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# Development and validation of the New Zealand Women's Healthy Diet Index

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## Abstract

**Background:** Diet quality indices represent an alternative approach to assessing associations between diet, health, and disease. At present, there is no simple, valid, food-based diet quality index to reflect the adherence of young women to national dietary guidelines in New Zealand

**Aim:** To develop and validate a healthy diet index to assess diet quality and adherence of young women to the Eating and Activity Guidelines for New Zealand Adults (EAGNZA).

**Method:** Dietary information was obtained from young women (n=110) aged 19 – 45 years who completed the New Zealand Women’s Food Frequency Questionnaire (NZWFFQ). Data from the NZWFFQ was used to develop the New Zealand Women’s Healthy Diet Index (NZW-HDI). Participants also completed a four-day weighed food record (FR), which was used to validate the index. Relative validity was evaluated by comparing the NZW-HDI total scores derived from the NZWFFQ against the NZW-HDI derived from the FR. Paired t-tests, Pearson’s correlation coefficients, cross-classification, and weighted kappa were used to assess relative validity. Construct validity of the NZW-HDI was determined using nutrient intakes from the FR and Spearman’s correlation coefficients and linear contrast analysis.

**Results:** Participants achieved an average total score of  $76.7 \pm 0.9$  for the NZW-HDI derived from the NZWFFQ and  $75.2 \pm 11.1$  derived from the FR. For relative validity, a significant correlation between total scores from the NZWFFQ derived NZW-HDI and the FR derived NZW-HDI ( $r = 0.29$ ;  $P < 0.05$ ) was found. Cross-classification of participants showed 50% were classified into the same tertile, and 16% were grossly misclassified into opposite tertiles. The weighted  $\kappa$ -statistic found both methods had fair agreement in ranking the NZW-HDI total score ( $\kappa = 0.244$ ). For construct validity, the NZW-HDI total score was significantly and positively related to dietary fibre (0.227), vitamin C (0.214), folate (0.286), and calcium intakes (0.277), and inversely related to intakes of saturated fat (-0.318) and alcohol (-0.236) (all  $p < 0.05$ ). In addition, using linear contrast analysis, higher NZW-HDI scores were associated with higher intakes of vitamin C and folate ( $P < 0.05$ ).

**Conclusion:** Adherence to the EAGNZA was moderate in this sub-sample of participants. The NZW-HDI was found to have fair relative validity in assessing diet quality. As expected, the total score was positively associated with dietary fibre, vitamin C, folate, and calcium intakes, and inversely related to intakes of saturated fat and alcohol. Future research is required to improve the validity of the NZW-HDI before use in larger study populations.

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## Abbreviations

Alternate Healthy Eating Index	A-HEI
Australian Eating Survey Food Frequency Questionnaire	AES FFQ
Australian Health Eating Index	Aust-HEI
Australian Recommended Food Score	ARFS
Body Mass Index	BMI
Bioelectrical Impedance Analysis	BIA
Coronary Heart Disease	CHD
Cardiovascular Disease	CVD
Canadian Healthy Eating Index	Canadian-HEI
Dietary Guidelines Index	DGI
Dietary Guidelines for Americans Index	DGAI
Diet Quality Index	DQI
Diet Quality Indices	DQIs
Diet Quality Index Alternative	DQI-a
Diet Quality Index China	DQI-C
Diet Quality Index Revised	DQI-R
Dietary Quality Score	DQS
Eating and Activity Guidelines for New Zealand Adults	EAGNZ
Examining Predictors Linking Obesity Related Elements	EXPLORE
Food Based Dietary Guidelines	FBDG
Food Frequency Questionnaire	FFQ
Food Habits Questionnaire	FHQ
Food Record	FR
Healthy Diet Indicator	HDI
Healthy Eating Index	HEI

Healthy Eating Index – 2005	HEI-2005
Healthy Eating Index – 2010	HEI-2010
Healthy Eating Index for Australian adults	HEIFA-2013
Healthy Food Index	HFI
Healthy Food and Nutrient Index	HFNI
Human Nutrition Research Unit	HNRU
Low-Density Lipoproteins	LDL
New Zealand	NZ
Nutrient Reference Values	NRVs
New Zealand Adolescent Food Frequency Questionnaire	NZAFFQ
New Zealand Women’s Food Frequency Questionnaire	NWFFQ
New Zealand Diet Quality Index for Adolescents	NZDQI-A
New Zealand Women’s Healthy Diet Index	NZW-HDI
Mediterranean Diet Score	MDS
Overall Dietary Index Revised	ODI-R
Recommended Food Score	RFS
Saturated Fat	SF
Simple Diet Quality Index	SDQI
Standard Deviation	SD
The Index of Relative Socioeconomic Disadvantage	SEIFA
United States	US
United States Department of Agriculture	USDA