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USING THE GLOBAL DIET QUALITY SCORE TO ASSESS WOMEN'S DIETARY INTAKE IN THREE SUB-SAHARAN AFRICAN COUNTRIES

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ABSTRACT

Dietary inadequacies are of serious concern for women in sub-Saharan Africa. Understanding dietary patterns is key to improving health and nutrition outcomes, but limited resources and non-standardized data collection methods hinder comprehensive dietary intake assessments in the region. The Global Diet Quality Score (GDQS) offers a novel, validated approach to assess diet quality at the population level, capturing both food group quantities and unhealthy dietary risk factors. This study utilized the GDQS to assess the diet quality and associated risks for women of reproductive age in Cameroon, the Democratic Republic of the Congo (DRC) and Nigeria. Data were collected from mothers, or primary caregivers, of children aged 6-59 months, through surveys conducted in the three countries. A 24-hour open-recall was employed to assess dietary intake, with foods categorized into 25 food groups and scored based on consumption levels. Points were assigned to reflect higher consumption of healthy foods and lower intake of unhealthy foods. Study outcomes included mean GDQS (25 food groups), mean GDQS 'positive' (16 healthy food groups), and mean GDQS 'negative' (7 unhealthy + 2 food groups unhealthy when consumed in excess). The study included 3,820 women from Cameroon (N=2,604), the DRC (N=321), and Nigeria (N=895). In all countries, the mean GDQS was 17-18 (out of 49), mean GDQS+ was 5-7 (out of 32), and mean GDQS- was 11-12 (out of 17). The majority of women (62-78%) were at moderate risk for nutrient inadequacy and diet-associated non-communicable diseases, while approximately 20% of women in Cameroon and the DRC and 30% in Nigeria were considered to be at high risk based on their dietary intake. The findings revealed concerningly poor diets, with nearly all women at moderate or high risk for adverse diet-related health and nutrition outcomes. Timely and actionable data, such as the GDQS, are important for creating awareness at all levels and for developing context-specific nutrition-centered strategies that address the barriers to women consuming healthy and diverse diets.

Key words: diet, GDQS, nutrition, sub-Saharan Africa, women of reproductive age

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INTRODUCTION

Dietary inadequacies are key determinants of malnutrition [1]. Despite significant progress in reducing global undernutrition, the prevalence remains high across much of sub-Saharan Africa (SSA) where poor quality diets, characterized by limited food diversity and a reliance on starchy staples, contribute to the nutritional insufficiency of women and children [2-5]. Additionally, the shift from traditional to western-influenced dietary patterns has reshaped food environments with serious public health implications [6,7]. The rising consumption of energy-dense and nutrient-poor foods underlies a worrisome upward trend in non-communicable diseases (NCDs) in the SSA region [8,9]. Recent evidence from Central and West Africa underscores the persistently high rates of undernutrition, primarily due to diet-related micronutrient deficiencies, alongside a mounting burden of chronic health conditions among women of reproductive age (WRA) [3,4,10,11].

Understanding dietary patterns is crucial for developing policies and strategies that address barriers to healthy diets to improve health and nutrition outcomes. However, comprehensive data on dietary intake at the population level are lacking for much of SSA due to limited resources and non-standardized data collection methods [12,13]. Simple cost-effective tools and food-based metrics are essential for assessing dietary nutritional adequacy in such settings. Though the Global Dietary Recommendations (GDR) [14] and Minimum Dietary Diversity for Women (MDD-W) [15] indicators have been used to examine dietary intake in numerous countries, neither of these approaches captures data on quantities consumed at the food group level. Furthermore, these measures do not provide any information about specific foods and beverages consumed within each food group or about mixed dishes. Moreover, the MDD-W metric excludes unhealthy food consumption and is not sensitive to diet-related outcomes associated with over-nutrition. To address these methodological issues, it is essential to develop more comprehensive tools that can accurately assess dietary patterns to enable evidence-based targeted interventions.

The Global Diet Quality Score (GDQS) [16] is a novel internationally-validated metric and data collection tool to examine dietary quality at the population level that incorporates quantities consumed at the food group level and unhealthy foods considered dietary risk factors for NCDs. The objective of this study was to assess the overall diet quality and associated factors for WRA in Cameroon, the Democratic Republic of the Congo (DRC), and Nigeria using the GDQS to provide current insights into the diet-associated risks for nutritional inadequacies in these diverse settings.

