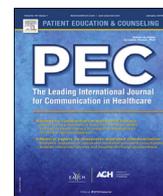




Contents lists available at ScienceDirect

## Patient Education and Counseling

journal homepage: [www.elsevier.com/locate/pateducou](http://www.elsevier.com/locate/pateducou)



# Motivational interviewing with families in the home environment

Carley O’Kane<sup>a,\*</sup>, Jennifer D. Irwin<sup>b</sup>, Don Morrow<sup>b</sup>, Lisa Tang<sup>a</sup>, Samantha Wong<sup>a</sup>,  
Andrea C. Buchholz<sup>a</sup>, David W.L. Ma<sup>c</sup>, Jess Haines<sup>a</sup>, on behalf of the Guelph Family  
Health Study

<sup>a</sup> Department of Family Relations and Applied Nutrition, University of Guelph, Guelph, Canada

<sup>b</sup> Faculty of Health Sciences, Western University, London, Canada

<sup>c</sup> Department of Human Health and Nutritional Sciences, University of Guelph, Guelph, Canada

### ARTICLE INFO

#### Article history:

Received 5 March 2019

Received in revised form 21 May 2019

Accepted 4 June 2019

#### Keywords:

Motivational interviewing

Childhood obesity

Home visits

Family health

Counseling

### ABSTRACT

**Objective:** This study explored the feasibility and acceptability of using Motivational Interviewing (MI) in the home setting with families of preschoolers.

**Methods:** Using mixed-methods pilot data from an MI-based obesity prevention intervention delivered via home visits by health educators (HEs) with 44 families (n = 17 four home visit group; n = 14 two home visit group), we examined: 1) fidelity of MI adherence by HEs; 2) parents’ perceptions of the intervention; and 3) HEs insights pertaining to the intervention’s delivery.

**Results:** Multiple measures of MI fidelity were deemed to exceed defined proficiency levels. Ninety-three percent of families reported being “satisfied” to “very satisfied” with the intervention. HEs reported building a high level of trust with families and gaining a thorough understanding of familial context. Parents appreciated how HEs’ were knowledgeable and provided personalized attention when discussing health goals. Some parents suggested more directive advice and follow-up visits as ways to improve the intervention.

**Conclusion:** Home-based MI was conducted with a high level of fidelity, was well accepted by families and practitioners.

**Practice implications:** Our findings from parents and MI practitioners provide key learnings that can inform future behavior change interventions that propose to use MI within the home setting.

© 2019 Elsevier B.V. All rights reserved.

## 1. Introduction

In 2016, the World Health Organization estimated that 41 million children under the age of 5 years were affected by overweight and obesity [1]. Parents influence their young children’s risks of overweight and obesity through genetic, behavioral, and environmental factors [2–7]. Therefore, to change behavior among young children, we need to effectively engage and change the behavior of parents. Recent reviews suggest that few effective interventions exist for early life obesity prevention, which may be due to low family engagement [8,9]. A 2016 Institute of Medicine report identified that intervening in the home setting may enhance parental engagement and be an effective approach for early childhood obesity prevention [10].

Evidence from obesity treatment interventions, particularly those within the primary care setting, suggest that Motivational Interviewing (MI) is an effective approach to influence weight outcomes in children [11,12]. MI is a collaborative conversation style for strengthening a person’s own motivation for and commitment to change. MI practitioners actively promote their clients’ welfare and give compassionate priority to their clients’ needs [13]. Treatment studies have demonstrated that MI contributes to improved body mass index (BMI) outcomes in overweight and obese children, as well as positive improvements in obesity-related health behaviors, particularly when parents and children are both involved in MI sessions [14–18]. While MI has been used with families primarily in the context of childhood obesity treatment in the clinical setting [14–18], few studies have examined the use of MI within the home setting and in the context of childhood obesity prevention.

This study aimed to address this gap by exploring the feasibility and acceptability of health educators (HEs) using MI in the home setting among families with preschool-aged children. Specifically, we used detailed process evaluation data from our pilot study to

\* Corresponding author at: 50 Stone Road East Guelph, ON N1G 2W1, Canada.  
E-mail address: [carley.okanerd@gmail.com](mailto:carley.okanerd@gmail.com) (C. O’Kane).

<sup>1</sup> Present address: Calgary, Canada.

examine: 1) HEs' MI fidelity using the Motivational Treatment Integrity (MITI) coding system; and 2) parents' and HEs' experiences with and perceptions of MI delivered within the home setting.

## 2. Methods

### 2.1. The Guelph Family Health Study pilot

The goal of the current study was to test the feasibility and acceptability [19] of a home-based obesity prevention MI intervention among families with preschool-aged children. Between August 2014 and January 2015, we enrolled 44 families with children between the ages of 1.5 and 5 years. Exclusion criteria were if families: 1) planned to move within one year, 2) had children outside of the target age range, or 3) were non-English speaking. As a primary prevention intervention, we made the intervention available to families regardless of the children's weight status. Our recruitment materials stated that we were testing a program designed to help children establish healthy habits and did not mention weight. Recruitment strategies included posters and rack cards at agencies that provide services for families with young children, i.e., Family Health Team, Community Health Centre and Ontario Early Years Centre, and postings on the Ontario Early Years Centre Facebook page and the University of Guelph webpage.

