Original Article

Perceptions of the characteristics of the Alberta Nutrition Guidelines for Children and Youth by child care providers may influence early adoption of nutrition guidelines in child care centres

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Abstract

In 2008, the Alberta government released the Alberta Nutrition Guidelines for Children and Youth (ANGCY) as a resource for child care facilities to translate nutrition recommendations into practical food choices. Using a multiple case study method, early adoption of the guidelines was examined in two child care centres in Alberta, Canada. Key constructs from the Diffusion of Innovations framework were used to develop an interview protocol based on the perceived characteristics of the guidelines (relative advantage, compatibility, complexity, trialability and observability) by child care providers. Analysis of the ANGCY was conducted by a trained qualitative researcher and validated by an external qualitative researcher. This entailed reviewing guideline content, layout, organisation, presentation, format, comprehensiveness and dissemination to understand whether characteristics of the guidelines affect the adoption process. Data were collected through direct observation, key informant interviews and documentation of field notes. Qualitative data were analysed using content analysis. Overall, the guidelines were perceived positively by child care providers. Child care providers found the guidelines to have a high relative advantage, be compatible with current practice, have a low level of complexity, easy to try and easy to observe changes. It is valuable to understand how child care providers perceive characteristics of guidelines as this is the first step in identifying the needs of child care providers with respect to early adoption and identifying potential educational strategies important for dissemination.

Keywords: child nutrition, food-based dietary guidelines, preschool children, evaluation, attitudes, beliefs.

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Introduction

Day care centre utilisation in Canada has increased dramatically over the past decade. More than 28% of children ages 6 months to 5 years are spending approximately 31 h week⁻¹ in care (Statistics Canada 2006), representing approximately one-half to two-thirds of children's meals to be provided for by child care centres. As childhood is an important period for the development of lifelong eating patterns, it is criti-

cal that child care facilities have nutrition focused guidelines that support healthy eating. Few nutrition guidelines focusing on healthy eating in children attending day care centres exist across Canada. In 2008, the Alberta government released the Alberta Nutrition Guidelines for Children and Youth (ANGCY) (Government of Alberta 2012). The ANGCY were based on the same principals as Eating Well with Canada's Food Guide (EWCFG) (Health Canada 2012) and the scientific literature. The

purpose of the ANGCY was to translate current nutrition recommendations (including EWCFG and Dietary Reference Intakes) for children into guidelines that would be useful and translatable to child care settings. A major component of the ANGCY was to promote age-appropriate food portion sizes and healthy menu choices by categorizing food choices into three main categories: 'Choose Most Often' (CMO), 'Choose Sometimes' (CS) and 'Choose Least Often' (CLO). This categorisation plan was used to emphasise consumption of healthy food selections from all food groups, while minimizing the consumption of unhealthy foods high in fat, sodium and simple sugars. Sample menus to facilitate guideline ease of use by child care providers and tips on how to create healthy meal environments to support healthy eating patterns in children were provided (Table 1).

Definitions of guidelines and policies vary and are often used interchangeably. We define guidelines as recommendations or voluntary courses of action and policies required or mandatory courses of action (Bosch *et al.* 1995). Rates of adoption of policies differ from guidelines and can result in varied implications. Policies tend to be adopted at a higher rate than guidelines (Bosch *et al.* 1995); however, providing incentives can influence uptake and compliance of voluntary nutrition guidelines (Pollard *et al.* 2001). Evaluative research on adoption of nutrition guidelines and policies has focused on outcome and impact evaluation rather than process and formative evaluation, particularly in the child care setting (Erinosho *et al.* 2011; Larson *et al.* 2011). Very little is known regarding how the characteristics of nutrition guidelines influence early adoption in the child care setting. Given the novelty of nutrition guidelines and the paucity of formative evaluation in this setting (Larson *et al.* 2011), it is important to assess perceived guide-

