A Comparison of Household Consumption and Expenditure Survey Data to 24-Hour Dietary Recall Data in Estimating Dietary Intake of Fortifiable Foods in Malawi

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KEY TAKE-AWAY

Estimates derived from a household consumption and expenditure survey using nutrient density and 24-hour dietary recall reveal similar patterns of micronutrient inadequacies.

BACKGROUND

Large-scale food fortification (LSFF) is a key strategy to alleviate micronutrient deficiencies, yet questions remain about the extent to which fortified foods contribute to reducing inadequacies, particularly among remote populations. Household consumption and expenditure surveys (HCES) provide nationally and often sub-nationally representative data for dietary inferences. However, HCES are a proxy for the family diet; unlike 24-hour dietary recalls, they do not measure individual intake. This study compared the use of secondary HCES and 24-hour dietary recall data to make inferences about fortifiable food consumption and changes in micronutrient inadequacy without and with LSFF in Malawi.

METHODS

We analyzed individual-level 24-hour dietary recall data collected from 177 women of reproductive age (WRA) in rural areas of Malawi's Kasungu District in 2019 alongside a subsample of 183 rural Kasungu households with WRA from the 2019/20 Malawi Fifth Integrated Household Survey (a HCES).

We compared estimated access to LSFF vehicles (oil, sugar, and wheat flour); micronutrient inadequacies; and the contribution of fortifiable foods to micronutrient adequacy for nine micronutrients. We estimated apparent intake from HCES households using nutrient density per 1,000 kcal. To calculate the prevalence of inadequacy under the no fortification and fortification scenarios, we compared the nutrient intakes to the harmonized average requirements. Then we used Intake Monitoring, Assessment, and Planning Program software to adjust the nutrient intake in the 24-hour period surveyed for usual intake using repeated recalls.

RESULTS

The HCES estimated lower consumption (in grams/day per adult female equivalent [AFE]) for all three fortifiable food products compared with the 24-hour recall. (See table 1). However, compared to the 24-hour recall, HCES consistently had a higher percentage of coverage of the three fortifiable products. These results may be due to the differing recall periods—one to two weeks for HCES and one day for 24-hour recall, and these foods not being consumed daily. Estimates of the prevalence of micronutrient inadequacy between the HCES using the nutrient density approach and 24-hour recall intakes were similar under the no fortification scenario: within 20 percentage points for six of nine micronutrients (figure 1): iron; zinc; and vitamins B1, B2, B6, and B12; and seven of nine under the fortification scenario: iron; zinc; and vitamins A, B1, B2, B6, and B9. For the micronutrients with a difference beyond 20 percentage points, irrespective of fortification scenario, the discrepancy was largest for vitamin B3. The difference may be due to the HCES not capturing foods high in B3, such as fish and nuts (figure 2).

Figure 1. Comparison of Percentage of Women at Risk of Inadequate Nutrient Intakes using Nutrient Density Approach for the HCES and Intakes for the 24-Hour Recall under Fortification Scenarios