As detailed previously [20], the families were randomized to one of three treatment groups over a six month period: 1) two home visits with a HE, weekly e-mails, and monthly mailed incentives (e.g., bedtime book) tailored to each family's health goals ( $n = 14$ ); 2) four home visits with a HE, weekly emails and monthly mailed incentives ( $n = 17$ ); or 3) the control condition which included monthly e-mails based on publicly available health information ( $n = 13$ ).

Home visits were conducted by one of 4 HEs. Visits were scheduled via e-mail, and it was requested that all primary caregivers be present, if possible. Prior to HEs entering the home, the study coordinator and a research assistant would complete an initial home visit with families to go over study proceedings. These individuals would do in informal assessment for safety and precautions in the home for the HE. When completing home visits, HEs would contact each other via text-message before and after visits to check-in.

All HEs received a two-day intensive MI training, and an advanced follow-up training one year later from MI trainers/experts at the Monarch System™. Initial home visits lasted about one hour and involved families rating their satisfaction with current health behaviors (e.g., sugar-sweetened beverage consumption, family physical activity, sleep routines, children's screen time, and family meals) from 1 (very unsatisfied) to 10 (very satisfied) using an MI-focused tool created by the study team called the Family Behavior Wheel (see Family Behaviour Wheel Appendix A). Health behaviours were selected based on evidence that these behaviours are associated with reduced obesity risk among children. Research has found that obesity rates among children who were exposed to healthful household routines, i.e., regularly eating meals as a family, ensuring adequate sleep, and having limited screen time, were 40% lower than among children who were not exposed to those routines. In addition, intake of sugar sweetened beverages and low physical activity have been associated with increased obesity risk [21–23]. If families identified that they wanted to make a behavior change goal, HEs would use MI techniques to help them identify specific steps required to implement the desired change. Together they would discuss possible challenges and potential solutions to address the identified challenges. In keeping with the tenets of MI, HEs offered

families optional methods of accountability for their health goals, such as mid-week emails to check-in. To facilitate self-monitoring of behavior, families were given a family routine tracker on which they could record their behavior. If families did not choose to set a behavior change goal, HEs acknowledged that families were not ready to make a change at that time and asked families what other information or support they would find helpful. Follow-up home visits typically last 30 to 60 minutes and involved HEs discussing families' progress towards their goals, setting new goals, and navigating any challenges.

### 2.2. Motivational interviewing fidelity assessment

An MI expert [DM] who was not involved with the day-to-day intervention delivery evaluated audio recordings (approximately 1 h in length) of 12 randomly selected home visits using the Motivational Interviewing Treatment Integrity (MITI) code version 3.1.1 (See Sample MITI Coding Sheet in Appendix A) [24]. The MITI coding system includes five global ratings of MI integrity utilizing 5 core MI processes: evocation; collaboration; autonomy support; direction; and empathy as well as overall behavioral counts of MI adherent (asking permission, affirming, supporting) and non-adherent (advising, confronting, directing) behaviors. The Global Ratings' categories were evaluated quantitatively from 1 (low) to 5 (high) and qualitatively from interview comments demonstrating consistent and applicable use of each MI process. The behavior counts were numerical counts for MI adherent or non-adherent comments and for open or closed questions and simple or complex reflections. The MITI has demonstrated acceptable psychometric properties across research settings; it is the most commonly used tool to evaluate the fidelity of MI [25–27]. As opposed to evaluating a random 20-minute segment of an audio recording, as recommended in the literature [24], the entire recording was analyzed due to the nature of the home environment being more chaotic and disruptive than a typical clinical setting (e.g., children attention-seeking).

### 2.3. Assessment of health educator perceptions

HEs were all Caucasian females who were registered dietitians and enrolled in a graduate level nutrition program. Their perceptions of using MI in the home setting were captured through regular formal meetings during which the team discussed successes, challenges, and strategies to improve MI in the home setting. A member of the research team (CO) engaged in inductive content analysis by reading meeting notes multiple times and summarizing the main themes about delivering MI in the home setting.

### 2.4. Assessment of parent perceptions

To assess parents' satisfaction with the intervention and to better understand how the home visits with the HEs were received, parents in the intervention groups were asked to complete a process evaluation questionnaire designed for this study that asked them to rate how satisfied they were with the content and length of the home visits. Of the 31 families who were randomized to the study intervention, 27 (87%) completed the questionnaire. A member of the research team [CO] reviewed the questionnaires, and recorded and summarized frequency of responses using Microsoft Excel.

All parents who completed the study intervention (30 mothers, 22 fathers) were invited to participate in a telephone interview exploring their home visit experience. Interviews were conducted by one of two research staff (SW & LT) who were not involved with the delivery of home visits. Interviews were arranged through

email at a time that was convenient for the participant, and were completed over the phone using a semi-structured interview guide (see questions in Table 1). The interviewer explained to participants that the purpose of the interview was to learn about their experience of their home visits in order to help inform any necessary improvements, and that participants could skip any questions that they did not want to answer. A total of 12 parents (11 mothers and 1 father) completed the interviews. Interviews were audio recorded, transcribed verbatim, and lasted an average of 12 min. Ethics approval was provided for this study by the University of Guelph.

