

ABSTRACT

Adequate dietary diversity and nutrient intake are essential for the health and productivity of women of reproductive age (WRA), yet disparities persist between rural and urban populations. This cross-sectional study assessed dietary patterns, nutrient adequacy, food security, and nutritional status among 400 WRA in monoga-prone rural and urban areas of northern Bangladesh. Data on dietary intake, dietary diversity, nutrient adequacy, and food security were collected and analyzed. Results revealed clear rural-urban disparities: urban women had significantly more diversified and nutrient-dense diets with higher consumption of pulses, nuts, seeds, dairy, and animal-source foods ($p < 0.05$), while rural women relied heavily on starchy staples and green leafy vegetables. Only 18.5% of rural households were food secure compared to 56% in urban areas, and severe food insecurity affected 53% of rural women compared to 15.5% in urban settings. Low dietary diversity scores were observed in 53% of rural women compared to 15.5% in urban areas. Macronutrient analysis showed widespread protein inadequacy (65.3% rural, 72.5% urban), excessive carbohydrate intake among rural women (62%), and universally insufficient fiber intake. Micronutrient inadequacies were pervasive, with near-universal deficiencies in vitamins A, B1, B6, calcium, and iron, alongside substantial inadequacy in vitamins B1, B9, vitamin C, zinc, and magnesium. Mean Adequacy Ratio (MAR) values were <1 for 100% of rural and 99.5% of urban women. Nutritional status indicated higher underweight prevalence in rural areas (16%) and greater overweight/obesity in urban areas (22% and 14.5%, respectively). Overall, both rural and urban WRA exhibited inadequate nutrient intake and widespread micronutrient deficiencies, underscoring the need for targeted interventions to improve dietary diversity, food security, and nutritional status.

PROBLEM STATEMENT

Women of reproductive age in monga-prone rural and urban areas of northern Bangladesh face inadequate dietary diversity and nutrient intake. Marked rural-urban disparities exist in food access, dietary patterns, and food security. Both undernutrition (rural) and overnutrition (urban) coexist alongside widespread micronutrient deficiencies. Poor maternal nutrition increases the risk of malnutrition and adverse health outcomes in the next generation, affecting child growth and development.

OBJECTIVES

1. To assess and compare rural-urban disparities in:
 - i. Dietary patterns & dietary diversity;
 - ii. Nutrient adequacy ratio (NAR) and household food security status;
2. To assess the nutritional status of WRA.
3. To provide evidence for designing targeted nutrition interventions and policies.

METHODOLOGY

Study Design and Tools: A cross-sectional study using a structured, interviewer-administered questionnaire adapted from Food and Agriculture Organization (FAO) guidelines and USAID Household Food Insecurity Access Scale (HFIAS). The tool covered sociodemographic data, 24-hour dietary recall, dietary diversity, nutrient adequacy (NAR, MAR), food security, and anthropometry.

Data Collection: Trained enumerators conducted face-to-face interviews. Dietary intake was assessed using 24-hour recall and food weight records. Anthropometric measurements (height, weight) were taken to calculate BMI following World Health Organization standards. Food security was evaluated using HFIAS (4-week recall).

Participants: Women aged 15-49 years residing ≥ 6 months in the study area. Excluded: pregnant/lactating women, individuals with chronic diseases, or non-consenting participants.

Dietary Diversity & Food Security Analysis: Dietary Diversity Score (DDS) calculated using FAO's MDD-W (10 food groups) [1]. DDS ≥ 5 = adequate, 3-4 = moderate, < 3 = poor. Food security categorized as food secure, mildly, moderately, or severely food insecure using HFIAS [2].



Figure 1. Study Area

Nutrient Adequacy Assessment: Nutrient intake calculated using Food Composition Table of Bangladesh. Nutrient Adequacy Ratio (NAR) computed as intake divided by recommended intake (NAR < 1 = inadequate). Mean Adequacy Ratio (MAR) is the average of all NAR values to assess overall adequacy [3].