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MATERIALS AND METHODS

Sampling and data collection

Data were collected from mothers, or primary caregivers, of children aged 6-59 months participating in Helen Keller Intl-commissioned child vitamin A supplementation coverage surveys in Cameroon, the DRC and Nigeria. The surveys were adapted to include the GDQS module. Standard survey methodology was employed in all three countries and included two-stage stratified cluster sampling in rural and urban strata with clusters selected using probability proportional to size sampling. In Cameroon, surveys were conducted in January 2023 in three regions: West (77 clusters), Adamawa (77 clusters) and the Far North (124 clusters). In the DRC, data collection took place in 77 clusters in Kongo Central province in November 2022. In Nigeria, surveys were conducted in January 2023 in 77 clusters that were representative of all 16 districts in Taraba State.

Households were randomly selected from lists created for each cluster and survey eligibility was based on at least one child aged 6 to 59 months residing in the household and a primary child caregiver present at the time of the survey visit. The survey enumerators, recruited and trained by Helen Keller Intl, administered the surveys in local languages. Field-based activities were monitored by supervisors from Helen Keller Intl and partner organizations to maintain data quality and adherence to standardized protocols. Research ethics approval was obtained from the Comité National d'Éthique de la Recherche pour la Santé Humaine in Cameroon, Comité National d'Éthique de la Santé in the DRC, and the Health Research Ethical Committee in Taraba State, Nigeria. Informed consent was obtained from all survey participants.

In accordance with the GDQS methodology [17], data were collected using a 24-hour open-recall for foods and beverages consumed during the previous day or night. Reported items were recorded using the GDQS application [18] installed on Android tablets which also automatically classified the consumed items into 25 corresponding food groups: 16 healthy food groups, seven unhealthy food groups, and two food groups (high-fat dairy and red meat) considered unhealthy when consumed excessively. Women were asked to estimate the amount consumed for each food group using a set of 10 three-dimensional cubes of specified sizes. Based on the cube size selected and food group-specific cutoff (g/day), the quantity consumed was categorized as low, medium, or high for each food group. High-fat dairy consumption was scored as low, medium, high, or very high. Mixed dishes, such as soups and stews, were disaggregated into their individual ingredients which were each classified according to the corresponding GDQS food group.

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A points-based system was used to quantify dietary quality based on reported food consumption, with more points allocated for higher consumption of healthy foods and for lower consumption of unhealthy foods. For high-fat dairy and red meat consumption, points increased up to a specific g/day threshold beyond which points decreased for higher intake, reflecting the potential health risks associated with excessive intake of these foods. Points allocated across the 25 food groups were summed to generate a GDQS metric for each individual (range: 0-49 points). Socio-demographic characteristics were also collected.

Statistical analysis

Dietary data were analyzed for women aged 15-49 years. Four study outcomes were examined to assess women's dietary intake. The mean GDQS was calculated as an aggregate measure of diet quality and to categorize women at low (GDQS ≥23), moderate (GDQS ≥15 and <23), and high (GDQS <15) risk for nutrient inadequacy and NCD-related outcomes. Furthermore, to assess the relative contributions of healthy and unhealthy foods to women's diets, the mean GDQS positive (GDQS+) indicator was calculated based on the total score across the 16 healthy food groups (range: 0-32) and the mean GDQS negative (GDQS-) indicator was determined based on the total score across the seven unhealthy food groups, in addition to high-fat dairy and red meat consumption (range: 0-17).

A good quality diet was defined as being adequate in nutrients and protective against diet-related NCDs. Bivariate and multivariable logistic regression analyses were conducted to examine the effects of rural/urban residence, women's age and education level, and household wealth on women's diet quality. Household wealth was assessed using an asset-based approach, which considered factors such as housing materials, access to water and sanitation, and ownership of land, livestock, and mobile phones, and was estimated using principal component analysis to create a socioeconomic proxy to examine the independent effect of household wealth on women's dietary quality. Covariates for the regression models were selected based on a significant (p<0.05) bivariate result and/or prior evidence suggesting a relationship with women's dietary intake. Sample-weighted results are presented as descriptive statistics and unadjusted and adjusted odds ratios (ORs) with 95% confidence intervals (CIs) in separate analyses for each country as the study was not designed to compare or pool country estimates. Data were analyzed using Statistical Package for the Social Sciences (SPSS) Complex Samples 26.0 (IBM Corp: Armonk, NY) with α=0.05 for all analyses.

