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Validation and reliability of the preschooler’s nutrition screening tool; NutricheQ

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Early identification of nutritional deficiencies through nutritional screening in children is recommended⁽¹⁾. NutricheQ, developed by Danone, is a self-administered nutrition screening questionnaire for assessing nutritional risk in preschool children. It comprises of 18 questions divided into 3 sections with section 1 and 2 generating the questionnaire’s total risk score and a higher score indicating increased nutritional risk.

This study tested the reliability of NutricheQ and aimed to validate the ability of the questionnaire to identify children at risk using data from the Irish National Preschool Nutrition Survey (NPNS)⁽²⁾ which recorded food and beverage consumption in a representative sample of Irish preschoolers. Principle component analysis (PCA) was used in conjunction with Cronbach’s alpha, as a test of reliability. Validation methods included the examination of mean daily intakes across quartiles of the NutricheQ score with the highest NutricheQ scores indicating high risk (Quartile 4) and the lowest NutricheQ scores indicating low risk (Quartile 1).

NutricheQ Score N	Quartiles of NutricheQ score							
	Quartile 1		Quartile 2		Quartile 3		Quartile 4	
	0–3		4–5		6–7		8–13	
	74		104		96		87	
	Mean	(sd)	Mean	(sd)	Mean	(sd)	Mean	(sd)
Age (yrs)	1.7 ^a	0.8	1.9 ^a	0.8	2.0 ^a	0.8	2.4 ^b	0.7
Energy (MJ)	4.6	1.1	4.6	1.1	4.5	1.0	4.6	1.0
Protein (%TE)	16.0 ^a	2.8	15.4 ^{ab}	2.4	15.2 ^{ab}	2.0	14.5 ^b	2.5
Dietary Fibre (g/10MJ)	27.7 ^a	6.7	25.0 ^b	7.2	24.7 ^b	6.6	21.4 ^c	6.8
Sat fat (%TE)	15.9	3.4	15.8	3.6	15.4	3.4	15.6	3.7
NMS (%TE)	14.0 ^a	5.1	16.1 ^{ab}	5.2	17.1 ^b	6.3	17.0 ^{ab}	7.0
Iron (mg/10MJ)	18.0 ^a	6.0	16.3 ^{ab}	5.6	15.1 ^{bc}	5.6	13.3 ^c	4.4
Vitamin D (µg/10MJ)	8.4 ^a	7.8	6.4 ^{ab}	6.9	5.2 ^b	6.0	4.4 ^b	5.1
Zinc (mg/10MJ)	13.1 ^a	3.4	11.6 ^b	2.6	10.9 ^{bc}	2.7	10.0 ^c	2.3
Calcium (mg/10MJ)	1935.1 ^a	513.3	1771.1 ^{ab}	503.0	1641.9 ^b	512.4	1561.6 ^{ab}	571.8
Sodium (mg/10MJ)	2390.3	680.8	2304.9	644.8	2506.4	623.4	2583.3	645.0
Riboflavin (mg/10MJ)	3.6 ^a	1.0	3.4 ^a	1.0	3.2 ^{ab}	0.9	2.9 ^b	1.0
Niacin (mg/10MJ)	24.5 ^a	6.1	24.3 ^a	8.4	23.1 ^{ab}	6.5	21.5 ^b	7.2
Folate (µg/10MJ)	411.1 ^a	169.3	382.0 ^{ab}	154.7	343.6 ^b	118.7	340.8 ^b	171.4
Phosphorous(mg/10MJ)	1917.7 ^a	359.7	1845.1 ^a	335.8	1786.0 ^{ab}	330.2	1696.1 ^b	359.3
Potassium (mg/10MJ)	3950.1 ^a	613.0	3976.0 ^a	656.9	3772.5 ^{ab}	631.3	3476.7 ^b	744.0
Carotene (µg/10MJ)	6022.3 ^a	6329.4	5179.7 ^{ab}	3711.2	3800.9 ^{bc}	3900.4	2631.8 ^c	2877.2
Total Fruit (g)	138.6 ^a	70.6	144.8 ^a	91.3	140.9 ^a	83.6	96.2 ^b	82.8
Total Vegetables (g)	77.8 ^a	45.7	62.1 ^b	34.9	50.9 ^{bc}	29.2	37.7 ^c	28.4

%TE = Percentage contribution to total energy intake. NMS = Non Milk Sugars. ^{abcd} Different superscript letters indicate significance between quartiles (One-Way Analysis of Covariance followed by Bonferroni’s test). Values not showing common significance ($p < 0.05$).

PCA and cronbach’s alpha revealed NutricheQ to be a multidimensional questionnaire with reasonable reliability (0.447). Across the quartiles of risk score, children who had a higher risk score (Quartile 4) had significantly lower protein, fibre, iron, vitamin D, zinc, riboflavin, niacin, folate, phosphorous, potassium, carotene and fruit and vegetable intakes compared to children with lower risk scores (Quartile 1). A greater proportion of children in quartile 4 tended to have intakes of iron, vitamin A and zinc below recommendations compared to children in quartile 1.

This data suggests that NutricheQ is a reliable and valid multi-dimensional nutritional screening questionnaire. It successfully identified toddlers with poorer nutritional intakes. However, further refinements could improve reliability and consider differences in food intakes.

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