Food-Aid Quality Correlates Positively With Diet Quality of Food Pantry Users in the Leket Israel Food Bank Collaborative

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Introduction

Enduring poverty in affluent countries, Israel included, has increasingly driven charitable food banks and pantries to provide food for large segments of society with chronic food insecurity.

Many food banks distribute staples that are replete in calories but poor in essential nutrients and are potentially harmful for this population already suffering from a higher prevalence of nutrition related diseases. Alternatively, food banks that provide nutrient dense perishable food such as fruit and vegetables might improve the quality of the food distributed by their partners and the nutrition and health of the households they serve.

It is vital to gauge the long-term effect of food banks on the health and wellbeing of those who routinely depend on their food but so far, the data has been sparse. We designed this exploratory study of adult Israeli food pantry users to examine the relationship between the quality of the food baskets distributed by multiple NPOs and the recipients' nutrition and health.

Methods

- The study was designed as a structured, cross-sectional telephone survey of 100 food-aid recipients receiving assistance from NPOs partnering with the "Leket Israel" food bank.
- NPOs staff recruited a representative demographic of volunteers from among their clients and registered the content of the food basket which they received.
- The interview consisted of a demographic questionnaire; a food security questionnaire; self-reported anthropometric measurements and health status; and a food frequency questionnaire.
- The interviews were conducted in Hebrew and Arabic.
- We devised two quality scores to evaluate the nutrient content of both the individual diets and food baskets:
  1. The Healthy Portions Score (HPS) is a food-based score which measures adherence to the "Basic Healthy Food Basket Guidelines" established by the Government of Israel's National Nutritional security Council and Ministry of Health.
  2. The Nutrient Density Score (NDS) captures the degree to which the diet achieves the recommended dietary allowance (RDA) for vital macro and micronutrients, divided by the overall energy density of the food.
- Analysis: Factors found in univariate analysis to show significant associations or trends for association ($P < 0.1$) were entered into the multivariable model and the most parsimonious models were selected in the final analysis.

Results

Twenty-two food pantries/NPOs were invited to participate in the study and 16 agreed to participate. Out of 152 participants who signed the consent, 90 had finished the interview including the FFQ and 53 had complete data.

The mean age was 51.1 ± 14.5 years and 77.1% were female. The majority of those surveyed identified as Israeli Jews, with the remainder either Israeli Muslims, Druze, Christian or Others (75.2, 12.4, 8.6, 1.9, and 1.9%, respectively).

About a third of the population earned a salary during the 3 months prior to the interview, 40% received a disability allowance or pension, and 25.7% were unemployed. 64.8% of households included children under the age of 18. Despite already receiving aid, over a third of the participants reported food insecure households but not experiencing hunger, while almost a half suffering from food insecurity with moderate or severe hunger (Table1). Conditions related to metabolic syndrome or cardiovascular disease as well as noncommunicable diseases involving nutritional deficiencies were widely prevalent.

Figure 1 reveals the nutrient intake inadequacy among study participants. Only 4.4% consumed enoug healthy portions per day to meet the government's "Basic Guidelines," and only half of the population met the recommended intake of fruit and vegetables.

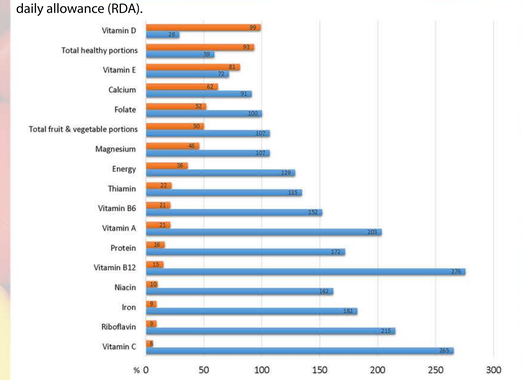
Table 1. Food security, health, and anthropometric status of the study participants.

	N	%
FOOD SECURITY		
Food secure	18	17.1
Food insecure without hunger	39	37.1
Food insecure with moderatae hunger	40	38.1
Food insecure with severe hunger	8	7.6
GENERAL HEALTH		
Very good	16	15.2
Good	44	41.9
Not good	29	27.6
Not good at all	16	15.2
NON COMMUNICABLE DISEASES (NCDs)		
High blood pressure	42	40
Anemia	38	36.2
High cholesterol	35	33.3
Tryglycerides	24	22.9
Oestoporesis	12	11.4
Diabtes	11	10.5
Cancer	6	5.7
Stroke	1	1
BODY MASS INDEX (BMI)		
Underweight (<18.5)	3	2.9
Normal weight (18.5-24.9)	37	35.2
Over-weight (25-29.9)	24	22.9
Obese (>30)	36	34.3
	Mean BMI ±SD	**Median BMI**
	28±6.5	26.9

All data are self-reported. Total sample size = 105 except where indicated otherwise. NCDs, Non-communicable diseases; BMI, Body mass index.