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RESULTS AND DISCUSSION

The study included 3,820 WRA: Cameroon: N=2,604, DRC: N=321, Nigeria: N=895 (Table 1). In all three countries, about half of the women were 20-29 years of age and from households located in rural areas. Most women had some formal education in the DRC and Nigeria. Approximately 40% of the women were from poor households in Cameroon and the DRC, while 86% resided in wealthy households in Nigeria (Table 1). Table 2 presents women's GDQS and risk for poor diet quality outcomes. In all three countries, the mean GDQS was between 17 and 18 (out of 49), the mean GDQS+ was between 5 and 7 (out of 32), and the mean GDQS- was between 11 and 12 (out of 17). Accordingly, the majority of women (62-78%) were at moderate risk for nutrient inadequacy and diet-associated NCDs. Approximately 20% of women in Cameroon and the DRC and 30% in Nigeria were considered to be at high risk for adverse health outcomes based on their dietary intake (Table 2).

In the analysis by area of residence, a higher mean GDQS (p<0.001), GDQS+ (p=0.021) and GDQS- (p<0.001) were observed among women in rural, compared to urban, areas in Cameroon (Table 3). Additionally, a larger percentage of women in rural, compared to urban, areas (12.9% vs. 6.1%; p<0.001) had a low risk for nutrient inadequacy and diet-related NCDs in Cameroon, whereas moderate and high-risk prevalences were higher among women in urban vs. rural areas (p<0.001). Also, in Cameroon, a larger percentage of women from poor, compared to wealthier, households (29.6% vs. 24.8%; p<0.001) were determined to be at high risk for poor diet quality outcomes. In the DRC, a higher mean GDQS- was observed for women in rural (12.7; 95% CI: 12.4, 12.9), compared to urban (12.0; 95% CI: 11.6, 12.4), areas (p=0.003) (Table 3).

The associations between women's socio-demographic characteristics and being at high risk for nutrient inadequacy and diet-related NCDs (GDQS <15) are presented in Table 4. In the adjusted analysis, women with no formal education were less likely to be at high risk in the DRC (OR: 0.26; 95% CI: 0.08, 0.82). Women's age, household wealth status, and area of residence were not associated with an elevated risk for poor diet quality outcomes in all three countries (Table 4).

This study assessed the dietary quality and associated factors for WRA in three diverse sub-Saharan African countries. The findings revealed concerningly poor diets, with about 90% of the sampled women in Cameroon and Nigeria and nearly all women in the DRC at moderate or high risk for adverse diet-related nutrition and health outcomes. A further analysis revealed that women's poor diet quality was mainly due to the under-consumption of health-promoting foods, as evidenced by the very low GDQS+ in all countries. Notably, in Cameroon and Nigeria, the average GDQS+ was approximately five times lower than the maximum attainable score and

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was almost seven times lower in the DRC. Moreover, the >20% of women categorized as being at high risk for adverse nutrition outcomes and diet-associated NCDs in Cameroon, the DRC, and Nigeria is concerning and suggests substantial nutritional deficits in these populations.

Though household wealth was not a predictor of high dietary risk in the analyses, rising food costs exacerbate the ongoing challenges associated with accessing healthy nutritious diets for populations in low-income settings [19,20]. Notwithstanding, the relatively low aggregate GDQS measures across all three countries in the study, despite the fact that ~40% of the women were from wealthy households in Cameroon and the DRC and 85% had a high socio-economic status in Nigeria, were unexpected findings and suggest that factors apart from the affordability of healthy foods contribute to the poor dietary quality of women in these settings. Furthermore, the comparable dietary risk prevalences among women from different socio-economic strata underscore the widespread nature of diet-associated health risks, as particularly evident in Nigeria where 90% of the women were from rural households.