As advised by Guba and Lincoln [28], strategies were employed throughout data collection and analysis to help ensure data trustworthiness. For example, credibility of the data was enhanced by the interviewers' employing member-checking between each question and at the end of each interview to check that responses were understood correctly, and multiple coders were utilized during the analysis to support the data's confirmability. Specifically, three members of the research team (JH, SW & LT), trained in qualitative analyses, individually reviewed the transcripts and by consensus determined that no further data collection was necessary and that theoretical saturation was achieved. Analysis of the interviews involved three phases. In phase one, each member of the analysis team (SW, LT & JH) immersed themselves in the data by reading the transcripts individually and noting interesting ideas and patterns. The analysis team then met to discuss the transcripts. During the discussions of the transcripts, the team generated initial codes using a deductive or directive approach to thematic analysis whereby the questions in the interview guide served as the framework for devising the initial codes [29–32].

In phase two of our analysis, two analysts (SW & LT) independently coded the transcripts by assigning codes developed in phase 1 to segments of data relevant to the questions asked in our interview guide [32]. Across the transcripts, three coding discrepancies were discussed and resolved between the two analysts.

In phase three, following the completion of coding, the full analysis team met again to review the coding and collate themes [32]. Themes were developed and reviewed against the data to ensure they were supported and made sense across the entire dataset. Quotations that best exemplified the themes were identified.

**Table 1**  
Qualitative Interview Script.

**Motivational Interviewing and Home-Based Health Education Qualitative Questions:**

- 1 What did you enjoy most about your home visits with a health educator?
- 2 What did you enjoy least about your home visits with a health educator?
- 3 What would have improved your home visit experience with the health educator?
- 4 What do you know now that you didn't know before your home visits with a health educator?
- 5 To what extent did you feel trust with the health educator?
- 6 What do you think was responsible for that level of trust?
- 7 How did working with a health educator in your home impact your confidence in making health behavior changes related to physical activity, family meals, screen time, and sugar-sweetened beverage consumption, implementing bedtime routine?
- 8 In what ways did home visits with a health educator impact or influence:
  - Your views about changing your behavior?
  - Your discussions about changing your behavior?
  - Your feelings about changing your behavior?
- 9 What else about your experience with the health educator do you want us to know?

### 3. Results

#### 3.1. Quantitative results

##### 3.1.1. Motivational interviewing integrity and adherence

Table 2 summarizes the results of using the MITI tool to assess MI integrity and adherence on the part of the HEs during home visits. In terms of the Global Ratings' scores for the summed 5 qualities of MI, the HE average was 3.26 or just below the 3.5 MITI-threshold of "beginning proficiency;" the range across the HEs for this computed score was 2.3–4.0 with 7 of the 12 HE interviewers achieving 3.5 or higher. In terms of behavior counts, the average MI adherence across HEs was 83.4% and the range was 55–100% with 6 of the HE recordings meeting or exceeding the 90% MITI-defined beginning proficiency threshold. With respect to the ratio of reflections to questions, the HEs' average was 1.0 thereby meeting the beginning proficiency threshold established by the MITI; the range for this ratio was .6–1.5. For the percentage of open questions out of total questions asked per session, the HEs' average was 53.9%, or just over the beginning proficiency threshold for that MITI variable. Although the MITI tool uses percent complex reflections in the protocol, the MI experts viewed complex reflections as a very advanced MI tool or skill, one that was not taught in either of the two HE MI trainings; therefore, no calculations were done for this behavior count.

##### 3.1.2. Parents' perceptions of MI in the home setting

The 31 families randomized to receive the study intervention included 31 mothers and 23 fathers; 81% of the parents identified as Caucasian and 38% had an annual household income \$100,000 or higher. Of the 27 parents who completed the survey, 93% (n = 25) reported being "satisfied" to "very satisfied" with the MI counselling received. Eighty-five percent (n = 23) found the quality of discussion during home visits to be "good" to "very good". One-hundred percent of families reported that the length of home visits were "just right".

#### 3.2. Qualitative results

##### 3.2.1. HEs' perceptions of MI in the home setting

HEs found that by using MI, they were able to develop good rapport and a trusting relationship with families. HEs identified that parents were responsive to the client-centered aspect of the MI approach, with many families taking pride in their ability to set and achieve their own goals. HEs found that using MI-focused intervention materials, such as the Family Behavior Wheel, were effective in eliciting meaningful discussion from parent(s) around how to work towards their ideal health behaviours. Compared to a clinical setting, HEs also reported that by intervening in the home they were better able to understand the family's lifestyle and context including socioeconomic advantages and limitations. Lastly, HEs found it helpful to have follow-up MI training 1 year after initial training to enhance and refresh their MI skills.

HEs identified a number of challenges when conducting MI within the home setting. A primary challenge in this environment was distraction, in the form of electronic devices (i.e., televisions, phones), pets, and children wanting parental attention, making it challenging to keep parents engaged in conversation. HEs found that conversations were best maintained when the distraction was immediately addressed and by summarizing conversations to re-engage parents. An additional challenge was parents who did not want to and/or were not ready set goals. According to current MI theory and practice, this tendency in some of the study's parents is perceived to be either a comfort in maintaining the *status quo* and/or parental-perceived lack of readiness to make behavior changes [33]. This prompted HEs to further explore parents' motives for participating in the study.