RESULTS

Table 1. Dietary Disparities among respondents [n(%)]

	Mithapukur	Rangpur Sadar	Total	p value
Starchy Staple	200(30.0)	200(30.0)	400(100.0)	-
Pulse	45(34.1)	87(65.9)	132(33.0)	<0.001
Nuts/Seeds	7(18.9)	30(81.1)	37(9.3)	<0.001
Dairy Products	12(14.3)	72(85.7)	84(21.0)	<0.001
Meat/Poultry/Fish	142(46.4)	164(53.6)	306(76.5)	<0.05
Egg	44(38.3)	71(61.7)	115(28.8)	<0.05
GLV	152(53.7)	131(46.3)	283(70.8)	<0.05
Vit A Rich Fruits	10(43.5)	13(56.5)	23(5.8)	>0.05
Other Veg.	83(53.9)	71(46.1)	154(38.5)	>0.05
Other Fruits	26(29.2)	63(70.8)	89(22.3)	<0.001

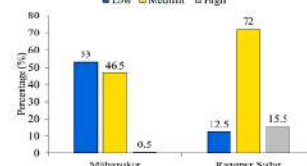


Figure 2. DDS Score of WRA

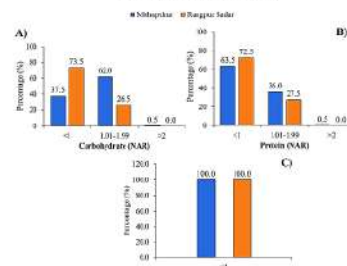


Figure 3. NAR Status for A) Carbohydrate, B) Protein, and C) Fiber

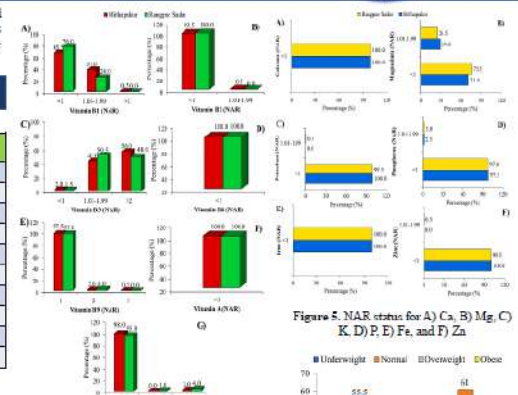


Figure 5. NAR status for A) Ca, B) Mg, C) K, D) P, E) Fe, and F) Zn

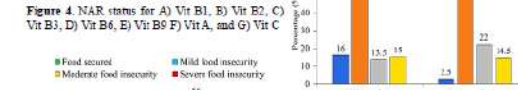


Figure 4. NAR status for A) Vit B1, B) Vit B2, C) Vit B3, D) Vit B6, E) Vit B9, F) Vit A, and G) Vit C

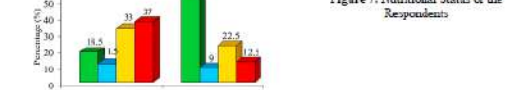


Figure 6. Household Food Security Status

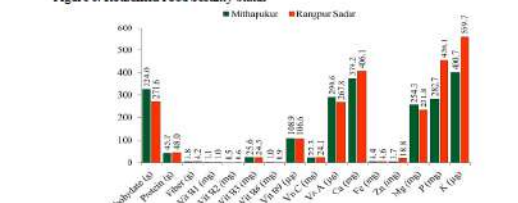


Figure 8. Total Amount of Nutrient Consumption

REFERENCES

- [1] FAO & IHL 160 (2016). Minimum dietary diversity for women: A guide for measurement. Rome, Italy: Food and Agriculture Organization of the United Nations.
- [2] Coates, J., Swinfield, A., & Bilal, P. (2007). Household food insecurity scale for measurement of household food access: Indicator guide. Washington, DC: USAID Food and Nutrition Technical Assistance Project, Academy for Educational Development.
- [3] Shalwan, N., Ishii, A. T. M. A., Moidudhammad, M., et al. (2014). Food composition table for Bangladesh. Rome, Italy: Food and Agriculture Organization of the United Nations.