In Cameroon, the proportion of rural women at low risk for poor diet quality outcomes was double that of their urban counterparts and more urban women were at moderate and high risk for nutrient inadequacy and diet-associated NCDs as compared to those in rural areas. These are interesting findings considering that urban populations generally have more exposure to health-related information and access to a wider variety of foods [21,22]. Therefore, this could be attributable to greater consumption of traditional foods in rural settings and/or the increasing availability and consumption of Western-influenced processed and high-calorie foods, snacks, and beverages in urban settings which are rapidly altering food environments and preferences [8,23,24]. Notwithstanding, the similar GDQS-measures for rural and urban women in Cameroon and Nigeria, and the higher GDQS- among rural women in the DRC observed in the study suggest other factors may also explain these findings which should be explored in future studies.

The upward trend in over-nutrition, along with the persistently high burden of anemia among WRA in SSA, characterize a double burden of malnutrition that poses significant challenges for already strained health systems [8,25-27]. Available data for Cameroon indicates 37% of WRA are overweight/obese, with a prevalence of 24% in rural areas and 32% among women in poor households, while 40% of WRA are estimated to be anemic [28]. Recent estimates for Nigeria suggest 28% of WRA are overweight/obese, with 21% and 36% in rural and urban areas, respectively, and 26% in poor households [29]. Moreover, in Nigeria, the prevalence of anemia among WRA is nearly 60% [29]. Though limited recent data are available for the DRC,

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estimates indicate the anemia prevalence is >40% among WRA and rates of overweight/obesity are 19% and 9% among women in urban and rural areas, respectively [30]. Consequently, concerted efforts are needed at the policy, program and community levels to identify and reduce women's dietary risk factors with a view to addressing the multiple forms of malnutrition in these settings. At the community level, nutrition education programs, mobile messaging, cooking demonstrations and peer support groups for women have shown to be effective as part of broader social and behavioral change initiatives that reinforce positive practices related to nutrition and health [31-36].

A key strength of this study is the large sample from three countries that provided a snapshot of women's dietary quality in diverse socio-demographic contexts in SSA. The findings are consistent with other measures such as the MDD-W and GDR, showing dietary inadequacies among WRA in Cameroon and Nigeria [14]. Standardized survey procedures, including random cluster sampling, ensured methodological consistency across all countries. Lastly, using the innovative GDQS method for primary data collection offered a more nuanced understanding of women's diets compared to other measures. However, certain study limitations should be acknowledged. The cross-sectional survey data restricted the ability to establish causal relationships between explanatory variables and GDQS metrics. Limited data available for Cameroon precluded examining the effects of women's education on their dietary quality. Moreover, factors such as women's nutritional knowledge and awareness of healthy eating practices, as well as household dynamics which impact food availability, sharing and meal patterns and which were not examined in the study, may have influenced women's dietary intake and should be considered in future studies. Evaluating the GDQS measures in relation to anthropometric and/or biomarker data would have strengthened the analysis and provided a more robust assessment of the linkages between women's nutritional status and dietary intake in these settings, but this was not feasible within the scope of this study. Lastly, while minimal within-person variation in dietary intake was expected in the study settings, future studies may consider incorporating repeated 24-hour dietary recalls for a subset of participants to validate this assumption.

CONCLUSION AND RECOMMENDATIONS FOR DEVELOPMENT

While traditional diets can be nutritious, ensuring year-round access to diverse and balanced foods remains a challenge for many women in the region. These findings underscore the importance of nutrition-centered policies and interventions that promote healthy diets and discourage the excessive intake of unhealthy foods. By capturing dietary risk factors for both under and over-nutrition, this study contributes to a more comprehensive understanding of women's dietary quality in these settings.

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There is a continuing need for timely and actionable dietary data, such as the GDQS, to examine ranges of intake at the food group level to provide specific information for evidence-based programming aimed at reducing diet-associated health risks and for monitoring the emerging dietary contributors to chronic illness among women in SSA. By better understanding the context-specific drivers of food choices, targeted interventions that are sensitive to local dietary practices and nutritional needs can be developed to promote the consumption of healthy foods, reduce the barriers to attaining diverse and nutrient-rich diets, and improve the health and nutrition of women in the region.

