

Development of a validated questionnaire to measure the self-perceived competence of primary health professionals in providing nutrition care to patients with chronic disease

Author

Ball, Lauren E, Leveritt, Michael D

Published

2015

Journal Title

Family Practice

Version

Accepted Manuscript (AM)

DOI

[10.1093/fampra/cmz073](http://dx.doi.org/10.1093/fampra/cmz073)

Rights statement

© 2015 Oxford University Press. This is a pre-copy-editing, author-produced PDF of an article accepted for publication in Family Practice following peer review. The definitive publisher-authenticated version, Development of a validated questionnaire to measure the self-perceived competence of primary health professionals in providing nutrition care to patients with chronic disease, Family Practice, 32(6), 2015, 706–710 is available online at: <http://doi.org/10.1093/fampra/cmz073>.

Downloaded from

<http://hdl.handle.net/10072/99014>

Griffith Research Online

<https://research-repository.griffith.edu.au>

TITLE PAGE

Title: Development of validated questionnaire to measure the self-perceived competence of primary health professionals in providing nutrition care to patients with chronic disease.

Running Head: Nutrition Care by Primary Health Professionals

Journal: Family Practice

Article Category: Original Research – Research Methods

Authors: Lauren E Ball¹, Michael D Leveritt²

¹Menzies Health Institute Queensland, Griffith University, Gold Coast, Australia

²School of Human Movement and Nutrition Sciences, The University of Queensland, Brisbane, Australia.

Corresponding Author: Dr L E Ball, Menzies Health Institute Queensland, Griffith University, Parklands Drive, Southport, Gold Coast Australia, 4222. E: l.ball@griffith.edu.au

Development of a validated questionnaire to measure the self-perceived competence of primary health professionals in providing nutrition care to patients with chronic disease.

Abstract

Background: Nutrition is an important aspect of chronic disease prevention and management by primary health professionals, including general practitioners, dietitians, practice nurses, diabetes educators, and exercise professionals. In order to better understand how to improve the delivery of nutrition care it is important to have valid and reliable tools to measure self-perceived competence.

Objective: This study aimed to develop a valid, structured, questionnaire that measures the self-perceived competence of primary health professionals to provide nutrition care to patients with chronic disease.

Methods: The development of the questionnaire was carried out in four stages; (1) preparation of scope and structure, through a literature review and consultation with an expert reference group; (2) development of questionnaire items, which were refined through feedback from the reference group and 18 primary health professionals; (3) investigation of internal consistency and concurrent validity through a pilot study on 118 primary health professionals; (4) investigation of test-retest reliability through a pilot study on 33 primary health professionals who completed the questionnaire twice, 2-3 weeks apart.

Results: Stages 1 and 2 resulted in four constructs and 35 questions in the questionnaire. Stage 3 confirmed internal consistency, with Cronbach's α ranging from 0.88-0.98 for each construct and 0.98 for all items combined. Dietitians scored significantly higher than speech pathologists ($p<0.05$) in each construct, confirming concurrent validity. Stage 4 confirmed

test-retest reliability, with correlation coefficients ranging from 0.89-0.94 for each construct and 0.95 for all items combined.

Conclusion: The NUTCOMP questionnaire is a valid, reliable and suitable tool that can be used to directly inform professional development and identify opportunities to support safe and effective practice.

Keywords: General Practice; Chronic Disease; Nutrition Therapy; Diet; Workforce; Professional Education.

Introduction

Nutrition care refers to any practice conducted by a health professional to support a patient to improve their dietary behaviours (1). Nutrition care can include aspects of nutritional assessment, education and counselling, as well as referral to nutrition-focused health professionals and services. Within the primary health care setting, nutrition care is a component of best practice guidelines for effective prevention and management of lifestyle-related chronic disease (2). Many primary health professionals provide nutrition care to patients, including general practitioners, practice nurses, dietitians, nutritionists, exercise professionals (known as exercise physiologists in Australia), physiotherapists, and diabetes educators. The manner in which these primary health professionals provide nutrition care has not been well researched, but is anticipated to differ in many ways including the content, duration, delivery, and reliance on evidence-based guidelines (3).