The mean energy intake was 1,974 ± 661 kcal/d (Mean ± SD, Median 1,886 kcal) which represents 128.7% of the mean recommended itake. Nevertheless, only 64% of participants reported intake that met their estimated energy requirements (EER). The situation was better for protein, with mean consumption of 80.9 gr protein per day, and over 72% reaching recommendations. However, the opulation's intake of many essential micronutrients was well below the recommended daily allowance (RDA).

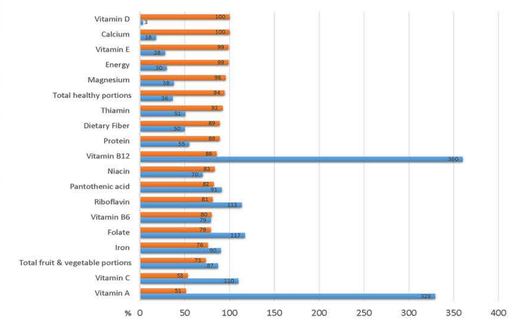
Figure 1. Dietary intake of study participants in in relation to recommended daily allowance (RDA).



Blue bar represent mean dietary intake of the study cohort expressed as % of RDA. Red bars represent % of survey participants whose habitual diet fails to achieve the RDA.

On average, food baskets provided approximately one third of the recommended number of healthy portions required per household (36%) but almost all of the recommended portions of fruits and vegetables (87%). The average basket provided only 29.8% of a household's required energy, 54.9% of their protein and 49.9% of their recommended allowance of fiber. However, Less than one third of the baskets provided the full household requirement for most minerals and vitamins, only 14.4% of baskets provided the recommended total number of healthy portions, and only one quarter of the baskets supplied the number of fruit and vegetable portions.

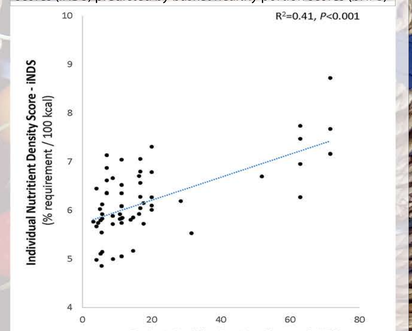
Figure 2. Basket contribution to household dietary requirements



Blue bars represent % of household requirement provided by average food aid basket. Red bars represent % of baskets that do not meet household requirements.

Although the baskets provided a relatively small portion of the dietary requirements of the recipients the quality of food aid as indicated by the basket healthy portions score (bHPS) was positively correlated with the quality of the aid-recipients' diet (iNDS). In a linear regression, the correlation remained highly significant after adjusting for gender, marital status, and country of birth. Figure 3 (R^2 = 0.41, F = 60.0, $p < 0.001$) clearly shows the linear relationship between bHPS and the unstandardized iNDS values predicted by this linear regression model.

Figure 3. Unstandardized predicted individual nutrient density scores (iNDS) predicted by basket healthy portion scores (bHPS)



Regression adjusted for gender, marital status, and country of birth

Discussion

Our findings are important because they suggest that nutritionally high-quality food distribution can contribute to the diet quality of food insecure populations. This is relevant to resource allocation and policy making within NPOs, food banks, and the government.

Our study is the first quantitative evidence that efforts to distribute fruit and vegetables through the supply chain from food bank through pantry to recipient can yield measurable benefit for the individuals who receive the food.

Future studies will need to consider additional issues that were beyond the scope of the present and address differences in food allocation and utilization between children and adult household members as well as probe Empirical research alone cannot answer the larger question of whether food banks are an appropriate or ethical response to food insecurity and poverty in affluent societies. Nevertheless, as charitable food banks become increasingly embedded in national responses to poverty and hunger, data on how food banks influence their users' health is crucial to inform practice and policies that not only alleviate immediate hunger, but contribute effectively and ethically to the long-term health and wellbeing essential to escaping the downward spiral of poverty. This study epresents a necessary step in that direction.

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