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Ethical considerations

Research ethics approval was obtained from the Comité National d'Éthique de la Recherche pour la Santé Humaine in Cameroon, Comité National d'Éthique de la Santé in the DRC, and the Health Research Ethical Committee in Taraba State, Nigeria. Informed written consent was obtained from all participants.

Declaration of conflicting interest

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Table 1: Study participant characteristics

	Cameroon[1] N=2604	DRC N=321	Nigeria N=895
Age			
15-19 years	140 (5.4)	40 (12.4)	37 (4.1)
20-29 years	1235 (47.4)	138 (43.0)	515 (57.6)
30-39 years	937 (36.0)	103 (32.1)	272 (30.4)
40-49 years	292 (11.2)	40 (12.5)	71 (7.9)
Formal education			
None	---	41 (12.8)	320 (35.7)
Primary		94 (29.3)	355 (39.7)
Secondary or higher		186 (57.9)	220 (24.6)
Household wealth			
Very poor (Q1)	330 (21.1)	72 (22.4)	126 (14.1)
Poor (Q2)	320 (20.4)	53 (16.5)	0 (0.0)
Medium (Q3)	289 (18.5)	51 (15.9)	0 (0.0)
Rich (Q4)	309 (19.7)	58 (18.1)	599 (66.9)
Very Rich (Q5)	318 (20.3)	87 (27.1)	170 (19.0)
Area			
Rural	1716 (65.9)	228 (71.0)	815 (91.1)
Urban	888 (34.1)	93 (29.0)	80 (8.9)

[1]Women's level of education was not collected in Cameroon

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Table 2: Mean Global Diet Quality Scores and percentage of women at low, moderate and high risk for poor diet quality outcomes [1]

	Cameroon N=2604	DRC N=321	Nigeria N=895
GDQS	17.9 (17.8, 18.1)	16.9 (16.4, 17.3)	17.0 (16.6, 17.4)
GDQS+ (positive) [2]	6.9 (6.7, 7.0)	4.7 (4.1, 5.2)	6.1 (5.7, 6.4)
GDQS- (negative)[3]	11.1 (11.0, 11.1)	12.2 (11.9, 12.5)	10.9 (10.7, 11.1)
Low risk	321 (10.9)	7 (1.6)	52 (6.8)
Moderate risk	1776 (67.3)	262 (78.3)	587 (61.8)
High risk	507 (21.8)	52 (20.1)	256 (31.4)

GDQS, Global Diet Quality Score

[1]For GDQS, GDQS+, and GDQS- data are presented as mean estimates with 95% CIs; For risk categories, data are presented as n (%). Low risk: GDQS ≥23; Moderate risk: GDQS ≥15 and <23; High risk: GDQS <15

[2]GDQS+ food groups: citrus fruits, deep orange fruits, other fruits, dark green leafy vegetables, cruciferous vegetables, deep orange vegetables, other vegetables, legumes, deep orange tubers, nuts and seeds, whole grains, liquid oils, fish and shellfish, poultry and game meat, low-fat dairy, eggs

[3]GDQS- food groups: processed meat, refined grains and baked goods, sweets and ice cream, sugar-sweetened beverages, juice, white roots and tubers, purchased deep fried foods, high-fat dairy, red meat

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Table 3: Mean Global Diet Quality Scores and percentage of women at low, moderate and high risk for poor diet quality outcomes by area of residence and household wealth status[1]

