Letter to the Editor

Nutritional Genomics for nutrition professionals: Who undertakes online training and are they more knowledgeable, confident and involved?

Running head: Who undertakes training in nutritional genomics?

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To the Editor,

Advancements in nutritional genomics offer the potential to change the way healthcare is provided, contributing to cost savings and better health outcomes.¹ There is commitment to making this a reality in Australia as evidenced by the Government's \$500 million allocation to the Genomics Health Futures Mission, and endorsement of the National Health Genomics Policy Framework¹ for 2018-2021.

To ensure the integration of nutritional genomics into healthcare is optimised, while mitigating the risks, nutritionists and dietitians must be trained to understand, communicate and critically appraise genetic test results, their application to practice and any associated confidentiality and discrimination issues.¹ There is a need for all nutrition professionals to have a basic level of competence (the 'knowers') to ensure professional standards are maintained. Concurrently, specialists with mastery level of competence are required (the 'doers'), providing expertise and leadership.

Many qualified nutrition professionals did not receive formal education on genetics and genomics during their professional training. Nutrition professionals have low levels of knowledge and confidence in nutritional genomics² and are unlikely to be equipped to respond to the challenges of integrating genomics into nutrition practice. To assist in meeting this educational gap, a number of online and

university-based courses (at least n=37) exist.³ Wright *et al.*² reported a lack of investigation into the effectiveness of these educational efforts. To our best knowledge, there have been no studies investigating which nutritional professionals seek post-graduate training and how this impacts their practice.

We conducted a case control study that aimed to compare the characteristics of nutrition professionals who completed an online nutritional genomics short course (n=8, trained group) to those who completed an unrelated online course (n=33, control group) (approved by Monash University HREC # 5579). Participants were excluded if they were not a nutritionist or a dietitian or if they were not actively practising. We assessed knowledge of genetics and nutritional genomics, confidence and involvement in performing eight related activities (listed in Table 1) and collected information on demographic characteristics. Questions were adapted from a previously validated survey.⁴ Comparisons were made between groups using independent t-tests and Fisher's exact test.

Of the 41 participants (response rate 11.5%), the majority were female (98%), from Australia (95%), working in individual client management (93%), with a median age of 31 years. A greater proportion of the trained group had completed training during their university degree (p=0.017) or professional development (p<0.001) relating to nutritional genomics compared to the control group. The trained group had higher mean knowledge scores from a multiple choice quiz (81% (SD 12%) vs 44% (SD 19%) correct answers overall, t(39)=5.2, p<0.001) (Figure 1). The trained group also had higher mean confidence scores (22/40 (SD 11) vs 11/40 (SD 5), t(7.6)=2.5,

$p=0.037$)), calculated from the sum of ratings for eight activities where 1 was 'low confidence' and 5 was 'high confidence'. Higher levels of knowledge and confidence to undertake activities among the trained group did not appear to translate to them being performed more, although this association has been reported.^{4,5} Overall, the proportion of participants reporting they had undertaken nutritional genomics activities was low in both groups, and there was no difference between groups for the majority of activities (Table 1). This could be explained by contextual factors limiting the opportunities to perform the activities assessed e.g. areas of participants' employment, the lack of evidence to support the routine application of genetic testing or the lower levels of consumer engagement in genetic testing in Australia.

It appears a number of characteristics (such as university training, higher knowledge and confidence levels and working in research or educational settings) co-exist amongst those who have completed an online nutritional genomics course. The small and uneven sample size and response rate are limitations. However it appears that a specialist group of nutrition professionals (the 'doers') who have knowledge, confidence and seek additional training may exist. Meanwhile, the capabilities of other nutrition professionals (the 'knowers') who have not undertaken online training in nutritional genomics may be insufficient.

How can we ensure the nutrition and dietetic profession (including both the 'knowers' and 'doers') will be prepared for genomics based healthcare? There is no clear answer, although changing the perception that nutritional genomics is a specialist area could be a starting point. Genetics influences nutritional requirements

and plays a role in conditions such as cardiovascular disease and cancer; both commonly-encountered by generalists. Access to supportive professional networks and ensuring positive work environments could further drive integration.⁵ Such frameworks could support professional ‘champions’ to complete the translational research required to convince the ‘knowers’ of the relevance to their practice. Online training courses, like the one investigated here, provide worldwide access to opportunities for knowledge and skill development. However, there is considerable heterogeneity in cost, duration and quality.³ There is a need to develop user-friendly credible, evidence-based learning opportunities in tertiary programs and professional development courses that go beyond the basic science.