Table 1. An overview of the content of ANGCY

Introduction
Why guidelines are important
Guiding principles
Summary recommendations
Nutrition guidelines for children and youth
Healthy eating for all children and youth
The food rating system
Category #1 – Choose most often
Category #2 – Choose sometimes
Category #3 – Choose least often
Beverages
A. Child care facilities
B. Schools
C. Recreation and community facilities
Tools to support implementation
Guidelines for policy development
Implementation tools
Frequently asked questions
Eating well with Canada's food guide
<i>*Sample menus and pictorial examples of recommendations also provided to aid implementation and simplify translation</i>
<i>Alberta Nutrition Guidelines for Children and Youth (Government of Alberta 2012)</i>

line characteristics by child care providers and how child care provider perception of guidelines may influence guideline uptake.

Diffusion of Innovations (DoI) is an important organisational behaviour change theory that provides a framework for understanding the process of adoption in organisations by explaining how, why and at what rate innovations are adopted, taking into consideration the context in which this occurs (Rogers 2003). Uptake of an innovation can vary greatly between users in different settings due to differences in perceptions about the relative characteristics of innovations by users. DoI identifies five perceived characteristics of innovations that affect the rate of adoption: *relative advantage* (to what is currently in

Key messages

- Nutrition guidelines focused within the child care setting are important to promote the health of the child.
- Understanding how child care providers perceive the characteristics of nutrition guidelines is the first step in identifying the needs of child care providers with respect to early guideline adoption within the child care centres.
- This information is valuable for modifying guidelines and identifying potential educational strategies important for dissemination.

use), *compatibility* (with existing knowledge, beliefs, and practices), *complexity* (level of difficulty), *trialability* (ease of experimentation) and *observability* (visibility of results) (Rogers 2003). These characteristics may be used to predict whether perceived characteristics of an innovation affect uptake and implementation of the innovation into practice. Innovations perceived as having greater relative advantage, compatibility, trialability and observability and low complexity are expected to be adopted more rapidly than others with attributes that are perceived differently (Rogers 2003). It is unknown which guideline characteristics influence early adoption of nutrition guidelines and how they may influence the extent of implementation in the child care setting. The objective of this study was to explore child care providers' perceptions and attitudes about ANGCY characteristics and how this may have influenced early adoption of the ANGCY recommendations within the child care setting.

Materials and methods

Study design

This study used an exploratory case methodology to gain an in-depth understanding of the processes involved in the adoption of the ANGCY (Yin 2009). Multiple case study design was used to explore two exemplary cases, and an intrinsic case analysis was undertaken (Miles & Huberman 1994). Key constructs from the DoI framework (Rogers 2003) were used to develop the interview protocol based on the perceived characteristics of the guidelines (relative advantage, compatibility, complexity, trialability and observability) by child care providers. Analysis of the ANGCY was conducted by a trained qualitative researcher and validated by an external qualitative researcher. Analysis entailed reviewing guideline content, layout, organisation, presentation, format, comprehensiveness and dissemination to understand whether characteristics of the guidelines affect the adoption process.

This study was part of the phase 2 evaluation framework of The Alberta Nutrition Guidelines Outcomes (TANGO) study evaluating the implementa-

tion of the ANGCY in multiple settings: schools, child care facilities and recreational facilities (Downs *et al.* 2010). Phase 1 of TANGO assessed *awareness of and intent-to-use* the guidelines in 488 child care facilities in Alberta, Canada (May–October 2009) using a cross-sectional telephone survey based on the Stages of Change constructs (Prochaska & Velicer 1997), which addressed key concepts related to awareness, adoption and barriers to implementing the guidelines in child care facilities.