	Cameroon[2]				DRC[3]				Nigeria			
	Rural	Urban	Poor	Middle / rich	Rural	Urban	Poor	Middle / rich	Rural	Urban	Poor	Middle / rich
GDQS	18.2 * (17.9, 18.4)	17.4 (17.1, 17.6)	17.0 (16.7, 17.3)	17.2 (16.9, 17.4)	17.0 (16.4, 17.6)	16.8 (16.1, 17.4)	17.3 (16.3, 18.3)	16.8 (16.3, 17.3)	16.8 (16.5, 17.1)	17.3 (16.0, 18.5)	17.1 (16.4, 17.9)	16.9 (16.5, 17.4)
GDQS+	7.0 * (6.8, 7.2)	6.6 (6.4, 6.9)	6.2 (5.9, 6.6)	6.4 (6.1, 6.6)	4.3 (3.7, 5.0)	4.8 (4.0, 5.6)	4.6 (3.5, 5.8)	4.7 (4.0, 5.3)	5.9 (5.7, 6.2)	6.4 (5.3, 7.5)	6.0 (5.3, 6.7)	6.1 (5.7, 6.5)
GDQS-	11.2 * (11.1, 11.3)	10.8 (10.6, 10.9)	10.8 (10.6, 11.0)	10.8 (10.7, 10.9)	12.7 * (12.4, 12.9)	12.0 (11.6, 12.4)	12.6 (12.4, 12.9)	12.2 (11.8, 12.5)	10.9 (10.8, 11.0)	10.9 (10.3, 11.4)	11.1 (10.9, 11.4)	10.9 (10.7, 11.0)
Risk												
Low	253 (12.9) *	68 (6.1)	34 (5.2) *	54 (5.6)	4 (1.1)	3 (1.8)	4 (3.4)	3 (1.3)	44 (6.0)	8 (8.8)	7 (4.9)	45 (7.0)
Moderate	1153 (66.6) *	623 (69.2)	434 (65.2) *	639 (69.7)	188 (80.4)	74 (77.3)	100 (80.3)	162 (78.1)	535 (63.7)	52 (56.6)	90 (71.2)	497 (60.7)
High	310 (20.5) *	197 (24.7)	182 (29.6) *	223 (24.8)	36 (18.5)	16 (20.9)	21 (16.3)	31 (20.6)	236 (30.3)	20 (34.6)	29 (23.9)	227 (32.3)

GDQS, Global Diet Quality Score; Poor includes women from very poor (Quintile 1) and poor (Quintile 2) households; Middle/rich includes women from middle (Quintile 3), rich (Quintile 4), and wealthiest (Quintile 5) households

[1]For GDQS, GDQS+, and GDQS- data are presented as mean estimates with 95% CIs; For risk categories data are presented as n (%); * denotes statistical significance

[2]For Cameroon: GDQS rural vs. urban $p<0.001$; GDQS+ rural vs. urban $p=0.021$; GDQS- rural vs. urban $p<0.001$; low, moderate, and high-risk rural vs. urban $p<0.001$; low, moderate, and high-risk poor vs middle/rich $p<0.001$

[3]For DRC: GDQS- rural vs. urban $p=0.003$

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Table 4: Multivariable associations between women's age, education, household wealth, and area of residence and high risk for poor diet quality outcomes[1]

	Cameroon [2]		DRC		Nigeria	
	UOR	**AOR**	**UOR**	**AOR**	**UOR**	**AOR**
Age						
<30 years	1.00 (0.79, 1.27)	0.98 (0.75, 1.28)	1.47 (0.51, 4.24)	1.49 (0.53, 4.21)	0.77 (0.44, 1.36)	0.81 (0.48, 1.36)
≥30 years (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Formal education						
None	---	---	0.27 (0.08,0.84)	0.26 (0.08, 0.82)	0.86 (0.49, 1.50)	0.90 (0.53, 1.55)
Any (ref)			1.00	1.00	1.00	1.00
Household wealth [3]						
Poor	1.28 (0.98, 1.68)	1.32 (0.98, 1.77)	0.75 (0.29, 1.96)	0.80 (0.24, 2.68)	0.66 (0.38, 1.14)	0.70 (0.42, 1.15)
Middle/rich (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Area						
Rural	0.79 (0.62, 1.00)	0.92 (0.69, 1.24)	0.86 (0.31, 2.34)	1.03 (0.32, 3.28)	0.82 (0.34, 1.99)	0.92 (0.38, 2.24)
Urban (ref)	1.00	1.00	1.00	1.00	1.00	1.00

UOR, unadjusted odds ratio; AOR, adjusted odds ratio. Reference categories: ≥30 years, any education, middle/rich, urban

[1] High risk for poor diet quality outcomes defined as GDQS <15

[2] Women's level of education was not collected in Cameroon

[3] Poor includes women from very poor (Quintile 1) and poor (Quintile 2) households; Middle/rich includes women from middle (Quintile 3), rich (Quintile 4), and wealthiest (Quintile 5) households

REFERENCES

1. **Afshin A, Sur PJ and KA Fay** Health effects of dietary risks in 195 countries, 1990–2017: A systematic analysis for the Global Burden of Disease Study 2017. *Lancet.* 2019; **393**: 1958-72.

