.99,1.03]	[0.98,1.02]
Widowed/other	0.94***	1.01	1.05***
	[0.92,0.97]	[0.98,1.03]	[1.03,1.08]
Religion (Christian)			
Muslim	1.12***	0.98**	0.91***
	[1.10,1.15]	[0.96,0.99]	[0.90,0.93]
Other	0.99	0.98	1.03*
	[0.96,1.02]	[0.95,1.01]	[1.00,1.06]
Education (no education)			
Primary	1.04**	1.00	0.96**
	[1.01,1.06]	[0.98,1.02]	[0.94,0.99]
Secondary	1.09***	0.99	0.93***
	[1.06,1.12]	[0.97,1.02]	[0.90,0.95]
Higher	1.18***	0.97	0.87***
	[1.14,1.22]	[0.94,1.01]	[0.85,0.90]
Occupation (unemployed)			
Blue collar	0.99	1.04***	0.97***
	[0.97,1.01]	[1.02,1.05]	[0.96,0.99]
White collar	0.98	1.05***	0.97**
	[0.96,1.00]	[1.03,1.07]	[0.95,0.99]
Household member			
Household head's sex (Male)			
Female	1.04***	0.99	0.97***
	[1.02,1.05]	[0.98,1.01]	[0.96,0.99]
Lad ownership status (Alone Only)			
Both Alone and Jointly	1.10***	0.99	0.92***
	[1.05,1.15]	[0.95,1.02]	[0.89,0.96]
Does not own	0.98	1.00	1.02*
	[0.95,1.00]	[0.98,1.02]	[1.00,1.04]
Jointly only	0.99	1.01	1.00
	[0.96,1.02]	[0.99,1.04]	[0.97,1.03]

Table 2 (continued)

	Food secure	Moderately insecure	Severely insecure
Wealth (poorest)			
Poorer	1.13***	0.98	0.90***
	[1.11,1.16]	[0.95,1.00]	[0.88,0.93]
Middle	1.23***	0.96**	0.85***
	[1.20,1.25]	[0.94,0.99]	[0.82,0.87]
Richer	1.30***	0.96**	0.80***
	[1.27,1.34]	[0.93,0.99]	[0.78,0.83]
Richest	1.52***	0.91***	0.73***
	[1.48,1.56]	[0.88,0.93]	[0.70,0.75]
Residence (urban)			
Rural	1.05***	0.99	0.97***
	[1.03,1.07]	[0.97,1.01]	[0.95,0.98]
Region (adamawa)			
Centre (without yaounde)	0.82***	1.14***	1.08***
	[0.79,0.84]	[1.10,1.17]	[1.05,1.11]
Douala	0.84***	1.02	1.17***
	[0.81,0.87]	[0.99,1.05]	[1.13,1.21]
East	0.86***	1.04**	1.11***
	[0.83,0.89]	[1.01,1.07]	[1.08,1.15]
Far-north	1.06***	1.05***	0.90***
	[1.03,1.09]	[1.02,1.07]	[0.88,0.92]
Littoral (Without Douala)	0.83***	1.03	1.18***
	[0.80,0.86]	[0.99,1.06]	[1.14,1.22]
North	0.95**	0.95***	1.11***
	[0.92,0.98]	[0.93,0.97]	[1.08,1.14]
North-West	0.89***	1.08***	1.04*
	[0.86,0.93]	[1.04,1.11]	[1.01,1.07]
West	0.97*	1.06***	0.97
	[0.94,1.00]	[1.03,1.10]	[0.95,1.00]
South	0.75***	1.10***	1.21***
	[0.73,0.77]	[1.07,1.13]	[1.18,1.25]
South-West	0.85***	1.11***	1.06**
	[0.81,0.89]	[1.06,1.16]	[1.02,1.12]
Yaounde	0.77***	1.12***	1.16***
	[0.74,0.79]	[1.09,1.16]	[1.12,1.20]

Predicted probabilities with 95% confidence intervals in brackets. Level of significance= $^{*}p<0.05$, $^{**}p<0.01$, $^{***}p<0.001$

participants were food insecure, with about a quarter of the participants facing moderate food insecurity, and 29% facing severe food insecurity, which is comparable to the African average of 66.2% moderate to severe food insecurity in 2020 [25]. Food insecurity is a multifactorial issue and can be caused by diverse factors including low agricultural productivity, harsh climatic conditions, slow economic growth, poor governance which can affect national capacity to produce or acquire adequate [25–27]. in Cameroon, the alarming level of food insecurity is a major concern for public health, and for programs towards the Sustainable Development Goal 2 of achieving zero hunger by 2030 [28].