Sampling

Two urban day care centres in Alberta, Canada, identified as 'early adopters', were purposely selected. The day care centres were both established between 1986 and 1991, accredited and comparable in size. Differences between the two centres included: organisational type, organisational structure, having a specialised cook and minimum level of formal training of staff (Table 2). 'Early adopters' were defined as 'implementation strategies initiated within 1 year of receiving the guidelines' (i.e. before December 2009). Purposeful sampling of exemplary cases was based on adopter characteristics identified in phase 1 ($n = 101$). Inclusion criteria for case selection included (1) centres made changes to the nutritional quality of foods offered as a result of the ANGCY, (2) changes were implemented for a period of 6 months or greater, (3) centres granted consent for follow-up during phase 1 ($n = 66$), (4) all meals/snacks had to be provided by centres ($n = 27$) and (5) degree of implementation whereby the sites that mostly closely followed guideline recommendations (identified by phase 1 analysis) were selected by the research team ($n = 6$). Only urban child care centres were included.

Access and recruitment

Following confirmation of case selection ($n = 2$), a formal consent process was undertaken with directors. Child care staff were recruited through provision of information sheets and verbal notification by directors and the researcher. Five key informants were interviewed from each centre, including directors, cooks, and junior and senior staff members to provide

Table 2. Description of day care centres

	Case 1	Case 2
Date of establishment	1986	1991
Organisational type	Non-profit day care	Private day care
Organisational structure	Top-down/horizontal	Top-down
Accredited	Yes	Yes
Location	Urban	Urban
Proximity to grocery store	Not within walking distance	Not within walking distance
Vending machines	No	No
Max. number of children allowed	47	60
Avg. child to staff ratio observed	5:1	5:1
Age range of children	19 months–6 years	3 months–6 years
Number of staff	12	11
Auxiliary staff	Yes	No
Number of volunteers	1 per day	1 periodically
Cook	Yes	No (director is the cook)
Kitchen	Yes	Yes
Level of formal training of staff	Min. 2 years diploma in Early Childhood Education	Min. Level 1 Child Care Assistant Course (50 h)
Requirements for professional development	1 year	1 year

a comprehensive understanding of guideline perception by those directly working with the guidelines. All interviews were held in a private room for confidentiality. It was not possible to keep participation anonymous; however, all discussions between the interviewer and participants were kept confidential. All staff underwent the same formal process of consent.

Data collection

Data were collected through direct observation, key informant interviews and documentation of field notes. Direct observation was carried out for 2 days to enable observation of mealtimes and general child care centre operating procedures. Specific days were determined by day cares; however, each site was observed for the same time period and mealtimes. Observational data were collected systematically based on a tool modified from Miles & Huberman (1994). Field notes included the observation of general attitudes and behaviours at mealtimes by child care providers regarding adherence to the guidelines and general observations regarding organisational procedures.

Five key informants representing all categories (director, cook, junior and senior child care staff) of

employees working within the centres were interviewed from each centre to provide a comprehensive understanding of guideline perception by those directly working with the guidelines. Key informant interviews were semi-structured consisting of open-ended questions. Interview questions addressed organisational structure, operating procedures, processes and strategies used in adoption and implementation of the guidelines, and child care provider perception of and attitudes towards content, adoption and usability of the guidelines. Theoretical saturation of themes identified was reached.

Data analysis

Interviews were digitally recorded, transcribed and coded. Notes were taken by the interviewer during the interviews to document non-verbal cues such as body language and gestures. Interviews and field notes were transcribed immediately post-interviews to document information as accurately as possible. Interview transcripts were validated by an external researcher who reviewed the digital recordings against the transcripts to ensure accuracy and avoid misrepresentation. Direct observations, field notes and interview data were coded and triangulated to

give credibility to findings (Yin 2009). Data were reviewed and analysed separately, together, then compared for reliability.

NVIVO software (version 9; QSR International, Doncaster, Victoria, Australia) was used to organise the qualitative data. Data were organised by site, emerging themes and conceptual ordering. Content was analysed using inductive and deductive coding strategies. Responses were first reviewed line-by-line then organised with the corresponding questions. This approach is useful as it allows for an in-depth comprehensive analysis of the data by identifying recurring themes and allowing for an interpretation of the underlying meaning of the text (Patton 2002). Procedures and methods were corroborated and independently verified by senior research team members to ensure coder reliability and validity of identified research themes. This study was approved by the Research Ethics Board of the Faculties of Physical Education and Recreation, Agricultural, Life and Environmental Sciences and Native Studies at the University of Alberta.