2. **Bain LE, Awah PK, Geraldine N, Kindong NP, Sigal Y, Bernard N and AT Tanjeko** Malnutrition in sub-Saharan Africa: Burden, causes and prospects. *Pan Afr Med J.* 2013; **15**: 120.

3. **Development Initiatives.** 2022 Global Nutrition Report: Stronger commitments for greater action. Bristol, UK; 2022.

4. **World Health Organization.** Global Nutrition Report: Nutrition in the WHO African Region. Geneva: WHO, 2017.

5. **Miller V, Webb P, Cudhea F, Shi P, Zhang J, Reedy J, Erndt-Marino J, Coates J and D Mozaffarian** Global dietary quality in 185 countries from 1990 to 2018 show wide differences by nation, age, education, and urbanicity. *Nat Food.* 2022; **3**: 694-702.

6. **Bosu WK** An overview of the nutrition transition in West Africa: Implications for non-communicable diseases. *Proc Nutr Soc.* 2015; **74**: 466-77.

7. **Popkin BM, Corvalan C and LM Grummer-Strawn** Dynamics of the double burden of malnutrition and the changing nutrition reality. *Lancet.* 2020; **395**: 65-74.

8. **Reardon T, Tschirley D, Liverpool-Tasie LSO, Awokuse T, Fanzo J, Minten B, Vos R, Dolislager M, Sauer C, Dhar R, Vargas C, Lartey A, Raza A and BM Popkin** The processed food revolution in African food systems and the double burden of malnutrition. *Glob Food Sec.* 2021; **28**: 100466.

9. **Bigna JJ and JJ Noubiap** The rising burden of non-communicable diseases in sub-Saharan Africa. *Lancet Glob Health.* 2019; **7***:* e1295-96.

10. **Chadare FJ, Affonfere M, Aidé ES, Fassinou FT, Salako KV, Pereko KK, Deme BS, Failler P, Kakaï RG and AE Assogbadjo** Current state of nutrition in West Africa and projections to 2030. *Glob Food Sec.* 2022; **32**: 100602.

11. **Ayoya MA, Bendech MA, Zagré NM and F Tchibindat** Maternal anaemia in West and Central Africa: Time for urgent action. *Public Health Nutr.* 2012; **15**: 916-27.

12. **de Quadros VP, Balcerzak A, Allemand P, de Sousa RF, Bevere T, Arsenault J, Deitchler M and BA Holmes** Global trends in the availability of dietary data in low and middle-income countries. *Nutrients.* 2022; **14**: 2987.

13. **FAO.** Intake Global Report on the State of Dietary Data. Rome: FAO, 2022.

14. **Global Diet Quality Project.** https://www.dietquality.org *Accessed June 10, 2024.*

15. **FAO.** Minimum dietary diversity for women: An updated guide to measurement - from collection to action. Rome: FAO, 2021.

16. **Bromage S, Batis C, Bhupathiraju SN, Fawzi WW, Fung TT, Li Y, Deitchler M, Angulo E, Birk N, Castellanos-Gutiérrez A, He Y, Fang Y, Matsuzaki M, Zhang Y, Moursi M, Gicevic S, Holmes MD, Isanaka S, Kinra S, Sachs SE, Stampfer MJ, Stern D and WC Willett** Development and validation of a novel food-based Global Diet Quality Score (GDQS). *J Nutr.* 2021; **151**: 75S-92S.

17. **Intake - Center for Dietary Assessment.** The Global Diet Quality Score: Data collection options and tabulation guidelines. Washington, DC: Intake, 2023.

18. **Moursi M, Bromage S, Fung TT, Isanaka S, Matsuzaki M, Batis C, Castellanos-Gutiérrez A, Angulo E, Birk N, Bhupathiraju SN, He Y, Li Y, Fawzi W, Danielyan A, Thapa S, Ndiyoi L, Vossenaar M, Bellows A, Arsenault JE, Willett WC and M Deitchler** There's an App for That: Development of an application to operationalize the Global Diet Quality Score. *J Nutr.* 2021; **151**: 176S-184S.

