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Development of a short-item diet quality questionnaire for Indigenous mothers and their young children: the Menzies remote short-item dietary assessment tool (MRSDAT)

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Author contributions

AR, JB and LMB contributed to the design of the study; AR and LM collected and analysed data; AR, JB and KOD developed the tool; AR and ET drafted the manuscript; all authors approve of the final manuscript and accept responsibility for its content.

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Conflict of interest

The authors declare no conflicts of interest

Introduction

The importance of a healthy diet in facilitating optimal childhood development and preventing chronic disease cannot be overstated. Despite this, unhealthy food patterns frequently occur as early as 9 months of age and continue through childhood. Australian Bureau of Statistics data indicate Indigenous Australian children to have particularly concerning dietary patterns, with children aged 2-3 years three times more likely to consume carbonated sugary drinks than their non-Indigenous counterparts (18% versus 5.8%).¹ Early intervention to prevent or improve obesity related behaviours can have a positive impact. The ability to improve dietary outcomes depends primarily on an accurate assessment of dietary intake. Data reliability and compliance issues common in dietary assessment are exacerbated when working with Indigenous Australians living remotely due to existing tools using inappropriate language, being resource intensive, and not incorporating culturally diverse foods and serving methods. The aim of this research was to develop a short-item questionnaire to assess the dietary quality of mothers and their young children (2-4 years) in the remote Indigenous community (RIC) setting for the Pregnancy and Adverse Neonatal Diabetes Outcomes in Remote Australia (PANDORA) longitudinal birth cohort study.² PANDORA participants are Northern Territory women (both Indigenous and non-Indigenous) with and without diabetes in pregnancy and their babies.

Participants, methods and results

Questionnaire development

The 14-item Mediterranean Diet Adherence Score³ (MDAS) was used as a base for the short-item diet quality questionnaire (henceforth the 'Menzie's remote short-item dietary assessment tool' [MRSDAT]). The MDAS was chosen as a base as it has been validated against health outcomes (including and especially relevant to Indigenous Australians, the development of type 2 diabetes) and found to be significantly more useful than a 137-item food frequency questionnaire in adult populations. The MDAS was modified through the omission and reformulation of questions and responses, and the addition of questions and responses from the National Nutrition and Physical Activity Survey, the Short Food Frequency Questionnaire⁴ and the Australian Recommended Food Score⁵. A table documenting all modifications with justifications is available from the authors upon request. Modifications were necessary to capture key aspects of the Australian dietary guidelines and consumption of wild harvested and procured foods and energy-dense, nutrient-poor foods to enhance relevance to the RIC setting. Briefly, questions assessing consumption of traditional food, offal, dairy food, confectionery and take-away meals were added. Illustrative food serving images

were also collated into a booklet (the 'supporting images', available upon request) to assist with respondent estimation of serving size and consumption frequency.

Preliminary testing and test-retest methods

An early version of the MRSDAT was administered to 20 mothers by PANDORA researchers who provided feedback on ease of use. The questionnaire was then revised with the help of a senior Indigenous leader and other experts with extensive experience in nutrition research in RICs, and tested for face validity and reliability. Face validity and test-retest reliability testing involved administering the MRSDAT with the supporting images to 10 Indigenous women originally from RICs but temporarily residing in the Darwin region. A researcher (AR) and a senior Indigenous leader (LM) attended the participants' home or location of choice to administer the MRSDAT. This procedure was repeated after a two week interval by the same researcher(s). The test-retest reliability was analysed (Kappa). Questions 1 and 2 (Table 1) were not assessed due to a lack of responses.

Preliminary testing results

All twenty mothers reported their child's intake (aged 18 to 54 months) and the early version MRSDAT took an average time of 12.05 ± 2.5 minutes to complete when administered by staff. PANDORA staff reported that the early version took more time than anticipated and conveying concepts such as serve sizes and frequency of consumption was problematic among remote Indigenous participants (n=7). All participants found the supporting images useful. The questionnaire was revised, a standard protocol and script were made available and training sessions were conducted to assist staff with administering the MRSDAT.

Test-retest results

The readability and clarity of the items were well accepted by Indigenous mothers, and the test-retest analysis showed good to very good agreement between participant responses for 20 of the 24 items tested (0.63-0.88). The 4 items that showed weak agreement (0.13-0.50) were for questions regarding homemade freshly squeezed juice, red meat serve size, offal consumption and the frequency of consuming confectionery (chips, chocolates and ice-creams). The MRSDAT was then modified to address these issues. Additionally, as all participants responded 'yes' to consuming sugary drinks on a daily basis, a question to estimate frequency and amount of sugary drinks consumed was added. Likewise, a sub-question regarding whether sweetened or unsweetened yoghurt was consumed was also added for prompting diet quality. The final version of the MRSDAT can be found in Table 1.