Results

Table 3 summarises child care provider perceptions of the characteristics of the ANG CY.

Guideline characteristics

Relative advantage of the ANG CY

Awareness, design and tangibility were the main advantages of the ANG CY reported by staff from both centres. *Increased awareness* of nutritional requirements in childhood was a key advantage of the guidelines reported by users. Staff reported using the guidelines as a source to stay up-to-date with nutrition recommendations and to identify healthy vs. unhealthy food choices. Portion sizes and number of servings were the main reasons cited by child care staff for using ANG CY. Other features commonly used included information on sugar content of foods, food variety in menus and menu planning. Implementation strategies were also identified as key features of the guidelines that helped to inform practice by making staff more aware of their own behaviour such as role modelling and child feeding practices.

Visibility of the guidelines also influenced awareness. Having print copies of ANG CY displayed in the work area served as visual prompts for using resource materials and cuing behaviour change and acted as a prompt like signage or messaging for child care staff; initiating discussions and reflection about current practices further promoting awareness.

Design of the ANG CY was a second key relative advantage. The most important features of the guidelines were that they were 'comprehensive', 'complete' and 'convenient'. Staff repeatedly described ANG CY as having more detail than other similar regulatory documents; they cover not only nutrition recommendations but also put them into context of child development and explain how to implement recommendations. This made it convenient for staff to find what they were looking for. Staff also repeatedly mentioned, other key benefits of the guidelines included: a 'logical format', 'practical layout' and that they are clear, easy to understand and explicative. One respondent, however, expressed the guidelines should provide more information about food allergies; they should provide more detail with respect to symptoms, causes and management. The design proved to be a very important construct of the guidelines because it had a direct impact on the utility of the guidelines for users influencing continued use.

Having the guidelines as a *tangible resource* was another key relative advantage of the guidelines influencing accessibility. Providing hard copies of the ANG CY bound in a three-ring binder made them easily accessible, portable and convenient because the format fit the setting with ready access by child care staff. Frequency of use and accessibility of having the printed materials in an easy to use binder enabled one centre to take pages right from the binder and post them in every classroom further increasing accessibility and convenience of the guidelines. Posting the guidelines in plain view enhanced teaching practices by enabling child care providers to review the guidelines with children and parents as questions or concerns would arise. The medium by which the guidelines were communicated made them appropriate for the child care context. Tangibility affected visibility, accessibility and convenience of ANG CY resulting in greater relative advantage.