19. **Headey DD, Ecker O, Comstock AR and MT Ruel** Poverty, price and preference barriers to improving diets in sub-Saharan Africa. *Glob Food Sec.* 2023; **36**: 100664.

20. **World Bank Group** Food prices for nutrition datahub: Global statistics on the cost and affordability of healthy diets. Washington, DC: World Bank, 2023.

21. **de Bruin S, Dengerink J and J van Vliet** Urbanisation as driver of food system transformation and opportunities for rural livelihoods. *Food Secur.* 2021; **13**: 781-98.

22. **Casari S, Di Paola M, Banci E, Diallo S, Scarallo L, Renzo S, Gori A, Renzi S, Paci M, de Mast Q, Pecht T, Derra K, Kaboré B, Tinto H, Cavalieri D and P Lionetti** Changing dietary habits: The impact of urbanization and rising socio-economic status in families from Burkina Faso in sub-Saharan Africa. *Nutrients.* 2022; **14**: 1782.

23. **Azeez TA** Obesity in Africa: The challenges of a rising epidemic in the midst of dwindling resources. *Obes Med.* 2022; **31**: 100397.

24. **Holdsworth M and E Landais** Urban food environments in Africa: Implications for policy and research. *Proc Nutr Soc.* 2019; **78**: 513-25.

25. **Seifu BL, Mare KU, Legesse BT and TM Tebeje** Double burden of malnutrition and associated factors among women of reproductive age in sub-Saharan Africa: A multilevel multinomial logistic regression analysis. *BMJ Open.* 2024; **14**: e073447.

26. **Kushitor SB, Owusu L and MK Kushitor** The prevalence and correlates of the double burden of malnutrition among women in Ghana. *PLoS One.* 2020; **15**: e0244362.

27. **Irache A, Anjorin SS, Caleyachetty R and P Gill** Trends in the intraindividual double burden of overweight/obesity and anemia among adult women living in 33 low- and middle-income countries: A secondary analysis of Demographic and Health Surveys from 2000-2019. *J Nutr.* 2023; **153**: 1111-21.

28. **National Institute of Statistics (Cameroon) and ICF.** 2018 Cameroon DHS Summary Report. Rockville, Maryland, USA: NIS and ICF, 2020.

29. **National Population Commission (Nigeria) and ICF.** Nigeria Demographic and Health Survey 2018. Abuja, Nigeria and Rockville, Maryland, USA: NPC and ICF, 2019.

30. **USAID.** Democratic Republic of the Congo: Nutrition profile. Washington, DC: USAID, 2021. https://www.usaid.gov/document/democratic-republic-congo-nutrition-profile *Accessed June 2024.*

31. **Janmohamed A, Sohani N, Lassi ZS and ZA Bhutta** The effects of community home visit and peer group nutrition intervention delivery platforms on nutrition outcomes in low and middle-income countries: A systematic review and meta-analysis. *Nutrients.* 2020; **12**: 440.

32. **Lufuke M, Bai Y, Fan S and X Tian** Women's empowerment, food security, and nutrition transition in Africa. *Int J Environ Res Public Health.* 2022; **20**: 254.

33. **World Health Organization.** Global strategy on digital health 2020-2025. Geneva: WHO, 2021.

34. **Jardí C, Casanova BD and V Arija** Nutrition education programs aimed at African mothers of infant children: A systematic review. *Int J Environ Res Public Health.* 2021; **18:** 7709.

35. **Majamanda J, Maureen D, Munkhondia TM and J Carrier** The effectiveness of community-based nutrition education on the nutrition status of under-five children in developing countries: A systematic review. *Malawi Med J.* 2014; **26**: 115-8.

36. **Gram L, Fitchett A, Ashraf A, Daruwalla N and D Osrin** Promoting women's and children's health through community groups in low-income and middle-income countries: A mixed-methods systematic review of mechanisms, enablers and barriers. *BMJ Glob Health.* 2019; 4: e001972.