


Relative validity of an image-based method for the assessment of dietary intake in pregnant women

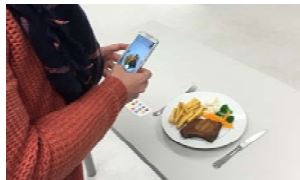



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Image-based food records



- Image contains intake data +/- additional information
- Not reliant on literacy or numeracy skills
- Active vs passive capture
- Manual, semi-automated, automated analysis

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Aims



- Assess food group and nutrient intakes of pregnant women
- Establish the validity of an image-based dietary assessment method in pregnant women relative to 24-hr recalls
- Assess the validity of a brief tool for nutrient assessment, SNaQ, relative to nutrient analysis software
- Assess the usability of the DietBytes method and the acceptability of a smartphone platform for receiving dietary feedback

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Methods



Eligibility criteria:

- Adult women, ≤ 24 weeks gestation
- Residing in Newcastle (2nd largest city in NSW, Australia) or Tamworth (regional NSW town)
- Willing to attend 2 in-person sessions
- Ownership or access to a smartphone
- Willing to use it to capture an image-based dietary record
- No current medical conditions (including GDM)



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DietBytes image-based food record

Participant's smartphone via third party app used to collect image-based dietary record on 3 non-consecutive days.

An entry consists of:

- Image
- Text and/or voice description
- Fiducial marker

Plus 3x 24-R on random days, one/week




Labels in the screenshot: Participant ID and Note title, Date of record capture, Image, Fiducial marker.

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SNaQ analysis tool


SNaQ = Selected Nutrient and Diet Quality



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Results: Participants



- 27 enrolled, 1 withdrawal, 1 only recorded 1 day
- Participant characteristics (n=25):
 - Median age 29 years (range 20 - 50 years)
 - 8 Aboriginal Australians
 - Gestation 6 - 24 weeks
 - 18 iPhone, 7 Android phones
 - All born in Australia and spoke only English at home
 - 14 hold a University Degree or higher
 - 15 primiparas



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Results: Food group intakes (n=25)

Food group	Mean (SD) intake (serves/day)	AGTHE Pregnancy (serves/day)
Grains	4.8 (2.0)	8.5
Vegetables	2.4 (1.4)	5.0
Fruit	1.9 (1.6)	2.0
Meats and alts	2.0 (1.0)	3.5
Dairy and alts	2.1 (1.3)	2.5
Unsaturated spreads/oils	1.9 (1.4)	0-2.5
Discretionary foods	3.7 (1.9)	0-2.5





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Results: Selected micronutrient intakes (n=25)

Nutrient	Median (IQR) intake	EAR	Proportion with intakes below EAR % (count)
Iron (mg)	11 (8, 15)	22	84 (21)
Calcium (mg)	877 (854, 1162)	840	48 (12)
Folate (µg)	852 (255, 1156)	520	44 (11)
Iodine (µg)	167 (94, 317)	160	44 (11)
Zinc (mg)	13 (10, 20)	8	12 (3)

EAR = estimated average requirement




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Relative validity of the SNaQ tool

Correlations between the SNaQ tool and nutrient composition software:

- Energy: $\rho = .898, P < .001$
- Micronutrients (iron, calcium, zinc, folate, and iodine): ρ range = .510-.955, all $P < .05$ both with and without supplements included



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Relative Validity of DietBytes method

Nutrient	Mean±SD intake DBBB ¹	Mean±SD intake 24-R ²	Pearson correlation	Mean±SD difference	t(DF) ³ , P
Energy (kJ)	7503±1864	8020±1884	.696 (P<.001)	517±1461	1.77(24), P=.089
CHO (g)	198.1±57.6	215.5±55.4	.580 (P=.002)	17.4±51.8	1.68(24), P=.107
Protein (g)	85.4±23.8	81.5±23.6	.619 (P=.001)	-3.9±20.7	-.94(24), P=.355
Fat (g)	69.2±21.5	77.0±23.4	.654 (P<.001)	7.8±18.7	2.08(24), P=.049
Fibre (g)	22.2±8.7	22.8±8.4	.844 (P<.001)	.6±4.8	.66(24), P=.516

¹Analysis based on DietBytes image-based food records; ²Analysis based on 24-R; ³Mean difference (24-R intake - DietBytes image record intake) calculated for each participant; ⁴one-sample t-test (degrees of freedom)

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Relative validity of the SNaQ tool

- Agreement between the SNaQ tool and nutrient composition software:
 - Kappa range = .488-.803 (all $P \leq .001$) for iron, calcium, folate, iodine and zinc when supplements included
 - Kappa range = .554-.632 (all $P \leq .001$) for calcium, iodine and zinc when supps excluded.
 - Both tools identified that no participant met iron requirements without supps



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Conclusion



The DietBytes method of dietary assessment has demonstrated relative validity, usability, and acceptability as a method of dietary assessment during pregnancy.



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For more information...

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