Table 3. Perceived characteristics of the ANGCY by child care providers

Perceived characteristics	Main themes	Uses and/or benefits
↑ Relative advantage	<ul style="list-style-type: none"> • Increased awareness of: <ul style="list-style-type: none"> – Nutritional requirements – Implementation strategies <p>P1: 'It's good for us because we have to know how much we have to give to a 3-year-old kid and a 4-year-old kid, 5-year, and . . . for toddler, for babies. Those lines help us. Otherwise we don't know how much they have to eat.'</p> <p>P2: ' . . . it's helped staff be more aware of their modelling and how they introduce nutrition.'</p> <ul style="list-style-type: none"> • Guideline design <ul style="list-style-type: none"> – Comprehensive – Complete – Convenient – Logical format – Practical layout – Functional <p>P3: 'Having all of that information all in one place.'</p> <p>P2: 'I think the strength is . . . it's all encompassing, that it's . . . clearly divided . . . it seems to be a natural content following so that staff can find what they need quickly. So you're not overwhelmed by a two-inch thick wad of paper . . . you can navigate through very easily and when you do find what you want it's very clear. I find that's a valuable resource because it's usable.'</p> <ul style="list-style-type: none"> • Tangibility <ul style="list-style-type: none"> – Convenient – Appropriate to context – Awareness <p>P2: 'Having the guideline . . . provides . . . that conversation to take place. Because, well, did you see what was in the guideline and . . . was that helpful or have you used this . . . that starts that conversation which then gets you thinking about what you are doing and how you're doing it . . . It's helped staff be more aware . . . they're talking about that, being reflective about it and then we're having discussions in staff meetings . . .'</p> <p>P6: 'Whenever the kids want something, they, ah, need breakfast, lunch and snack, we go through this.'</p>	<ul style="list-style-type: none"> • Portion sizes • Number of servings • Staying up-to-date with nutrition recommendations • Identification of healthy vs. unhealthy foods • Nutrient specifications • Menu planning, menu ideas, adding variety to menus • Reflection of practice behaviour <ul style="list-style-type: none"> • Clear • Easy to understand • Explicative • Practical • Usable <ul style="list-style-type: none"> • Accessible • Portable • Visible • Reflection of practice behaviour
↑ Compatibility	<ul style="list-style-type: none"> • Compatible with: <ul style="list-style-type: none"> – Knowledge – Belief systems – Current nutrition and child care practices – Learning styles – Context <p>P8: 'Definitely I will agree [with the content of the guidelines]. Yes. Yes. Yes.'</p> <p>P9: 'I feel that it's good to promote healthy eating and healthy choices for the kids . . . because it starts early . . . and that's part of the Early Childhood Educator that I've learned is part of the job description . . .'</p> <p>P10: 'Nothing really drastically because we were . . . going towards that direction anyway . . . we sort of incorporated that before, already, so it wasn't a big change for us.'</p> <p>P1: ' . . . the nutrition guidelines has . . . more detail but they're very same, similar, they fit into the same topics.'</p>	<ul style="list-style-type: none"> • Agreement with content and purpose of guidelines • Confirmation of current nutritional practices • Positive perception of guidelines increased willingness to try recommendations • Lower complexity
↓ Complexity	<ul style="list-style-type: none"> • Clearly written • Straight forward • Uncomplicated • Explicative • Comprehensive • Familiar format • Applicable to child care setting 	<ul style="list-style-type: none"> • Easy to read and understand • Easy to comprehend • No translation or interpretation required • Easy to apply to practice • Easy to share knowledge among staff members

Table 3. Continued

Perceived characteristics	Main themes	Uses and/or benefits
	P6: 'Clear, clear, clear' . . . [written] very much in plain English . . . I even think not even a grade eight reading level.'	
	P2: 'So you're trying to cover not only what foods should be done but how to develop a menu, how to develop . . . appropriate portions for appropriate age groups and . . . a little bit of child development so that they understand that children of this age will prefer and should be able to, you know, so they know when children are eating with their fingers that's perfectly acceptable to eat with fingers . . . and just that kind of information all in one place . . .'	
↑ Trialability	<ul style="list-style-type: none"> • Simple to try • Low commitment • Limited investment in time and planning 	<ul style="list-style-type: none"> • Healthier menu options <ul style="list-style-type: none"> – Increase in fruit and vegetables – Leaner meats – Whole grain/wheat breads – Serving more yogurt – Lower sugar content of foods • Improved menu variety • Created a more supportive meal environment
↑ Observability	P2: ' . . . what's new and different, what haven't we tried and let's see how we can try that.' <ul style="list-style-type: none"> • Direct and immediate response to change was visible 	<ul style="list-style-type: none"> • Informative • Increased trialability
Relative advantage: degree to which an innovation is perceived as better than the idea it supersedes		
Compatibility: degree to which an innovation is perceived as being consistent with existing values, past experiences, and needs		
Complexity: degree to which an innovation is perceived as difficult to use		
Trialability: how easily an innovation can be tried		
Observability: how easily results are visible		
<i>Definitions based on Rogers' Diffusion of Innovations theory (Fitzgerald et al. 2002)</i>		

Compatibility of the ANGCY

Child care staff reported the guidelines to be highly compatible with knowledge and belief systems and current practices resulting in a positive perception of the guidelines. Staff interviewed from both sites reported agreement with the content and purpose of ANGCY. Responses indicated that child care staff perceived the purpose of the guidelines to be compatible with the overall goal of practice: healthy child development.