In conclusion, the apparent inter-dependent relationship between exposure, training, knowledge, confidence and involvement requires more consideration. There is a need to determine the most effective methods to assist nutrition professionals to develop the skills they need to ensure effective genomics based healthcare is realised.

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Conflict of interest

CT declares no conflict of interest. MA and CM are involved in the delivery of the short course evaluated in this research. JC, MA and CM are employed by Monash University. None of the authors benefit directly from income generated by the short course evaluated in this research.

Authorship

The study design was conceived by JC, MA and CM. All authors contributed to the survey design. Data collection, extraction, analysis and interpretation was completed by CT, with guidance from JC. The manuscript was written by CT and revised by JC, MA and CA. All authors approved the final manuscript and are accountable for the accuracy and integrity of the research. All authors declare that this work has not previously been published.

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Figure 1.png

Table 1 Comparison of confidence and involvement in activities relating to nutritional genomics between participants who completed an online nutritional genomics course and a control group.

Activity	Confidence				Involvement			
	Response	Trained (n=8) n (%)	Control (n=33) n (%)	P value	Response	Trained (n=8) n (%)	Control (n=33) n (%)	P value
Collecting genetic information/history from a client	Confident Neutral Not confident	3 (37.5) 4 (50.0) 1 (12.5)	5 (15.2) 6 (18.2) 22 (66.6)	0.011	Active Not active	3 (37.5) 5 (62.5)	17 (51.5) 16 (48.5)	0.937
Referring clients to specialist genetic services (e.g. geneticist, a genetic counsellor or genetic testing)	Confident Neutral Not confident	2 (25.0) 4 (50.0) 2 (25.0)	3 (9.1) 3 (9.1) 27 (81.8)	0.008	Active Not active	1 (12.5) 7 (87.5)	4 (12.1) 29 (87.9)	1.000
Conducting and/or interpreting the results of genetic tests	Confident Neutral Not confident	2 (25.0) 3 (37.5) 3 (37.5)	1 (3.0) 1 (3.0) 31 (94)	0.003	Active Not active	2 (25.0) 6 (75.0)	5 (15.2) 28 (84.8)	0.079
Providing nutritional advice or education to clients that is specific to their genetic profile, health status and the available evidence	Confident Neutral Not confident	3 (37.5) 3 (37.5) 2 (25.0)	2 (6.0) 3 (9.1) 28 (84.9)	0.002	Active Not active	3 (37.5) 5 (62.5)	12 (36.4) 21 (63.6)	1.000
Providing education or training on genetics or nutritional genomics	Confident Neutral Not confident	3 (37.5) 0 5 (62.5)	0 0 33 (100)	0.005	Active Not active	3 (37.5) 5 (62.5)	1 (3.0) 32 (97.0)	0.019
Marketing or advertising genetic services (e.g. consultations, genetic testing)	Confident Neutral Not confident	1 (12.5) 2 (25.0) 5 (62.5)	1 (3.0) 0 32 (97)	0.019	Active Not active	2 (25.0) 6 (75.0)	2 (6.1) 31 (93.9)	0.165
Conducting research on the relationship between genes, nutrition and health	Confident Neutral Not confident	3 (37.5) 0 5 (62.5)	1 (3.0) 1 (3.0) 31 (94.0)	0.019	Active Not active	3 (37.5) 5 (62.5)	0 33 (100)	0.005
Preparing public health policy that addresses the relationship between genes, nutrition and health	Confident Neutral Not confident	1 (12.5) 1 (12.5) 6 (75.0)	0 1 (3.0) 32 (97.0)	0.019	Active Not active	0 8 (100)	0 33 (100)	n/a

Confidence measured on a 5 point likert scale, with responses classified as 'Confident'= rating of 4 or 5, 'Neutral' = rating of 3 or 'Not confident'= rating of 1 or 2. P value calculated to determine if there is a difference in the proportion of participants in each group who identified themselves as 'Confident', 'Neutral' or 'Not confident' using Fisher's exact test. Involvement responses classified as 'Active' = performed the activity 'weekly', 'monthly' or '1-2 times per year' in the last 12 months or 'Not active' = performed the activity 'never' in the last 12 months. P value calculated to determine if there is a difference in the proportion of participants in each group who identified themselves as 'Active' or 'Not active' using Fisher's exact test.

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