‘Competence’ is a dynamic concept that encompasses the knowledge, skills, and attitudes that facilitate safe and effective health care practices (4). The competence of primary health professionals to provide nutrition care is somewhat unclear. There is evidence that some primary health professionals, such as general practitioners, dietitians and nurses, are capable of eliciting modest improvements in patients’ dietary behaviours and chronic disease management after providing nutrition care (5-7). However, a recent meta-analysis of behavioural weight management interventions by primary health professionals (including general practitioners, practice nurses, dietitians, and nutritionists) suggests negligible long-term effects are observed in patients (8). Understanding the competence of primary health professionals to provide nutrition care, and factors associated with being safe and effective, are essential to facilitate strategies that support best practice health care. Therefore, further

research that investigates the competence of primary health professionals in providing nutrition care is warranted.

Measuring the competence of primary health professionals to provide nutrition care is challenging. Direct measurement of competence requires considerable resources to examine care provided to patients and subsequently, patients' dietary behaviours over time. Indirect measurement of competence must account for variations in usual health care practices of different professions. Self-perceived competence is an accepted indicator of competence in health professionals when the domains of investigation are clearly specified (9). For example, the domains of competence in nutrition care may include knowledge about nutrition, skills in providing nutrition care, and attitudes that are conducive towards providing nutrition care.

There are some tools available which are designed to measure the self-perceived competence of health professionals to provide nutrition care (10, 11). However, these tools have not been systematically validated and have associated limitations such as assumptions about ideal nutrition care practices, being specific for a single group of health professionals, only including one domain of competence, and not being focussed on nutrition as it relates to the prevention and management of chronic disease. In order to address these limitations, the aim of the present study was to develop a valid and reliable questionnaire that measures the self-perceived competence of primary health professionals in providing nutrition care to patients with lifestyle-related chronic disease. The tool will allow investigations into the competence of primary health professionals in providing nutrition care, and opportunities to support safe and effective practice.

Methods

The questionnaire development comprised four stages as displayed in Figure 1: (1) Preparation of scope and structure; (2) Development of questionnaire items; (3) Pilot study; (4) Test-retest reliability. A similar process has been previously undertaken by others to validate nutrition-related questionnaires (12, 13). The study was approved by the Griffith University Human Research Ethics Committee (Reference number AHS/22/14/HREC).

The questionnaire development process utilised a reference group to provide informed, objective input from relevant, diverse primary health professional stakeholders. The reference group contained six individuals, as this was considered the lowest number of people required to cover the targeted professions. Professional contacts were utilised as a starting point to identify appropriate individuals, and half (n=3) of the reference group were unknown to the authors prior to commencing the project. The reference group included two nutrition & dietetics tertiary educators, one primary health care dietitian, one nurse practitioner/diabetes educator, one exercise professional and one podiatrist. All members of the reference group were highly experienced in their profession, had some experience in providing nutrition care to patients, and also employed other primary health professionals.

Stage 1: Preparation of scope and structure

A narrative literature review on the self-perceived nutrition competence of primary health professionals was performed to draft the scope of the questionnaire and identify previous studies that have measured an aspect of self-perceived competence. Based on the literature review, five possible areas of investigation were identified and subsequently drafted as constructs for the questionnaire. A list of the draft constructs and example questions for each

construct were sent to the reference group for feedback on appropriateness of each construct in contributing to the overall aim of the questionnaire.

Stage 2: Development of Questionnaire Items

A draft pool of 42 questions, structured as 5-point Likert scales, was developed based on the constructs of the questionnaire, previous studies that have investigated self-perceived competence of health professionals, and relevant nutrition guidelines for primary health professionals (e.g. competency standards, best practice guidelines). The questions for each construct were developed to include all items that may be relevant to the overall topic of self-perceived competence of primary health professionals providing nutrition care to patients with lifestyle-related chronic disease. For the constructs focusing on confidence, 5-point Likert scale questions had answer options of ‘Not Very Confident at All’; ‘Not Very Confident’; ‘Somewhat Confident’; ‘Very Confident’; ‘Extremely Confident’. For the construct focusing on attitudes, 5-point Likert scale questions had answer options of ‘Completely Disagree’; ‘Somewhat Disagree’; ‘Neither Agree nor Disagree’; ‘Somewhat Agree’; ‘Completely Agree’. The draft questions were sent to the reference group and an expert on questionnaire development for feedback on appropriateness, relevance, accuracy and formulation of each question.