A second factor related to compatibility is that the guidelines were in agreement with existing nutritional practices. The transition to adopting ANGCY was easy because they did not require a major change and the guidelines were an 'affirmation' and 'confirmation' of current nutritional practices. When asked about changes made after adopting the guidelines, staff reported they were already moving in that direction so it did not require a big change for them. Participants found the guidelines 'very comparable' to what they were already trying to achieve in their prac-

tice and as a result felt very 'comfortable' and 'confident' trying recommendations from the guidelines.

Child care staff found the format of the guidelines compatible with other child care standard practice guidelines (Health Canada 2012). Respondents stated that the guidelines informed them of new information, but it was shared in a familiar format and an appropriate context, making them easy to understand and apply to practice. Overall, child care staff found the ANGCY to be highly compatible with existing knowledge and beliefs, current nutritional practices and modes of information delivery.

Complexity of the ANGCY

The guidelines were perceived by all staff interviewed as having a low level of complexity given they were easy to read and understand, clearly written, easy to translate and apply, comprehensive and in a format both familiar and applicable to child care practice standards. Child care staff described the readability of

the guidelines as clearly written and at a reading level easy to understand. Staff members said they did not find ANGCY challenging; in fact, they found them 'very helpful'. Translating the guidelines and putting them into practice was described as effortless. Staff reported that translation, or interpretation of menu ideas, recipes, portion and food serving guides to be straightforward and applying the guidelines to practice uncomplicated. Child care staff pointed out that the comprehensiveness of the guidelines and the clear, systematic organisational format of the ANGCY lowered the level of complexity because it helps to support the whole picture. The guidelines put nutrition recommendations into perspective by relating them to child development and clearly explaining how to implement recommendations in a compatible context increasing comprehension and decreasing interpreter fallacy.

Trialability and observability of the ANGCY

The guidelines were found to have high trialability and observability because recommendations were simple to try, required a low commitment and change was easily observed. The attitude among centres was positive, and staff were eager to try recommendations. Trying a new menu idea, a new recipe, was simple because it took little time and planning as complete recipes and sample menus were provided. The most notable changes in the menu were an increase in fruits and vegetables servings offered and/or changing from regular cuts to lower fat cuts of meat or from white to whole grain/wheat breads. Other changes included serving more yogurt and foods lower in simple sugars, purchasing child-sized utensils, improving menu variety and increasing variety within the menu rotation cycle. Child care providers were able to observe children's attitudes and behaviour to changes made and make adjustments in response to this. For example, one centre tried to incorporate more vegetables into mixed meals such as soups and casseroles but found that children were spending their time trying to pick out the vegetables and consequently eating less. To overcome this, the centre decided to serve vegetables on the side so children would try them separately.

Discussion

The ANGCY were developed with limited formative evaluation making this one of the first opportunities to conduct a qualitative study of the evaluation of end-users' perceptions of the characteristics of the guidelines. It is valuable to understand how child care providers perceive characteristics of guidelines as this is the first step in identifying the needs of child care providers with respect to early adoption and identifying potential educational strategies important for dissemination (Rogers 2003).

Overall, the ANGCY were perceived positively by child care staff. Child care providers found the guidelines to have a high relative advantage, be compatible with current practice, have a low level of complexity, easy to try and easy to observe changes. These findings are in contrast to findings of perception of the ANGCY in schools and recreational centres where barriers to relative advantage, compatibility and complexity were noted. Key barriers in the school setting were lack of parent acceptance and profit losses (Downs *et al.* 2012). In recreational facilities, the possibility of profit loss was the key barrier to adoption (Olstad *et al.* 2011). Given that child care centres do not rely on food sales for funding, loss of profit is not a barrier. Moreover, positive perception of the guidelines by child care providers may be attributed to professional development opportunities and coursework specific to early childhood development and meal planning as day cares must follow federal policies, such as two food groups per snack and four food groups per meal that neither schools or recreational facilities are required to follow. Additionally, early adopters may have organisational strategies influencing staff behaviour in the uptake of new initiatives.