Comment

The 26-item MRSDAT can be used as an acceptable alternative for complex dietary tools when working with Indigenous and non-Indigenous Australians in remote settings. The MRSDAT comprises 12 Mediterranean Diet Adherence Score questions and 18 additional questions that capture consumption of discretionary foods, breads and cereals, wild hunted and harvested foods and dairy foods. Testing indicated that questions and response categories were acceptable and 83% of questions and responses were reliable. A validation study is needed to establish construct and content validity with Indigenous mothers and their children, and one is being planned for children aged <2 years living in East Arnhem Land. While the MRSDAT was developed for the purpose of the PANDORA study, it can be applied efficiently across a large sample to provide an assessment of dietary quality and identify dietary patterns in populations ranging in age from young children to adult.

References

1. Australian Bureau of Statistics. Australian Aboriginal and Torres Strait Islander Health Survey: Nutrition Results - Food and Nutrients, 2012-13, 4727.0.55.005. Canberra: Australian Bureau of Statistics 2015.
2. Maple-Brown LJ, Brown A, Lee IL, Connors C, Oats J, McIntyre HD, et al. Pregnancy And Neonatal Diabetes Outcomes in Remote Australia (PANDORA) Study. *BMC Pregnancy Childbirth* 2013; 13: 221
3. Schroder H, Fito M, Estruch R, Martinez-Gonzalez MA, Corella D, Salas-Salvado J, et al. A short screener is valid for assessing Mediterranean diet adherence among older Spanish men and women. *The Journal of Nutrition* 2011; 141(6): 1140-5.
4. Gwynn JD, Flood VM, D'Este CA, Attia JR, Turner N, Cochrane J, et al. The reliability and validity of a short FFQ among Australian Aboriginal and Torres Strait Islander and non-Indigenous rural children. *Public Health Nutrition* 2011; 14(3): 388-401.
5. Collins CE, Burrows TL, Rollo ME, Boggess MM, Watson JF, Guest M, et al. The comparative validity and reproducibility of a diet quality index for adults: the Australian Recommended Food Score *Nutrients* 2015; 7(2): 785-98.

Table 1. The Menzies remote short-item dietary assessment tool (MRSDAT)

Questions	Responses
1. Is your child still being breastfed?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. What do you usually use as your main cooking fat/oil?
3. Which of these vegetables do you usually eat?	<input type="checkbox"/> Potato <input type="checkbox"/> Sweet corn/yam <input type="checkbox"/> Green coloured vegetables <input type="checkbox"/> Orange/yellow/red coloured vegetables <input type="checkbox"/> Other coloured vegetables
4. How often do you eat vegetables?	<input type="checkbox"/> Every day or nearly every day <input type="checkbox"/> A few times a week <input type="checkbox"/> Once a week <input type="checkbox"/> Once a fortnight <input type="checkbox"/> Once a month <input type="checkbox"/> I don't eat vegetables
5. When you eat vegetable, how much do you usually eat?	<input type="checkbox"/> 1 serve or less <input type="checkbox"/> 2 serves <input type="checkbox"/> 3 serves <input type="checkbox"/> 4 serves <input type="checkbox"/> 5 serves or more <input type="checkbox"/> I don't eat vegetables
6. How often do you eat fruits? (Includes freshly squeezed homemade juice)	<input type="checkbox"/> Every day or nearly every day <input type="checkbox"/> A few times a week <input type="checkbox"/> Once a week <input type="checkbox"/> Once a fortnight <input type="checkbox"/> Once a month <input type="checkbox"/> I don't eat fruits
7. When you eat fruit, how much do you usually eat?	<input type="checkbox"/> 1 serve or less <input type="checkbox"/> 2 serves <input type="checkbox"/> 3 serves <input type="checkbox"/> 4 serves <input type="checkbox"/> 5 serves or more <input type="checkbox"/> I don't eat fruits
8. How often do you usually drink sugar sweetened drinks like soft drink, fruit drinks, added sugar fruit juice, cordials or sports drinks?	<input type="checkbox"/> Every day or nearly every day <input type="checkbox"/> A few times a week <input type="checkbox"/> Once a week <input type="checkbox"/> Once a fortnight <input type="checkbox"/> Once a month <input type="checkbox"/> I don't drink sugar sweetened drinks
(8.b) How much do you usually drink?
9. How often do you usually drink flavoured milk?	<input type="checkbox"/> Every day or nearly every day <input type="checkbox"/> A few times a week <input type="checkbox"/> Once a week <input type="checkbox"/> Once a fortnight <input type="checkbox"/> Once a month <input type="checkbox"/> I don't drink flavoured milk
10. How often do you have cheese or yoghurt?	<input type="checkbox"/> Every day or nearly every day <input type="checkbox"/> A few times a week