The paper-based draft questionnaire was then pre-piloted on 13 primary health professionals (representing general practitioners, dietitians, practice nurses, diabetes educators, and exercise professionals) for feedback on (i) clarity and readability of individual questionnaire items, and (ii) the adequacy of the tool in assessing self-perceived competence to provide nutrition care to patients with lifestyle-related chronic disease. The questionnaire was then transferred into an online format, and pre-piloted on an additional five primary health

professionals (representing general practitioners, dietitians, practice nurses exercise professionals, physiotherapists) to ensure each item was interpreted as intended. To do this, the primary health professionals met face-to-face with the researchers and were asked to verbally explain the interpretation of each item in the questionnaire. The pre-pilot sample size was sufficient to result in no further changes being recommended for clarity, readability and adequacy of the tool.

Stage 3: Pilot Study

A pilot study was conducted on 118 primary health professionals (n=84 dietitians; n=34 speech pathologists) to investigate the internal consistency and concurrent validity of the questionnaire. The sample size represents the largest group of dietitians and speech pathologists available through advertisements with the professional associations of each group. Recruitment strategies continued until sufficient power was obtained to test for internal consistency and concurrent validity. Scores were calculated for questionnaire items (1=Not Very Confident at All, 2=Not Very Confident, 3=Somewhat Confident, 4=Very Confident, 5=Extremely Confident; 1=Completely Disagree, 2=Somewhat Disagree, 3=Neither Agree nor Disagree, 4=Somewhat Agree, 5=Completely Agree) and then summed to provide the piloting participants with a score for each construct, and a total score (possible score range from 35-175).

Internal consistency refers to the homogeneity of the questionnaire, and individual items within each section should be well correlated with the total score of the section. Internal consistency was measured using Cronbach's α . Cronbach's α values range from 0 to 1, and a score of 0.7 or higher is generally acceptable (14). Cronbach's α was calculated for each of the four constructs as well as the total score.

Concurrent validity refers to the ability of a questionnaire to distinguish between groups who have a known or theoretically different level of the test measure. Dietitians are extensively trained and experienced in providing nutrition care to patients, whereas speech pathologists have not had extensive training or experience in providing nutrition care. Dietitians should, in theory, perceive themselves to be more competent at providing nutrition care than speech pathologists. Independent t-tests were used to compare scores of dietitians and speech pathologists for each construct as well as the total score.

Stage 4: Test-retest reliability

A test-retest pilot was conducted on 33 primary health professionals (representing general practitioners, dietitians, practice nurses, exercise professionals, diabetes educators and physiotherapists) to determine the extent to which the questionnaire produces the same results when applied repeatedly in the same situation with the same participants. The sample size was based on having sufficient power to undertake an investigation of test-retest reliability. Pilot participants completed the questionnaire twice in online format, approximately 2-3 weeks apart. This time period was chosen because it was deemed to be long enough to minimise the likelihood of participants recalling previous answers, but short enough to minimise the likelihood of a real change in competence. Pearson's correlation was used to measure the reliability between test and retest scores for each construct as well as the total score. The correlation coefficients of the two tests should ideally be at least 0.7 (15).

Results

Stage 1: Preparation of scope and structure

Feedback from the reference group on the five possible constructs for the questionnaire resulted in two constructs being combined, and a resultant four constructs being confirmed: (1) Confidence in Knowledge about Nutrition and Chronic Disease; (2) Confidence in Nutrition Skills; (3) Confidence in Communication and Counselling about Nutrition; (4) Attitudes towards Nutrition Care. In addition to the four constructs, demographic and education questions were included at the end of the questionnaire to enable investigations of associations between these characteristics and primary health professionals' self-perceived competence to provide nutrition care.

Stage 2: Development of Questionnaire Items

Feedback from the reference group on the draft pool of 42 questions resulted in minor changes to question wording and order, the removal of six questions and the inclusion of four additional questions that were deemed as important in meeting the aim of the constructs. After the paper-based pre-pilot, recommendations made by the primary health professionals were recorded, and changes were made accordingly. Changes included deleting six questions deemed as unnecessary, and the inclusion of one further question. After the online pre-pilot, very minor changes to question wording was completed.