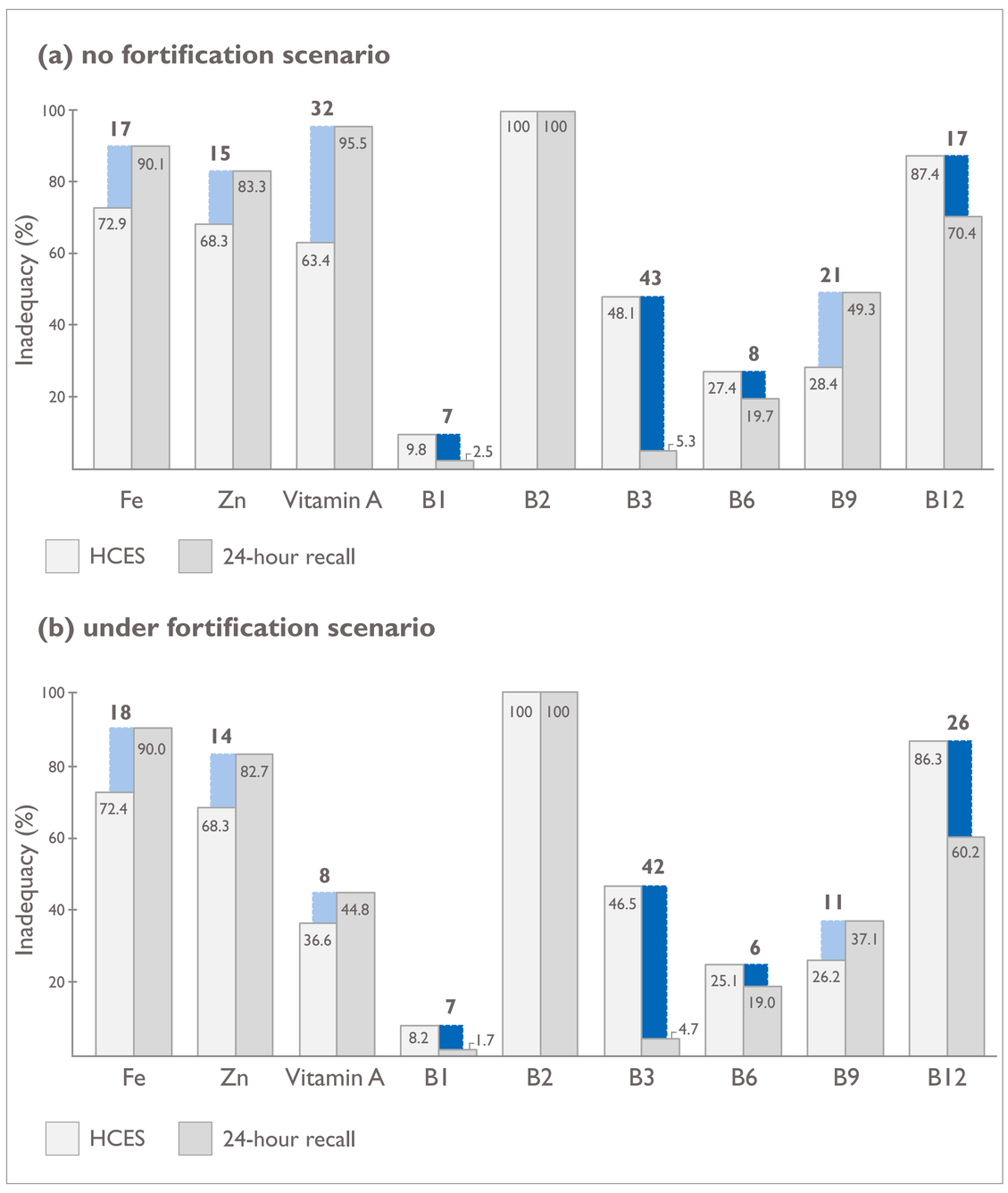
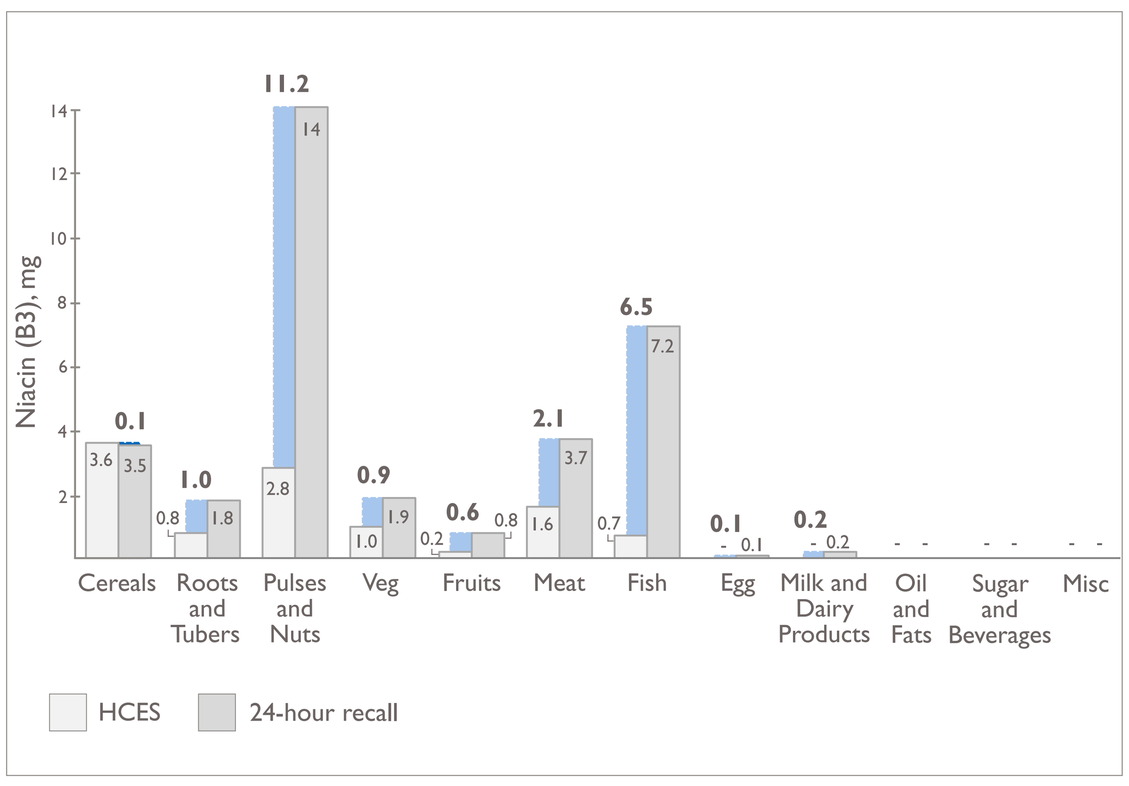


Table 1. Comparison of Median Apparent Consumption Quantity (Interquartile Range) and Percentage of Coverage between Estimates using HCES and 24-Hour Data

Food vehicle	HCES (n=183)	24HR (n=177)	p-value[1]
Sugar			
Intake (g/d)	17.0 (5.2, 28.3)	26.0 (20.1, 36.1)	<0.001
Coverage (%)	42.6	27.7	0.003
Oil			
Intake (g/d)	5.5 (2.6, 10.5)	21.2 (10.0, 37.7)	<0.001
Coverage (%)	83.6	45.2	<0.001
Wheat flour & products			
Intake (g/d)	12.3 (6.6, 17.1)	57.0 (44.8, 77.1)	<0.001
Coverage (%)	32.2	11.9	<0.001

[1]Comparison (intake) done using Mann-Whitney U test; Comparison (%) done using Pearson's Chi-squared test; grams/day per AFE for HCES

Figure 2. Average Food Group Contribution to Niacin (B3), for the HCES (per day per AFE) and the 24-Hour Recall (per day per person)



CONCLUSIONS

HCES, using the nutrient density approach, may be useful to have a relatively easy and fast approximation of the quality of the diet to identify the main micronutrient inadequacies in the absence of 24-hour dietary recall data. The study leaves open the possibility that HCES is a practical methodology to approximate quality of the diets and the contribution of LSFF to micronutrient adequacy, but it may still require improvement of the food list, especially, for example, fish and pulses and nuts in Malawi. Additional studies are needed to confirm whether differences in estimates of fortifiable food consumption between the HCES and 24-hour dietary recall are due to differences in the reporting period and frequency of consumption.

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