**Table 2**  
Summary Scores for 12 Health Educators on Global MI Ratings & MI Behavior Counts.

Clinician Behavior-Count or Summary Score Thresholds	Beginning Proficiency Threshold	Competency Threshold	HE Range	HE Avg
Global Clinician Ratings (Avg of 12 interviewers' ratings across the 5 qualities of global ratings)	Average of 3.5	Average of 4	2.3 – 4.0	3.26
Reflection to Question Ratio (simple ration calculation from Behavior Counts)	1	2	.6 – 1.5	1.0
Percent Open Questions (simple per centage calculation from Behavior Counts)	50%	70%	17 – 71 %	53.9%
Percent Complex Reflections (simple per centage calculation from Behavior Counts)	40%	50%	N/A	N/A
Percent MI-Adherent (per centage of MI Adherent to total of MI Adherent plus MI Non-Adherent Giving Information Counts)	90%	100%	55 – 100%	83.4%

### 3.2.2. Interviews with parents

Of the 12 parents (11 mothers and 1 father) who completed the qualitative interviews 67% identified as Caucasian and 42% had an annual household income of \$100 000 or higher.

Three major themes emerged from the qualitative interviews with parents: aspects of home visits that contributed to a high level of trust with HEs, aspects of home visits that were helpful, and ideas for improving home visits. These themes, their respective subthemes, and illustrative quotations are summarized below and in Table 3.

**3.2.2.1. Aspects of home visits that contributed to trust with HEs.** Two subthemes emerged regarding aspects of home visits that parents' perceived as contributing to the good rapport and trust felt with HEs: the approachable and personable nature of HEs and the HEs' knowledge level.

**HEs were approachable and personable.** Parents expressed that because HEs created a warm and friendly atmosphere in the home, it made them and their children comfortable and helped establish a trusting relationship. One parent said, "everybody was very friendly and warm and made everyone, even my kids at ease". Another parent mentioned that the HE was "really warm and really open and she was good with the kids".

**HEs were knowledgeable.** Many parents described the value placed on the expertise of the HEs. Parents perceived HEs as being "knowledgeable" and "educated". Parents felt that they could rely on their HE for trusted information, as noted by one parent who said, "... and if you get it from the person who is authorized for it and the information is educated it just adds more value".

**3.2.2.2. Aspects of home visits that were helpful.** Three subthemes emerged regarding aspects of the home visits that were helpful to parents: the opportunity to discuss family health goals, the opportunity to engage in self-monitoring or goal tracking, and receiving personalized guidance and attention.

**The opportunity to discuss family health goals.** Parents expressed that working with a HE was "useful just to talk things through" and that it was nice to "talk to someone else about [their health behaviors]". Parents also mentioned that by initiating the discussion with a HE, it contributed to more conversations around healthy behavior change as a family. One parent reflected that their family was "very happy because I think that as a family we've had more conversations around... what constitutes a healthy balanced meal...".

**The opportunity to engage in self-monitoring or goal tracking.** Many parents felt that the concept of self-monitoring, or goal tracking, was "useful" in moving them towards successful behavior change. More specifically, one parent mentioned that the HE:

... encouraged me to keep a daily diary and it was just very... simple, I made three goals... [which] were screen time, family meal time, and... regular sleep time. But every day I would put a tick in a box if I had sort of felt that we had met our goals... I found that quite useful to look back on at the end of a week.

**Personalized attention.** Many parents identified that one of the most favorable aspects of home visits was the "personalized plan" they created with their HE. As one parent expressed their appreciation for "just being able to give our specific situation and kind of talk about different ideas that we could use to help with things that we were dealing with at the time". Parents also described the tailored convenience of visits, as one parent said, "... they come on our schedule, they come to our house... they bring their own props... tools that we need".

**3.2.2.3. Ideas for improving home visits.** Three subthemes emerged regarding ways to improve home visits: having HEs provide more directive advice, having more information aimed at the children, and including more follow-up visits.

**More directive approach.** Some parents felt that a more directive or authoritarian approach would be beneficial for their family's health behavior change. Four parents mentioned that a more prescriptive "action plan" would have been beneficial, as well as more "specific" nutrition advice. Another parent suggested having a specific challenge at the end of each visit... that may help motivate behaviour change.

**Providing more information aimed at the children.** A small group of parents felt that HEs could have brought more tools or resources to help engage the children, such as an "interactive" tool on an iPad, so that the children could "know more of what the study is about... for as much as they can understand".

**More follow-up visits with HE.** Many parents identified that having "more visits" with a HE would be beneficial in sustaining behavior change. One parent expressed, "... we were going through kind of a lot of transitions... so the things we discussed... during those two visits weren't really all that applicable even just a few months later". Parents described that having follow-up visits "a couple months later just to... touch base and see how things are going," would be beneficial for long-term behavior change.

## 4. Discussion and conclusion

### 4.1. Discussion

The goal of the current study was to test the feasibility and acceptability of a home-based MI intervention among families with preschool-aged children. We sought to explore the fidelity of MI adherence as well as the perceptions of the MI process among