Regarding the sociodemographic factors, the results showed that participants in the higher age groups are more likely to experience severe food insecurity compared with the youngest age group of 15–19 years. The possible explanations behind this could include financial hardships, income earning opportunities, and poorer health conditions that can contribute to food insecurity. Interestingly, women were less likely to experience severe food insecurity which is contrary to the previous findings [29, 30]. It is generally thought that the traditional gender roles in many societies limit women's access to resources and thereby resulting greater risk of food insecurity. Among men, on the other hand, the higher risk of food insecurity could be due to societal norms that place pressure on men as the main providers for their families, fulfilling which can involve higher levels of stress and anxiety and thereby making it challenging to prioritize their own nutritional needs. Widowed individuals had higher probability of experiencing food insecurity compared to their married counterparts, which is probably due to lower income earning opportunities. Financial well-being, and other socioeconomic factors are key determinant of food security and those who experience

material poverty and are with low socioeconomic standing can face significant challenges in maintaining food security [4, 31–33].

The role of socioeconomic factors on food security was also reflected in the present findings as higher education levels, employment status, and land ownership showed a positive association with food security. People with higher education levels and those employed in white or blue-collar jobs are less likely to experience severe food insecurity compared to those who are unemployed. Moreover, participants who owned land jointly with others showed a lower probability of severe food insecurity while those that did not own land showed a higher probability, highlighting the importance of property ownership on food security [34]. As expected, participants in the households from higher wealth levels had consistently lower probabilities of both moderate and severe food insecurity. Another important finding was the role of household head's sex on the probability for severe food insecurity. We found that households headed by females showed a lower probability of severe food insecurity, which is contrary to the findings of a meta-analysis that showed a greater risk of food insecurity among women-headed households [30]. Regarding, geographic factors, rural residency showed a lower probability of severe food insecurity which is probably due to lower cost of living and greater access to agricultural and natural resources which can provide a source of food and income. Households in most regions had higher probabilities of food insecurity compared to Adamawa region, except for households in Far North region which showed a lower probability of severe food insecurity. The variations in food insecurity across different regions of Cameroon are an important aspect of our study findings. Further investigation is required to provide a comprehensive explanation for the relatively better food security situation in certain regions. The regional differences observed may be influenced by various factors such as differences in agricultural practices, economic conditions, access to social support systems, or cultural factors.

Overall, the results indicates the role of various demographic and socioeconomic factors on food security. Food insecurity is typically understood to result from the macro level factors such as inadequate infrastructure, political instability, corruption, and conflicts that contribute by shaping the factors that affect individuals' access to food at the micro or individual levels [35]. Unfortunately, political unrest and conflict are common realities in Cameroon which can significantly disrupt the food production and distribution systems and lead to shortages and higher food prices that can hurt the low-income consumers. Limited access to employment opportunities or low wages exacerbate the situation, making it difficult for individuals and families to break free from the cycle of poverty. The current analysis indicates that food insecurity is a significant issue in Cameroon, particularly among certain sociodemographic groups e.g. male sex, urban residents, unemployed individuals, lower educational and income groups, and no land owners. The situation therefore warrants urgent policy attention and implement targeted interventions that consider the specific needs and challenges faced by these groups, such as improving access to education, creating employment opportunities, and increasing access to nutritious food.