Stage 3: Pilot Study

Dietitians scored significantly higher in each construct of the questionnaire than speech pathologists ($p < 0.05$; Table 1). This demonstrates good concurrent validity because the questionnaire is able to differentiate between two groups who would have different levels of perceived competence to provide nutrition care. The Cronbach's α for the questionnaire

constructs ranged from 0.88 to 0.98, and was 0.98 for the overall questionnaire (Table 2). Given these values, the individual items in each construct appeared to measure the construct with a high level of internal consistency.

Stage 4: Test-retest reliability

The correlation coefficients within each construct ranged from 0.89 to 0.94, and was 0.95 for the overall questionnaire (Table 3). All correlations were significant for each construct ($p < 0.05$) and for the overall questionnaire ($p < 0.05$). This demonstrates very high test-retest reliability because the questionnaire is able produce the same results when applied repeatedly in the same situation with the same participants.

Please see the supplementary data file for the finalised NUTrition COMPetence (NUTCOMP) questionnaire.

Discussion

This study aimed to develop a valid and reliable questionnaire that measures the self-perceived competence of primary health professionals in providing nutrition care to patients with lifestyle-related chronic disease. The resultant NUTrition COMPetence (NUTCOMP) tool has been developed using an extensive process that has ensured construct validity, content validity, face validity, internal consistency, concurrent validity and test-retest reliability.

Consideration of validity and reliability is important when developing survey tools in nutrition (15). The process used to establish validity of the NUTCOMP tool was extensive, involving a literature review, examination of current competency frameworks, consultation with an expert reference group and feedback from many primary health professionals. The final pool of 35 questions across four constructs demonstrated good internal consistency, could differentiate between two groups with theoretically different self-perceived competence and had very high test-retest reliability. Therefore the results of this study suggest that the NUTCOMP questionnaire is a tool that can be confidently used to measure self-perceived competence of primary health professionals to provide nutrition care to patients with chronic disease.

The NUTCOMP questionnaire can be used to develop and evaluate strategies to enhance the nutrition care provided primary health professionals. For example, the questionnaire contains four constructs (based on knowledge, skills, communication and attitudes), which allows for continuing education and professional development activities to be tailored to the specific needs of the target audience based on their scores in each construct, and the overall questionnaire. The NUTCOMP questionnaire is appropriate for use as a baseline and follow-

up measure to investigate the impact of an intervention on improving the confidence and perceived competence of primary health professionals to provide nutrition care. Given that self-perceived competence is likely to be an indicator of actual competence (9), the NUTCOMP questionnaire can also be used cross-sectionally to identify opportunities for enhancement to curricula in medical and health professional education programs, as well as assisting in the evaluation of health services by providing information on the readiness and capacity of primary health professionals to provide nutrition care to a community or population group.

It is important to acknowledge that the development of the NUTCOMP tool did not involve the consideration of an ideal NUTCOMP score. Despite a wide range of scores possible with the questionnaire (35-175), it was not deemed appropriate to specify a point at which a participant was viewed as being 'competent'. Additionally, it is unclear what the required change in NUTCOMP score is in order to facilitate positive improvements in the provision of nutrition care and subsequent patient outcomes. Further research is required to investigate the relationship between NUTCOMP scores, provision of nutrition care, and ultimately, patient outcomes regarding dietary behaviour change.

In conclusion, the NUTCOMP questionnaire was designed to assess the self-perceived competence of primary health professionals in providing nutrition care to patients with chronic disease. The tool has construct validity, content validity, face validity and a demonstrated high level of internal consistency, good concurrent validity, and very high test-retest reliability. The NUTCOMP questionnaire is a useful tool for measuring the self-perceived competence of primary health professionals.

Acknowledgements: The authors thank the NUTCOMP reference group and Dr Nicola Burton for their contribution to the questionnaire development.

Funding and Conflicts of Interest: None.

Ethical Approval: This study was approved by the Griffith University Human Research Ethics Committee (Reference number AHS/22/14/HREC).

