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Assessing bio-diverse foods in dietary intake surveys-a case study considering random selected samples

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Abstract

This survey is based on expressing diet diversity indicators such as the diet diversity score (DDS) or food variety score as a reflection for dietary quality and measure the diversity of unique food groups and food items consumed, respectively. During our approach the questionnaires conducted in the period of 2022 and 2023 the DDS for women was a count of the total number of food groups consumed from a list of 10: (i) grains, white roots and tubers, and plantains; (ii) pulses; (iii) nuts and seeds; (iv) dairy; (v) meat, poultry, and fish; (vi) eggs; (vii) dark-green leafy vegetables; (viii) other vitamin A-rich vegetables and fruits; (ix) other vegetables; and (x) other fruits. For children, a seven food-group classification was used, including the following: (i) grains, white roots and tubers, and plantains; (ii) legumes, nuts, and seeds; (iii) dairy; (iv) meat, poultry, and fish; (v) eggs; (vi) vitamin A-rich fruits and vegetables; and (vii) other fruits and vegetables. Following references, a 15-g minimum quantity consumed was considered as a cutoff for species inclusion in the DDS for women but not for children. The questionnaire considered 271 adult woman and 233 children. The Minimum Dietary Diversity (MDD) was used as a cutoff for higher nutrient adequacy and refers to a minimum of five and four food groups for women and children, respectively. The results shows that >50% of adult woman's have value of dietary species richness lower than 0.5, while in case of children's the average value was slightly higher (0.52).

Introduction

Following different approaches, a food system must be considered in the context of rapid population growth, urbanization, growing wealth, changing consumption patterns, and globalization as well as climate change and the depletion of natural resources [1]. The developments in food systems have yielded many positive results, especially over the past three decades in developing countries. These results include the expansion of off-farm employment opportunities as food industries have developed, and the widening of food choices beyond local staples, thus satisfying consumers' preferences in terms of taste, form and quality. The World Health Organization recently reported that malnutrition affects one in every three people worldwide, afflicting all age groups and populations, particularly in the developing world; malnutrition continues also to be a cause and a consequence of disease and disability in the children who survive [2, 3]. This is the largest number and proportion of malnourished people ever recorded in human history [4]. The food shortage and malnutrition problems are primarily related to rapid population growth in the world and to the declining per capita availability of land, water and energy resources [5].

This survey is based on expressing diet diversity indicators such as the diet diversity score (DDS) or food variety score as a reflection for dietary quality and measure the diversity of unique food groups and food items consumed, respectively.

The recent analyses [6] of dietary transition in developing countries, including Albania, in association with globalization have noted increases in the diversity of plants contributing to diets locally, along with a western type of diets transition in preference of energy-dense foods (i.e., animal products, plant oils, and sugars) over

cereals, pulses, and vegetables, and of particular major crop plants within these food categories over traditional crops [7]. This type of impact of such changes on overall crop diversity on a global scale has not been comprehensively documented, although recent changes in varietal and allelic level diversity of some crops have been investigated [6].

Materials and methods

The methodological approach is based on a questionnaires conducted in the period of 2022 and 2023 the DDS for women was a count of the total number of food groups consumed from a list of 10: (i) grains, white roots and tubers, and plantains; (ii) pulses; (iii) nuts and seeds; (iv) dairy; (v) meat, poultry, and fish; (vi) eggs; (vii) dark-green leafy vegetables; (viii) other vitamin A-rich vegetables and fruits; (ix) other vegetables; and (x) other fruits.

For children, a seven food-group classification was used, including the following: (i) grains, white roots and tubers, and plantains; (ii) legumes, nuts, and seeds; (iii) dairy; (iv) meat, poultry, and fish; (v) eggs; (vi) vitamin A-rich fruits and vegetables; and (vii) other fruits and vegetables. Following references, a 15-g minimum quantity consumed was considered as a cutoff for species inclusion in the DDS for women but not for children. The questionnaire considered 271 adult woman and 233 children. The Minimum Dietary Diversity (MDD) was used as a cutoff for higher nutrient adequacy and refers to a minimum of five and four food groups for women and children, respectively.

Due to the fact that the study assessed the level of food biodiversity in the diet, intake of breast milk was not considered in the calculation of biodiversity indicators, as recommended by [6]. The consumption of different parts of particular plant or animal species was counted once, with no minimum quantity. No minimum quantity consumed was applied to include a species in the biodiversity indicators.

