

RELATIVE VALIDITY AND REPRODUCIBILITY OF A COMPLEMENTARY FEEDING QUESTIONNAIRE TO ASSESS NUTRIENT INTAKE IN NZ INFANTS

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AIM: To assess the relative validity and reproducibility of a complementary feeding questionnaire (CFQ) to determine nutrient intakes of New Zealand infants aged 9 to 12 months.

BACKGROUND

Dietary assessment in infants is challenging but necessary to understand the relationship between diet and growth and development¹. There are currently no simple, validated dietary assessment tools to determine nutrient intake in New Zealand (NZ) infants.

METHOD

- Healthy term infants (n=95) aged 10±1 months were recruited
- The primary caregiver completed a complementary feeding questionnaire (CFQ) twice (CFQ-1 and CFQ-2), approx 4 weeks apart (reproducibility).
- A four-day weighed food record (4dWFR) was collected on non-consecutive days between CFQ administrations (validity).
- Validity and reproducibility were assessed for intakes of energy and nutrients using paired t-tests, correlation coefficients, cross-classification and Bland-Altman analysis.



RESULTS

For validity, most nutrients from the CFQ were comparable to the 4dWFR (range <1-28% difference; Table 1). Correlation coefficients ranged from r=0.18 (saturated fat) to r=0.81 (iron; mean r=0.52). Over half (mean, 54%) of participants were correctly classified by both methods (range 39% to 67%). Between 2% and 15% of participants (mean 7%) were grossly misclassified. Most nutrients showed acceptable agreement between methods (κ=0.20-0.60).

For reproducibility, the CFQ had adequate performance for all nutrients (range 1-14% difference; correlation coefficients range r=0.40 (folate) to r=0.82 (vitamin B₁₂; mean r=0.67)). Most participants were correctly classified by both CFQ's (mean 60% correctly classified and 6% grossly misclassified). All nutrients showed acceptable to good agreement between the CFQ-1 and CFQ-2 (range κ=0.25 to κ=0.66).

Table 1 Validity of the CFQ: difference in mean daily nutrient intakes, correlations, cross-classification by tertiles and weighted kappa based on the 4dWFR and CFQ-1 among infants aged 9 to 12 months (n=95).

Nutrients	4dWFR Daily intake ^(a)	CFQ-1 Daily intake ^(a)	Mean difference (%)	Paired t-test (p-value)	Correlation Coefficients ^(b)	Correctly classified (%)	Grossly misclassified (%)	κ
Energy (kJ)	3295 ± 810	3306 ± 1047	<1	0.92	0.37†	44.2	10.5	0.3
Protein (g)	26.6 ± 8.8	27.2 ± 10.3	-2.2	0.55	0.51†	52.6	5.3	0.4
Fat (g)	33.2 ± 8.7	37.1 ± 13.6	-11.8	<0.01	0.35†	52.6	10.5	0.3
Saturated fat (g)	13.5 ± 4.6	16.3 ± 6.2	-20.5	<0.01	0.18	43.2	14.7	0.2
CHO (g)	92.7 ± 31.2	83.6 ± 29.6	9.8	<0.01	0.41†	55.8	9.5	0.4
Fibre (g)	9.3 ± 4.5	6.8 ± 3.6	26.6	<0.01	0.37†	46.3	9.5	0.3
Vitamin E (mg)	4.8 ± 2.2	4.7 ± 2.4	<1	0.97	0.47†	49.5	8.4	0.3
Folate (µg)	137.8 ± 74.7	115.1 ± 54.2	16.5	<0.01	0.46†	50.5	12.6	0.3
Potassium (mg)	1257 ± 405	1071 ± 434	14.8	<0.01	0.50†	45.3	8.4	0.3
Calcium (mg)	478 ± 207	498 ± 246	-4.1	0.27	0.73†	65.3	2.1	0.6
Zinc (mg)	4.8 ± 1.9	5.1 ± 2.3	-5.8	0.13	0.67†	60.0	4.2	0.5
Selenium (µg)	23.8 ± 7.8	22.8 ± 8.1	4.5	0.28	0.27†	39.0	12.6	0.2
Thiamin (mg)	0.6 [0.6 - 0.7]	0.6 [0.5 - 0.6]	13.1 [∞]	0.01	0.69†	57.9	3.2	0.5
Riboflavin (mg)	0.8 [0.7 - 0.9]	0.7 [0.6 - 0.8]	12.9 [∞]	<0.01	0.70†	54.7	4.2	0.5
Niacin (mg)	5.5 [5.0 - 6.0]	4.7 [4.3 - 5.2]	15.8 [∞]	<0.01	0.66†	57.9	3.2	0.5
Vitamin C (mg)	57.3 [51.8 - 63.4]	49.7 [44.8 - 55.1]	14.3 [∞]	<0.01	0.54†	60.0	5.3	0.5
Vitamin B ₁₂ (µg)	1.0 [0.9 - 1.2]	1.0 [0.8 - 1.1]	6.2 [∞]	0.31	0.71†	61.1	4.2	0.5
Iodine (µg)	41.9 [37.4 - 46.9]	39.5 [34.5 - 45.3]	5.8 [∞]	0.20	0.76†	60.0	4.2	0.5
Iron (mg)	4.6 [4.0 - 5.2]	4.3 [3.8 - 5.0]	5.4 [∞]	0.21	0.81†	67.4	2.1	0.6

4dWFR, four-day weighed food record; CFQ-1, First complementary feeding questionnaire; CHO, carbohydrate; κ, weighted kappa statistic. ^(a) mean ± SD or geometric mean [95% CI]; ^(b) Pearson's Correlation Coefficients; †p<0.01, significant difference (2-tailed); [∞]Symmetric mean percent difference. ^{Note:} Participants were in tertiles, 2 groups of 32 and 1 group of 31 participants

CONCLUSION

The CFQ appears to have acceptable relative validity and good reproducibility for assessing nutrient intake in infants aged 9 to 12 months.

The CFQ could be used in future research to investigate infant nutrient intakes, where using a simple tool with little participant burden is beneficial.

REFERENCES

¹ Cade, J., Thompson, R., Burley, V., & Warm, D. (2002). Development, validation and utilisation of food-frequency questionnaires - a review. *Public Health Nutrition*, 5(4), 567-587. doi:10.1079/phn2001318