**Table 3**  
Qualitative Themes and Subthemes from Parent Interviews.

Theme/Subtheme	Quote
<b>Aspects that contributed to high level of trust with health educator</b>	
<i>Health educators were approachable and personable</i>	<p>"Just the friendliness of everybody. Everybody was very friendly and warm and made everyone, even my kids at ease s-so it was good".</p> <p>"Um she was very friendly and uh open and um attentive to our family's needs".</p> <p>"She was just like really warm and really open and she was good with the kids".</p> <p>"Just the friendliness um . . . you know everybody seemed to you know be genuine".</p> <p>"I think we had a nice relationship with her I certainly felt comfortable."</p>
<i>Rapport building by health educators</i>	<p>"She spent time making sure like we had developed, like, a report and a relationship".</p> <p>"I was really impressed with how patient she was with our kids".</p> <p>"I think what I mentioned before just was her patience with our kids and letting them be involved as well I think that was really good for them".</p> <p>". . . it's about relationship building as opposed to just [..] like- come in and do the study and leave".</p> <p>"She was really good with our kids and like our kids were involved in the interview".</p> <p>"So it was really neat to see that she after the first time that she paid attention to who we are . . . we weren't just a number"</p>
<i>Health educators were educated and knowledgeable</i>	<p>". . . and if you get it from the person who is authorized for it and the information is educated it just adds more value".</p> <p>"She seemed really knowledgeable".</p> <p>"She was just really kind and um and felt like you know she knew her stuff and uh if she if I had a question she could get me . . . the answer or could get me an answer".</p> <p>"When she didn't know the answer she would always come back to us with something else like she would go look into it and then get back to us".</p>
<b>Key aspects of home visits that were helpful</b>	
<i>The opportunity to discuss family health goals</i>	<p>"It was useful just to talk things through".</p> <p>"Very happy because I think that as a family we've had more conversations around [ . . . ] ummm what constitutes a healthy balanced meal and if we make you know, three different things like a vegetable, or a grain and a meat or a protein [ . . . ] you- there's plenty of things within that balanced meal for everybody to choose and that's kind of how we roll with mealtime now".</p> <p>"A lot of it I knew too but it was nice to go through it again with someone else and talk to someone else about it".</p> <p>"It's like you get a chance to talk to my husband it's usually about more imperative things than like [..] the amount of sleep we're getting and the amount of vegetables we're getting [..] because we're like two ships passing sometimes so having a third party there and focused time to actually sit down and discuss where we're at [..] and where we're going was probably the most umm important aspect of that".</p> <p>"My husband and I would talk more about [health behaviors]".</p>
<i>Helpful information and strategies to support family health goals</i>	<p>"I think that it's nice to have someone else who is in the field and can give uh current contemporary information around recommendations for your health".</p> <p>"You don't realize what's going on until someone breaks it down for you".</p> <p>"It was still fun to have her come and like we'd like brainstorm over a few things".</p> <p>"It was kind of nice to have the feedback from someone else about like, what uhh . . . issues that we were concerned with, what problems we were having, and, and uhh . . . they had lots of ideas . . . and suggestions for us to solve the problems that we were encountering".</p>
<i>The opportunity to engage in self-monitoring or goal tracking</i>	<p>". . . and to fill out some daily ummm just a quick sort of diary type thing about how the day had gone and if we'd met our goals.. [..] and I found that to be quite helpful to ermm just to [..] to sort of see things that were working things that weren't on sort of a daily basis so keeping that record was quite useful too".</p> <p>"It was useful to keep the diaries".</p> <p>"She was really good at providing [ . . . ] ummm the tools that we needed to . . . so like we had the charts, like the goal setting charts and we had the visuals to kind of keep us on track throughout the month".</p> <p>"So she encouraged me to keep a daily diary and it was just very similar- simple, I made three goals and I think our goals were screen time, [..] family meal time and, [..] sleeping- sleep time were regular sleep time. But every day I would put a tick in a box if I had sort of felt that we had met our goals [ . . . ] and if I- I- I'd write a few comments and I found that quite useful to look back on at the end of a week".</p>
<i>Personalized attention</i>	<p>"Like the fact that they come on our schedule, they come to our house, uh they bring their own props and, uh, or you know tools that we need".</p> <p>"We enjoyed most like the personalized plan and discussing different strategies how to include umm . . . more activity as a family into our daily lives and listening to her different suggestions along the way".</p> <p>"But it was nice to have someone who could answer our specific questions that are like unique to us".</p> <p>"Just being able to give our specific situation and kind of talk about different ideas that we could use to help with things that we were dealing with at the time".</p>
<b>Ideas for improving home visits</b>	
<i>More directive advice</i>	<p>"Come up with like action plans".</p> <p>"I don't really believe she really touched on any sort of nutrition side of things specifically – no specific sort of advice or anything".</p> <p>"I don't know if there's a way t'uh [..] have like uh . . . like action plan type thing like [ . . . ] you know [..] we're going to do this, 'n then this 'n then this 'n then have follow up on it".</p> <p>"I think it would be good to like give us a specific challenge at the end of each visit maybe".</p> <p>". . . like a focused goal on one specific umm [..] one specific topic as opposed to like a variety of topics I think that would have been good".</p> <p>". . . where's she's like – okay, like your challenge for this month would be to try to include [..] like umm I don't know, veggies in like, [ . . . ] every meal or try to eat vegetarian once a week, or something along those lines or try to be active as a family like four times a week, like a challenge".</p>
<i>Providing more information aimed at the children</i>	<p>"And it would be nice to have things online. So even if they brought like um an iPad and could show you how to flip through a website with all of the information. Or . . . yeah I don't know that's . . . I mean and the kids too. Kids these days like little ones under five are totally into doing iPads and stuff. They're really you know? Interactive with that sort of thing. So, that would be a nice component to um add but . . . interactive with that sort of thing".</p> <p>"Maybe one thing that could be done is find a way . . . to sort of . . . umm . . . discuss the items in the bin and maybe even encourage some [ . . . ] play with the kids around those items and maybe model some of the different ways we could have used [ . . . ] like there was a beach ball . . . and some plastic plates I think were in there [ . . . ] so maybe just sort of a way that they could umm incorporate the kids into the visit a little bit more by modeling what some of those items were for".</p> <p>"I think just so that [the kids] know more of what the study is about – like for as much as they can understand. Like, umm [ . . . ] they had a lot of questions as well".</p>

