Evaluation of Dietary Practices in an Increasingly Urbanised Rwanda – Results From Repeated Cross-sectional Surveys

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Introduction

- The double burden of malnutrition has been observed in Rwanda, which involves the persisting issue of undernutrition and infectious diseases [1], but also overnutrition and the development of non-communicable diseases (NCDs) [2].

- Dietary transition involves a shift from traditional, nutrient-rich dietary patterns to a 'Western diet' [3], caused by urbanisation, rapid economic growth and rural-urban migration [4].

- Transitional and westernised dietary patterns and habits have been observed in urban areas of other sub-Saharan African (sSA) countries such as Burkina Faso, Uganda and Kenya [5,6,7].

- A previous cross-sectional study in India reported that rural to urban migration was associated with increased fat intake and obesity [8].

- The objective of the present study was to describe the dietary patterns of a sample of Rwandan adults and assess urban and rural differences.

Methods

Study Design & Participants

- Repeated cross-sectional study.
- 300 adults aged 18-49 years were selected from 300 households in urban and rural regions of Rwanda (150 urban, 150 rural).

Data Collection & Dietary Assessment

- Socio-economic screening questionnaire.
- Two multiple-pass 24-hour dietary recalls were conducted every four months (a total of eight recalls throughout twelve months) [9].

### Dietary Pattern Derivation & Statistical Analyses

- Eighteen food groups were derived from 148 food items.
- Exploratory factor analysis (EFA) was used to derive dietary patterns from foods consumed in all, urban and rural subjects.

Results

Table 1 - Socio-demographic characteristics

Characteristics	Frequency (%)
Sex	
Male	60 (28.8)
Female	148 (71.2)
Geographical region	
Urban	102 (49)
Rural	106 (51)
Age category	
18-25	24 (11.5)
26-30	40 (19.2)
31-35	42 (20.2)
36-40	53 (25.5)
41-45	28 (13.5)
46-49	21 (10.1)
Education level	
None	1 (0.5)
Primary school	121 (58.2)
Secondary school	56 (26.9)
University	8 (3.8)
Vocational training	2 (1)
Unspecified	20 (9.6)

Figure 1 - Prevalence of Food Group Consumption in Urban and Rural Subjects (%)
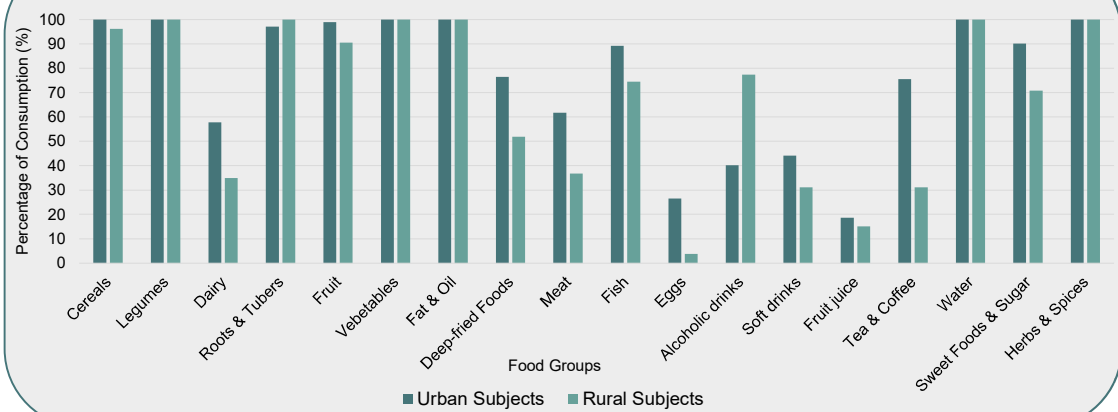
Dietary Patterns

Table 2 - All Subjects

Food group	Factor 1: Traditional Pattern, All	Factor 2: Transitional Pattern, All	Factor 3: Westernised Pattern, All
Cereals	0.4969	0.5326	-
Legumes	0.5112	-	- 0.4984
Dairy	-	0.4469	-
Roots & Tubers	-	-	-
Fruit	0.4720	-	-
Vegetables	0.8755	-	-
Fat & Oil	0.8814	-	-
Deep-fried Foods	-	-	0.5859
Meat	-	-	0.7040
Fish	0.4460	-	-
Eggs	-	-	-
Alcoholic drinks	-	- 0.4653	-
Soft drinks	-	-	0.5990
Fruit Juice	-	-	-
Tea & Coffee	-	0.5971	-
Water	0.8129	-	-
Sweet Foods & Sugar	-	0.4042	-
Herbs & Spices	0.9032	-	-

Table 3 - Urban Subjects

Food group	Factor 1: Traditional Urban Pattern	Factor 2: Transitional Urban Pattern	Factor 3: Westernised Urban Pattern
Cereals	0.6176	-	-
Legumes	0.4736	-	- 0.5829
Dairy	-	0.6610	-
Roots & Tubers	-	-	- 0.4371
Fruit	0.4872	-	-
Vegetables	0.9119	-	-
Fat & Oil	0.9494	-	-
Deep fried Foods	-	-	-
Meat	-	-	0.4614
Fish	0.5390	-	-
Eggs	-	-	-
Alcohol	-	-	0.6278
Soft drinks	-	-	-
Fruit Juice	-	-	-
Tea & Coffee	-	0.5533	-
Water	0.8031	-	-
Sweet Foods & Sugar	-	0.4780	- 0.4440
Herbs & Spices	0.9025	-	-

Table 4 - Rural Subjects

Food group	Factor 1: Traditional Rural Pattern 1	Factor 2: Traditional Rural Pattern 2	Factor 3: Transitional Rural Pattern	Factor 4: Westernised Rural Pattern
Cereals	-	-	0.7027	-
Legumes	-	0.6605	-	-
Dairy	-	-	-	-
Roots & Tubers	-	-	-	-
Fruit	-	-	-	-
Vegetables	0.8460	-	-	-
Fat & Oil	0.9475	-	-	-
Deep-fried foods	-	-	-	0.5650
Meat	-	-	-	0.9419
Fish	-	-	-	-
Eggs	-	-	-	-
Alcoholic drinks	-	-	-	-
Soft drinks	-	-	-	0.8810
Fruit Juice	-	-	-	-
Tea & Coffee	-	-	-	-
Water	-	0.7715	-	-
Sweet Foods & Sugar	-	-	0.6495	-
Herbs & Spices	-	0.5669	-	-

Discussion & Conclusions

- Identical food groups had high positive factor loadings for traditional dietary patterns in all subjects and urban subjects, similar to those found in Uganda [6] and Ghana [10].
- The rural diet may be less diverse than the urban diet as less food groups had high positive factor loadings in the traditional rural dietary patterns.
- The transitional and westernised dietary patterns identified in the three groups (all, urban and rural) could be representative of gradual dietary transition in both the rural and urban populations, as such food groups are adopted from the 'Western diet,' characterised by intake of animal products, sweets and processed foods [11].
- However, a slightly more advanced stage of dietary transition may be observed in the urban areas due to a higher prevalence of consumption of westernised food groups.
- The EFA method may be a limitation as results can be difficult to compare to findings in previous studies due to variations with regards to food grouping and factor labelling.
- Future research should focus on the quantitative dietary assessment of urban and rural populations in Rwanda and associations with the development of NCDs.

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