References

1. Ball L, Hughes R, Desbrow B, Leveritt M. Patients' perceptions of nutrition care received from General Practitioners: Focus on Type 2 Diabetes. *Fam Pract.* 2012;29(6):719-25.
2. World Health Organization. WHO Technical Report Series: Diet, nutrition, and the prevention of chronic diseases. Geneva, 2003.
3. Ashby S, James C, Plotnikoff R, Collins C, Guest M, Kable A, Snodgrass S. Survey of Australian practitioners' provision of healthy lifestyle advice to clients who are obese. *Nurs & Health Sci.* 2012;14(2):189-96.
4. Verma S, Paterson M, Medves J. Core competencies for health care professionals: what medicine, nursing, occupational therapy, and physiotherapy share. *J Allied Health.* 2006;35(2):109-15.
5. Ball L, Johnson C, Desbrow B, Leveritt M. General practitioners can offer effective nutrition care to patients with lifestyle-related chronic disease: a systematic review. *J Prim Health Care.* 2013;5(1):59-69.
6. Ash S, Reeves M, Yeo S, Morrison G, Carey D, Capra S. Effect of intensive dietetic interventions on weight and glycaemic control in overweight men with Type II diabetes: a randomised trial. *Int J Obes Rel Metab Disorders.* 2003;27(7):797-802.
7. Andrews R, Cooper A, Montgomery A, Norcross A, Peters T, Sharp D, et al. Diet or diet plus physical activity versus usual care in patients with newly diagnosed type 2 diabetes: the Early ACTID randomised controlled trial. *Lancet.* 2011;378(9786):129-39.
8. Booth H, Prevost T, Wright A, Gulliford M. Effectiveness of behavioural weight loss interventions delivered in a primary care setting: a systematic review and meta-analysis. *Fam Pract.* 2014;31(6):643-653.

9. Davis D, Mazmanian P, Fordis M, Van Harrison R, Thorpe K, Perrier L. Accuracy of physician self-assessment compared with observed measures of competence: a systematic review. *JAMA*. 2006;296(9):1094-102.
10. McGaghie W, Van Horn L, Fitzgibbon M, Telser A, Thompson J, Kushner R, et al. Development of a measure of attitude toward nutrition in patient care. *Am J Prev Med*. 2001;20(1):15-20.
11. Mihalyuk TV, Scott CS, Coombs JB. Self-reported nutrition proficiency is positively correlated with the perceived quality of nutrition training of family physicians in Washington State. *Am J Clin Nutr*. 2003;77(5):1330-6.
12. Feren A, Torheim LE, Lillegaard IT. Development of a nutrition knowledge questionnaire for obese adults. *Food & Nutr Res*. 2011;55.
13. de Pinho L, Moura PH, Silveira MF, de Botelho AC, Caldeira AP. Development and validity of a questionnaire to test the knowledge of primary care personnel regarding nutrition in obese adolescents. *BMC Fam Pract*. 2013;14:102.
14. Cronbach L. Coefficient Alpha and the Internal Structure of Tests. *Psychometrika*. 1951;16(3):297-334.
15. Parmenter K, Wardle J. Evaluation and Design of Nutrition Knowledge Measures. *J Nutr Educ*. 2000;32(5):269-77.

Table 1: NUTCOMP scores of dietitians and speech pathologists for each construct and overall. Values are mean (SD). *denotes significant difference between the two groups ($p < 0.05$).

Construct	Dietitians	Speech Pathologists
Confidence in Knowledge about Nutrition and Chronic Disease	26.7 (4.2)	16.3 (4.6)*
Confidence in Nutrition Skills	48.7 (5.2)	22.8 (7.6)*
Confidence in Communication and Counselling about Nutrition	37.7 (5.7)	28.0 (5.5)*
Attitudes towards Nutrition Care	32.3 (2.8)	23.1 (4.3)*
Total Score	145.5 (14.9)	90.5 (16.3)*

Table 2: Internal consistency for each construct and the overall NUTCOMP questionnaire.

Construct (number of items)	Internal Consistency (Cronbach's α)
Confidence in Knowledge about Nutrition and Chronic Disease ($n=7$)	0.95
Confidence in Nutrition Skills ($n=11$)	0.98
Confidence in Communication and Counselling about Nutrition ($n=9$)	0.94
Attitudes towards Nutrition Care ($n=8$)	0.88
Total ($n=35$)	0.98

Table 3: Test-retest reliability for each construct and the overall NUTCOMP questionnaire.

*denotes significant correlation ($p < 0.05$).

Construct	Correlation Coefficient (r)
Confidence in Knowledge about Nutrition and Chronic Disease	0.89*
Confidence in Nutrition Skills	0.94*
Confidence in Communication and Counselling about Nutrition	0.90*
Attitudes towards Nutrition Care	0.90*
Total	0.95*