Table 3 (Continued)

Theme/Subtheme	Quote
More follow-up visits with health educator	<p>"Almost felt like they were a little young, like we were going through kind of a lot of transitions they were changing [...] on sort of a weekly- the monthl- you know, monthly basis and that- so the things we discussed [...] during those two visits weren't [...] really all that applicable even just a few months later".</p> <p>"... really aren't applicable now because things have changed their sleep patterns have changed their eating patterns have changed [...] screen time has changed they've just changed a lot in that time".</p> <p>"So I guess it would be good to like, be followed up like [...] you know, a couple months later just to like kind of touch base and see how things are going".</p> <p>"If we had some more visits I think it would have been more helpful".</p> <p>"... would be awesome if there was a way to do like a check in like even six months or yearly with the families involved in the study especially now since it's going for like fifteen years".</p>

parents and HEs in a home-based obesity prevention intervention that used family-targeted MI to support behavior change.

We found that average global ratings for the use of MI processes, i.e., evocation, collaboration, empathy etc., was moderate or just below the beginning proficiency level. It should be noted that both HEs and the MI expert identified that distractions within the home setting were a challenge when conducting the MI sessions. Typically, MI is done 1:1 in an unobtrusive environment; however, the HEs worked with at least 1 and often 2 parents and at least 1 pre-school child. Thus, making the HEs' level of near-threshold MITI-performance notably impressive. At the same time, the HEs identified that counselling in the home environment provided a better understanding of the family's context than is possible in clinical settings. That is, in spite of the often-distracting environment, it made more sense to meet and interview the families in their home. Similarly, calculated MI adherence was very close to the MITI prescribed beginning proficiency level; we would assert that HEs, in general and on average, were adherent to the tenets of MI behavior. This assertion is supported by the determinations that the HEs met or exceeded both the reflection to question ratio and the percentage of open questions; in fact, it might well be argued that the essence of doing MI effectively stems from the use of open-ended questions and using more reflections than questions. Overall, our conclusion is that MI was utilized with integrity and adherence in family intervention environments. Coalesced with the perceived levels of parental satisfaction with MI counseling suggests MI is an important aspect of family health counseling with potential for even greater use in such environments. These findings warrant both the continued use of MI by the HEs in the ongoing study as well as future studies utilizing larger samples to examine the impact of MI on family health behaviors.

While the majority of studies that have used MI for health behavior change do not measure MI fidelity [18–20], evaluating MI fidelity is critical to ensuring the validity of study findings [25]. Proficiency is demonstrated at an MI adherence level of >90%. The majority or two-thirds of the HE-family interview sessions were evaluated at the proficiency level. Lower individual levels of adherence (<90%) may be due to the nature of the visits that often involved multiple people, i.e., two parents versus a single client, and occurred in the home where there were more interruptions than would be typical in a clinical setting or in more MI-typical one-on-one interview sessions. Given that the study's HEs received one, intensive 2-day MI training, the proficiency-level achievement by most of the HEs is at the very least, commendable. Additional and possibly modified training, i.e., training specifically on engaging with two individuals, may be needed to ensure HEs achieve a "proficient" level of MI adherence at home-based sessions. Including strategies to minimize distractions, e.g., child care, may also be needed in HE training.

Parents perceived the MI-based home visits positively, reporting high overall satisfaction. This high level of satisfaction with MI has also been found in clinic-based obesity interventions involving

families with preschool age children [34]. These results suggest that the MI approach is very satisfying and worthwhile to parents of preschoolers and that this level of acceptance is similar across the home and primary care settings.

The assessment of parent perceptions also showed that MI-focused conversations played an important role in helping them to improve their family's health behaviors. A study by Ciccone et al. also supports the use of an empowering counseling style from a health educator-type role when it comes to improving health outcomes [35]. Findings from the qualitative interviews suggest that parents valued the high degree of trust they established with HEs. Parents also identified that having the opportunity to receive personalized, in-home attention and support when discussing family health goals was helpful in changing their health behaviors. A minority of parents expressed wanting more directive advice, more information for their children, and would have preferred more follow-up sessions with their HE.

Parents' interest in receiving more directed guidance for behavior change, i.e., an expert-led, "top-down" approach, is counter to the MI, client-centered approach, but may be an approach that families are more accustomed to receiving from health practitioners. These results suggest that it may be beneficial to inform families beforehand what they can expect from an MI-based intervention. More in keeping with the tenets of MI, for some families, it may be appropriate in an MI-based intervention to provide advice, with the family's permission, in order to best meet their needs. In MI practice and theory, advice-giving is sanctioned and recommended when permission to do so is sought. The MI-advice rendering process is framed as Elicit-Provide-Elicit; that is, ask or elicit permission to give the advice and if person consents, provide the advice, then elicit or check out how worthwhile/practical the advice is perceived by the interviewee/s. If permission is not given, then it likely means the interviewee is simply not ready to hear it and/or prepared to make a behavior change; in this case, respecting the interviewee's 'no' is important in the MI relationship-building and maintenance process. Designing this MI-adherent advice-giving protocol at the start of the family interview process would very likely be well received by the families who might well be more accustomed to receiving unsolicited advice.