Increased awareness directly affected child care practice by informing child care providers of nutritional requirements and implementation strategies, a key relative advantage. Staff could rely on the guidelines to inform their practice and were perceived as a trusted information source. Information source and attributes of an innovation have been found to affect perceived credibility by users and uptake behaviours of recommended actions (Granados *et al.* 1997; Flan-

agin & Metzger 2007; Johnston & Warkentin 2010). The guidelines also prompted reflection of knowledge and practice behaviour, and information sharing among staff to identify areas for improvement. Design and tangibility were also perceived as relative advantages by facilitating translation of guideline content. The ANG CY were in a familiar format and suitable context, emphasizing knowledge translation by end users is an important aspect in the adoption process. These factors worked together, increasing the perception of relative advantage; one of the most influential factors in adoption (Aubert & Hamel 2001). While relative advantage was found to influence uptake behaviour; the degree to which this influenced guideline adoption is unclear.

Context is important to consider because it influences suitability of an innovation for prospective users. A meta-analysis of diffusion of innovations in service organisations found context to be a strong predictor of the success or failure of a dissemination initiative (Greenhalg *et al.* 2004). Innovations made convenient and compatible for prospective users will increase the positive perception of the innovation increasing perception of trialability, subsequently reducing barriers to adoption and increasing the likelihood of continued adoption and institutionalisation (Rogers 2003).

Compatibility is very important for reducing barriers and increasing willingness to try an innovation. An innovation must fit with its intended audience, or it will not be adopted as rapidly, if at all (Rogers 2003). Participants reported agreement with both guideline content and characteristics and the underlying goal of providing healthy nutritious foods for children. New knowledge must be accepted before it will be utilised (Fitzgerald *et al.* 2002). Compatibility increases an organisation's willingness to adopt and assimilate an innovation (Greenhalg *et al.* 2004). According to these interviews, the ANG CY were in accordance with provincial licensing standards known to child care staff, requiring minimal skills or knowledge acquisition, all factors that are associated with early adoption of innovations (Greenhalg *et al.* 2004).

Format and context are also important when considering compatibility because an innovation must be in line with practice needs and information sharing

styles. The common, compatible format of the guidelines, as reported in the interviews, increased acceptance for child care providers by adding familiarity and lowering the level of complexity. Staff reported that the ANG CY are a substantial resource so presenting them in a usable format consistent with organisational practice is important; this increases functionality and value of the innovation. This finding is consistent with uptake of technological innovations in the medical sector where quality of information (relevance, usefulness of layout and format) positively influence uptake of the innovation (Aubert & Hamel 2001).

Complexity level affects readability, comprehension, translation and application, all important determinants of adoption. Innovations difficult to understand require new skills and knowledge development, which can be barriers to adoption (Rogers 2003). Innovations perceived as difficult to understand and/or use decrease compliance with practice guidelines (Grilli & Lomas 1994) and lower willingness for adoption (Aubert & Hamel 2001). Additionally, technical factors affecting complexity and ease-of-use of innovations must be perceived positively to be adopted, but innovations will not be adopted simply due to a low complexity level (Aubert & Hamel 2001), indicating that complexity level is important in the adoption decision but is not a determining factor.

Trialability is also affected by the relative ease of trying something new, the level of commitment required (time, cost, skills/knowledge development) and the ease of discontinuing use (Rogers 2003). Innovations that can be experimented on a limited basis are readily adopted and implemented (Grilli & Lomas 1994; Greenhalg *et al.* 2004). Additionally, the more easily change can be observed and measured, the sooner the adoption decision can be made (Rogers 2003). Staff reported the guidelines had high observability because recommendations were observable and measurable. Similarly, because most of the implementation recommendations were suggestions for practice, which may directly impact teaching approaches, child care providers could measure children's responses and the effect it had on them, increasing the likelihood of guideline adoption (Rogers 2003; Greenhalg *et al.* 2004).