To address the persistent issue of food insecurity in Cameroon, several policy recommendations can be made from the current findings. First, implementing social assistance programs, such as targeted cash transfers and food assistance, can significantly benefit vulnerable groups, including older individuals, widowed persons, and those from lower socioeconomic backgrounds. Secondly, investing in socioeconomic empowerment through increased access to education, training, and skill development programs is essential for improving the employability of individuals from lower socioeconomic status and improving food security. Additionally, increasing agricultural productivity and rural development by improving infrastructure and supporting smallholder farmers can serve to promote food production, increase household incomes, and further strengthen food security. Furthermore, allocating resources to national-level research and development to explore the root causes of food insecurity will help designing evidence-based intervention programs that address the specific regional challenges faced by different communities.

Strengths and limitations

This study is the first nationally representative study on food security in Cameroon and its main strengths include the use of the Food Insecurity Experience Scale (FIES), a robust tool for assessing the severity of individuals' challenges in obtaining adequate food. The FIES enables accurate comparisons of food insecurity levels across different countries and regions, identification of trends over time, and evaluation of interventions or policies aimed at reducing food insecurity. The large nationally representative sample used in the study increases external validity, allowing for generalization of the findings to the larger population. However, the study's cross-sectional design limits the ability to establish causal relationships between the factors examined and food insecurity, and the reliance on self-reported data may involve the risk of social-desirability bias. Furthermore, the study does not account for potential seasonal variations in food security or the effect of recent economic or sociopolitical changes, which could impact food security status. The data may not be representative of the areas where complete coverage was not possible due to security issues.

Given the secondary nature of the data, we were unable to include all the potential confounding factors in the analysis and address the measurement errors. This might affect the generalizability of the findings to other populations or time periods. Despite these limitations, the study provides important insights into the factors associated with food insecurity and highlights the need for interventions that address the root causes of food insecurity, such as poverty, unemployment, and limited access to education and job opportunities.

Conclusion

In conclusion, this study provides valuable insights into the widespread issue of food insecurity in Cameroon. The findings indicate that over half of the participants experienced some level of food insecurity, highlighting the urgent need for interventions to address this problem. Sociodemographic factors play a significant role in determining the severity of food insecurity. Specifically, higher age groups, male sex, lower education levels, unemployment, and lack of land ownership were associated with a higher probability of severe food insecurity. Conversely, women, individuals in white or blue-collar jobs, and those who owned land jointly with others were less likely to experience severe food insecurity. Additionally, rural residency was associated with a lower probability of severe food insecurity, likely due to lower cost of living and better access to agricultural and natural resources. These findings underscore the importance of targeted interventions to address the specific vulnerabilities faced by different sociodemographic groups. Policy efforts should focus on providing support and resources to the identified high-risk groups, including improving access to education, creating employment opportunities, and facilitating land ownership. Additionally, efforts to enhance agricultural productivity and promote sustainable farming practices could help alleviate food insecurity in both rural and urban areas. By addressing these factors, policymakers can work towards reducing the prevalence of food insecurity and achieving the Sustainable Development Goal of zero hunger by 2030. It is essential to recognize that food insecurity is a complex issue influenced by various socioeconomic and environmental factors. Future research should continue to explore the underlying causes and dynamics of food insecurity in Cameroon, considering the potential impacts of recent economic and sociopolitical changes. By gaining a deeper understanding of these factors, policymakers can develop more effective and targeted strategies to combat food insecurity and improve the overall well-being of the population.

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Author contributions
SY and GB contributed to the study design, the review of literature, and analysis of literature, manuscript conceptualization, preparation and data analysis. SY had final responsibility to submit for publication. All authors read and approved the final manuscript.

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Data availability
Data for this study were sourced from Demographic and Health surveys (DHS) and available here: http://dhsprogram.com/data/available-datasets.cfm.

Declarations

Ethics approval and consent to participate
Ethics approval for this study was not required since the data is secondary and is available in the public domain. More details regarding DHS data and ethical standards are available at: http://goo.gl/ny8T6X.

Consent for publication
No consent to publish was needed for this study as we did not use any details, images or videos related to individual participants. In addition, data used is available in the public domain.

Competing interests
The authors declare no competing interests.

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