Like parents, our HEs also positively perceived the use of MI in the home environment; specifically noting that using MI helped them to create a trusting relationship with families and supported meaningful discussion and health behavior change among families. These findings are similar to those of other studies that found primary care clinicians perceived MI to be enriching, useful, and satisfying [36,37]. While HEs in our study perceived that intervening in the home setting provided them with a more in-depth look into the family's lifestyle and context than is possible in the clinical setting, this comparison has not been directly tested. Future research could explore whether use of MI in the home setting leads to improved behavior change as compared to using the same approach in a clinic-based setting. HEs did report some

**Table 4**  
Key Learnings to Inform Future Behavior Change Interventions Using MI in the Home Setting.

- Provide practitioners with MI training that is specific to the home setting, e.g., how to deal with distractions, and to counsel families (vs. individuals)
- Ensure practitioners receive upgraded or refresher MI training approximately every six months
- Orient families to the MI approach prior to starting an intervention
- Focus on rapport building and creating an inviting atmosphere with both parents and children
- Provide personalized attention and support that is specific to each family's environment
- Offer a way for families to be accountable in tracking their progress
- Address distractions in the home immediately as opposed to ignoring them; possibly include child care support staff to engage young children while speaking with the parents
- Include strategies to engage all family members in a discussion or related activities
- If possible, offer continued follow-up for families who may need additional support

unique challenges when using MI in the home, namely in the form of distractions (i.e., electronics, pets, children seeking attention), making it challenging to keep parents engaged in behavior change discussions. In their evaluation of a home visiting program focused on general child development, Roggman et al. [38] also identified distractions as a challenge and recommended that home visits should be scheduled at a time when distractions can be minimized.

Although the current study provides valuable insights on the feasibility of a home-based, obesity prevention, MI intervention among families with preschool-aged children, it is not without its limitations. Specifically, only one MI expert assessed fidelity of MI counseling during home visits and thus, the study may have benefitted from another reviewer to determine inter-rater reliability. Additionally, although theoretical saturation was reached, it may still not be suitable to generalize qualitative findings to the broader Canadian population. Likewise, while the majority of parents in the study completed the questionnaire, the relatively small sample size hinders the generalizability of the findings to other sociodemographic groups. Furthermore, due to the low sample size, it was not deemed feasible to analyze differences in parental or HE satisfaction between home visit groups. And while our results showed that home visits can feasibly be implemented, we did not assess the costs associated with coordinating and implementing home visits. Future research should explore costs and cost-effectiveness of a home-based approach.

#### 4.2. Conclusion

In summary, we found that MI within the home setting was feasible, well accepted by and satisfying to families and practitioners.

#### 4.3. Practice implications

Our findings from parents and MI practitioners provide key learnings that can inform future behavior change interventions that propose to use MI within the home setting (see Table 4). Full-scale, long-term trials are needed to determine the impact and cost-effectiveness of MI in home-based interventions in the maintenance of health behavior change and the prevention of obesity.

#### Conflict of interest

Authors declare no conflict of interest.

#### Ethical standards disclosure

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects/patients were approved by the University of Guelph Research Ethics Board. Verbal informed consent was obtained from all subjects/patients.

#### CRedit authorship contribution statement

**Carley O'Kane:** Data curation, Writing - original draft, Writing - review & editing, Formal analysis. **Jennifer D. Irwin:** Writing - review & editing, Supervision, Resources. **Don Morrow:** Writing - review & editing, Supervision, Data curation, Methodology, Resources, Formal analysis. **Lisa Tang:** Data curation. **Samantha Wong:** Data curation. **Andrea C. Buchholz:** Supervision, Resources, Investigation. **David W.L. Ma:** Project administration, Conceptualization, Supervision, Writing - review & editing, Investigation. **Jess Haines:** Project administration, Funding acquisition, Conceptualization, Writing - review & editing, Resources, Investigation, Supervision.

#### Acknowledgements

Financial Support: This research was funded by CIHR project grant #376067. The funding source had no involvement in the study design; data collection, analysis and interpretation; writing or submission.

#### Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.pec.2019.06.002>.

#### References

- [1] World Health Organization, Commission on Ending Childhood Obesity, (2016). (Accessed 12 February 2019) <https://www.who.int/end-childhood-obesity/facts/en/>.
- [2] J. Martin-Biggers, C. Cheng, C. Byrd-Bredbenner, The unseen power of parents: the influence of parent physical activity behaviors and values on preschool children's PA, sleep, and screentime, *FASEB J.* 28 (2014) 808.2..
- [3] D. Benton, Role of parents in the determination of the food preferences of children and the development of obesity, *Int. J. Obes.* 28 (2004) 858–869.
- [4] L.L. Birch, J.O. Fisher, Development of eating behaviors among children and adolescents, *Pediatrics* 101 (1998) 539–549.
- [5] H.R. Clark, E. Goyder, P. Bissell, L. Blank, J. Peters, How do parents' child-feeding behaviors influence child weight? Implications for childhood obesity policy, *J. Publ. Health* 29 (2007) 132–141.
- [6] C.G. Russell, A. Worsley, K.J. Campbell, Strategies used by parents to influence their children's food preferences, *Appetite* 90 (2015) 123–130.
- [7] J.D. Skinner, B.R. Carruth, W. Bounds, P.J. Ziegler, Children's food preferences: a longitudinal analysis, *J. Am. Diet. Assoc.* 102 (2002) 1638–1647.
- [8] D.S. Ward, E. Welker, A. Choate, K.E. Henderson, M. Lott, A. Tovar, et al., Strength of obesity prevention interventions in early care and education settings: a systematic review, *Prev. Med.* 95 (2017) S37–52.
- [9] J. Ling, L.B. Robbins, F. Wen, Interventions to prevent and manage overweight or obesity in preschool children: a systematic review, *Int. J. Nurs. Stud.* 53 (2016) 270–289.
- [10] National Academies of Sciences, Engineering, and Medicine, Obesity in the Early Childhood Years: State of the Science and Implementation of Promising Solutions: Workshop Summary, The National Academies Press, Washington, 2016.
- [11] M.J. Armstrong, T.A. Mottershead, P.E. Ronksley, R.J. Sigal, T.S. Campbell, B.R. Hemmelgarn, Motivational interviewing to improve weight loss in overweight and/or obese patients: a systematic review and meta-analysis of randomized controlled trials, *Obes. Rev.* 12 (2011) 709–723.