There tends to be an overlap between the characteristics (e.g. complexity, trialability, compatibility), making it difficult to clearly define specific influences of guideline characteristics on user perception. Interestingly, guideline characteristics had cumulative effects; as one characteristic was appreciated it affected another, influencing overall perception. However, this is not always the case. An innovation could be easy to try but not offer any advantages in which case it most likely would not be adopted (Aubert & Hamel 2001). Or an innovation could offer many advantages but be too complex to use. That is why DoI postulates that innovations tend to be adopted more rapidly when all of these conditions are met; the more characteristics that are perceived positively, the greater the chance and rate of adoption (Rogers 2003). Some research suggests that factors such as relative advantage may play a greater role in understanding uptake behaviour. Early adopters perceived the ANGCY to have a high relative advantage to what they were currently doing; were highly compatible with existing knowledge, beliefs, and practices; had an all-around low level of complexity; were easy to try; and were easy to observe change. These attributes of the ANGCY, as perceived by child care providers, were all successful components of increasing the likelihood of adoption.

Evaluating nutrition guidelines in child care organisations is an emerging area of research; consequently, it has several limitations. Evaluation of the characteristics of the guidelines was part of an exploratory study looking at adoption of the guidelines by early adopters in urban populations. Purposefully selecting two exemplary cases provides an opportunity to learn from information-rich sources highlighting unusual or extreme conditions; lessons may be learned about what works and how from cases such as these. Studying of early adopters may inherently underestimate potential barriers and hence influence the ability to generalise study finding. Case study methodology facilitated in-depth exploration of study outcomes but does not facilitate comparability or generalisability of study findings. Probing study findings can potentially result in recommendations for improvement of ANGCY recommendations for this sector. The perceptions of child care providers that took part in this

study may not be characteristic of other child care centres as these were exemplary cases. Exploration of how organisational structure, culture, networking and leadership influence uptake of the ANGCY is also a critical component to evaluating the factors influencing guideline adoption. Exploring child care provider's perceptions of the attributes of the guidelines is the first step in the evaluation framework for the ANGCY, informing policy makers and health professionals of factors to consider in the modification of the guidelines. The perceptions of guideline users regarding the characteristics of the ANGCY can assist policy makers with understanding the factors that may influence uptake of guideline recommendations in the child care setting. This is an important to ensure that targeted strategies are used by policy makers in the development and dissemination of nutrition guidelines.

Knowledge translation is crucial in the relationship between knowledge creation (the guidelines) and action (adoption and implementation). Making updates available only in web-based form may not be practical as providing child care centres with printed materials proved to be a key relative advantage promoting awareness and enhancing usability of the guidelines. Dissemination strategies that include workshops targeted to specific sectors (schools, child care, recreational facilities) and potentially reformatting the ANGCY to these three sectors may increase the number of child care providers that adopt the ANGCY. Studies have shown that nutritional policies are an effective method for increasing the nutritional quality of foods served in child care centres (Erinosho *et al.* 2011), suggesting that perhaps the next step is to move from guidelines to policies as it is imperative that nutrition guidelines are adopted and implemented in child care organisations that target the early stages of life when eating preferences and habits are formed. In summary, understanding the child care providers' perceptions about nutrition guideline characteristics is an important component to the early adoption of nutrition focused guidelines within the day care setting. Future research should tailor evaluations specific to the characteristics of the guidelines and investigate a larger sample size, including non-adopters and centres in multiple settings.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

Contributions

HN collected and analysed the data and co-wrote the initial draft of the manuscript. LJM and TB provided guidance in interpretation of results and participated in manuscript preparation. DM and AF lead data collection, analysis, interpretation and critically reviewed all sections of the manuscript for important intellectual content. All co-authors participated in manuscript preparation and review.

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