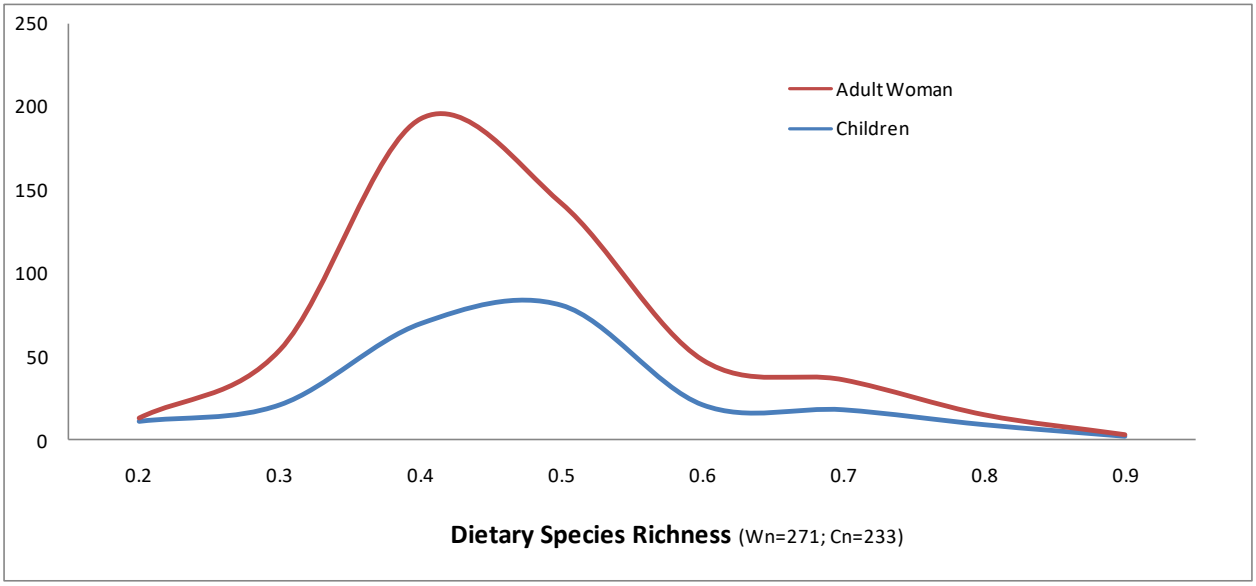

Figure 1. Dietary Species richness (Woman-n=271 and Children n=223)

Results and discussions

As presented at the introductory section, the current approach aimed to recommend a cross-cutting indicator that measures food biodiversity in human diets and helps guide interventions toward human and environmental health simultaneously. Similar approach has been performed by [6] where the applied three ecological biodiversity indicators to dietary intake data of women and children in seven lowland middle-income countries and evaluated how these indicators were associated with nutrient adequacy. Associations between food biodiversity, diet diversity, and nutrient adequacy as three complementary dimensions of diet quality were assessed. It is worth to mention that country (Albania) was facing serious changes within the last three decades, where large number of population was moving from upland to lowland regions, the western type food and diets were replacing the traditional one. Further on, within this article we assessed the use of a cutoff for minimal food biodiversity to identify diets with higher nutrient adequacy and compared it with the existing cutoff for minimum diet diversity. Following data presented in Figure 1 and Figure 2, the results of analyzed samples shows that >50% of adult woman's have value of dietary species richness lower than 0.5, while in case of children's the average value was slightly higher (0.52).

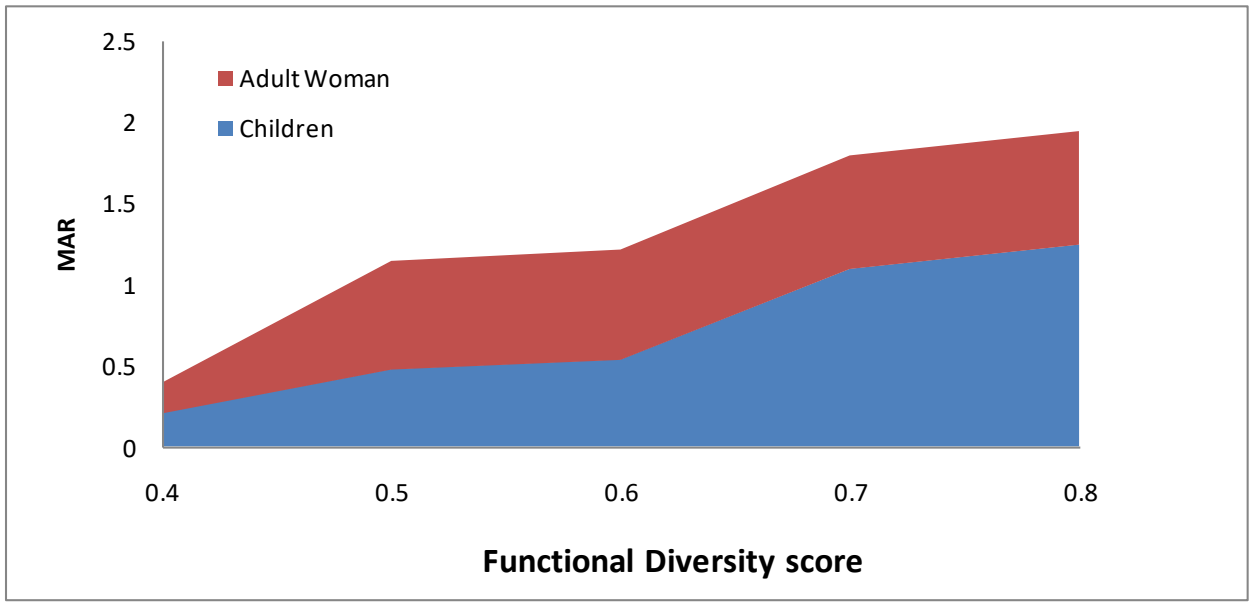

Figure 2. Functional Diversity score (Woman-n=271 and Children n=223)

Conclusion

Assessment of the contribution of species in the diet enables identifying species with the greatest potential to improve diets in different local contexts and provides additional imputes to assess the importance of food diversity in ensuring diet quality. The data can be further correlated with the health state of considered society groups. The present study provides evidence on the role of different foods commodities to both energy and micronutrient intakes in rural areas and also population coming from these regions. Identifying foods consumed at the species level adds information that supports both conservation and sustainable food system practices.

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