	<input type="checkbox"/> Once a week <input type="checkbox"/> Once a fortnight <input type="checkbox"/> Once a month <input type="checkbox"/> I don't eat cheese or yoghurt
(10.b) If you have yoghurt, is it usually sweetened or unsweetened?	<input type="checkbox"/> Sweetened <input type="checkbox"/> Unsweetened
11. Do you drink plain milk <u>nearly every day</u> ? (includes milk added with cereal)	<input type="checkbox"/> Yes <input type="checkbox"/> No
12. How many serves of red meat (steak, lamb, sausages or ham) do you usually eat <u>per day</u> ?	<input type="checkbox"/> less than 1 serve <input type="checkbox"/> 1 serve or more <input type="checkbox"/> I don't eat meat
13. When you eat/cook red meat, do you usually cut the fat off?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I don't eat meat
14. When you eat/cook chicken do you usually take the skin off?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I don't eat meat
15. What do you eat more often; white meats like chicken, turkey OR red meats like steak, lamb, pork, hamburgers, hamper or sausages?	<input type="checkbox"/> White meat <input type="checkbox"/> Red meat <input type="checkbox"/> I don't eat meat
16. Do you usually eat offal meat (such as kidney, liver, heart, brain etc.)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I don't eat meat
17. How much butter, margarine or cream do you usually eat <u>per day</u> ?	<input type="checkbox"/> None <input type="checkbox"/> less than 1 serve <input type="checkbox"/> 1 serve or more
18. How much baked beans, three beans mix, cooked lentils, split peas or dried beans do you usually eat <u>per week</u> ?	<input type="checkbox"/> None <input type="checkbox"/> less than 1 serve <input type="checkbox"/> 1- 2 serves <input type="checkbox"/> 3 or more serves
19. How much fish including wild harvested fish and seafood including turtle, oysters, crab etc. do you usually eat <u>per week</u> ? (excluding fish fingers or fish patties)	<input type="checkbox"/> None <input type="checkbox"/> less than 1 serve <input type="checkbox"/> 1- 2 serves <input type="checkbox"/> 3 or more serves
20. How many times <u>per week</u> do you usually eat traditional food (native fruits, berries, nuts, other wild plants, meats (like fish, kangaroo, goose, goanna etc.)?)	<input type="checkbox"/> None <input type="checkbox"/> less than 1 time <input type="checkbox"/> 1- 2 times <input type="checkbox"/> 3 or more times
21. How many times <u>per week</u> do you usually eat unsalted nuts?	<input type="checkbox"/> None <input type="checkbox"/> less than 1 time <input type="checkbox"/> 1- 2 times <input type="checkbox"/> 3 or more times
22. How many times <u>per week</u> do you usually eat pastries such as cookies/biscuits or cake?	<input type="checkbox"/> None <input type="checkbox"/> less than 1 time <input type="checkbox"/> 1- 2 times <input type="checkbox"/> 3 or more times
23. How many times <u>per week</u> do you usually eat chips, pretzels, lollies, chocolates or ice creams?	<input type="checkbox"/> None <input type="checkbox"/> less than 1 time <input type="checkbox"/> 1- 2 times <input type="checkbox"/> 3 or more times

24. How many times per week do you usually eat meals or snacks from take-away such as pizza, burgers, fries, pies etc.?

- None
- less than 1 time
- 1- 2 times
- 3 or more times

25. How many times per week do you usually use a tomato based sauce as a seasoning for vegetables, pasta, rice, or other dishes?

- None
- less than 1 time
- 1 time
- 2 or more times

(25.b) Is the sauce homemade or a commercial product?

- Home made
- Commercial product

26. What type of bread do you usually eat?

- None
 - White
 - Multigrain/rye/wholemeal
-