- [12] B.L. Burke, H. Arkowiz, M. Mechola, The efficacy of motivational interviewing: a meta-analysis of controlled clinical trials, *J. Consult. Clin. Psychol.* 71 (2003) 843–861.
- [13] W.R. Miller, S. Rollnick, *Motivational Interviewing: Preparing People to Change Addictive Behavior*, Guilford Press, New York City, 1991.
- [14] K.A. VanBuskirk, J. Loebach Wetherell, Motivational interviewing with primary care populations: a systematic review and meta-analysis, *J. Behav. Med.* 37 (2014) 768–780.
- [15] J.A. Woo Baidal, S.N. Price, E. Gonzalez-Suarez, M.W. Gillman, K. Mitchell, S.L. Rifas-Shiman, et al., Parental perceptions of a motivational interviewing-based pediatric obesity prevention intervention, *Clin. Pediatr.* 52 (2013) 540–548.
- [16] A.H. Pakpour, P. Gellert, S.U. Dombrowski, B. Fridlund, Motivational interviewing with parents for obesity: an RCT, *Pediatrics* 135 (2015) e644–52.
- [17] K. Resnicow, F. McMaster, A. Bocian, D. Harris, Y. Zhou, L. Snetselaar, et al., Motivational interviewing and dietary counseling for obesity in primary care: an RCT, *Pediatrics* 135 (2015) 649–657.
- [18] S.J. Tucker, K.L. Ytterberg, L.M. Lenocho, T.L. Schmit, D.I. Mucha, J.A. Wooten, et al., Reducing pediatric overweight: nurse-delivered motivational interviewing in primary care, *J. Pediatr. Nurs.* 28 (2013) 536–547.
- [19] D.J. Bowen, M. Kreuter, B. Spring, L. Cofta-Woerpel, L. Linnan, D. Weiner, et al., How we design feasibility studies, *Am. J. Prev. Med.* 36 (2009) 452–457.
- [20] C. O'Kane, A. Wallace, L. Wilson, A. Annis, D.W.L. Ma, J. Haines, Family-based obesity prevention: perceptions of Canadian parents of preschool-age children, *Can. J. Diet. Pract. Res.* 79 (2018) 13–17.
- [21] S.E. Anderson, R.C. Whitaker, Household routines and obesity in US preschool-aged children, *Pediatrics* 125 (2010) 420–428.
- [22] M.D. DeBoer, R.J. Scharf, R.T. Demmer, Sugar-sweetened beverages and weight gain in 2- to 5-year-old children, *Pediatrics* 132 (2013) 413–420.
- [23] L.L. Moore, U.D.T. Nguyen, K.J. Rothman, L.A. Cupples, R.C. Ellison, Preschool physical activity level and change in body fatness in young children: the Framingham children's study, *Am. J. Epidemiol.* 142 (1995) 982–988.
- [24] T.B. Moyers, T. Martin, J.K. Manuel, W.R. Miller, D. Ernst, *Motivational Interviewing Treatment Integrity 3.1.1* (Accessed 12 February 2019, [https://casaa.unm.edu/download/miti3\\_1.pdf](https://casaa.unm.edu/download/miti3_1.pdf)).
- [25] B. Borrelli, D. Sepinwall, D. Ernst, A.J. Bellg, S. Czajkowski, R. Breger, et al., A new tool to assess treatment fidelity and evaluation of treatment fidelity across 10 years of health behavior research, *J. Consult. Clin. Psychol.* 73 (2005) 852–860.
- [26] R. Turrisi, M.E. Larimer, K.A. Mallett, J.R. Kilmer, A.E. Ray, N.R. Mastroleo, H. Montoya, A randomized clinical trial evaluating a combined alcohol intervention for high-risk college students, *J. Stud. Alcohol Drugs* 70 (2009) 555.
- [27] S. Martino, S. Ball, C. Nich, T.L. Frankforter, K. Carroll, Correspondence of motivational enhancement treatment integrity ratings among therapists, supervisors and observers, *Psychother. Res.* 19 (2009) 181–193.
- [28] E.G. Guba, Y.S. Lincoln, *Fourth Generation Evaluation*, Sage Publications, Newbury Park, 1989.
- [29] V. Braun, V. Clarke, Using thematic analysis in psychology, *Qual. Res. Psychol.* 3 (2006) 77–101.
- [30] M. Vaismoradi, H. Turunen, T. Bondas, Content analysis and thematic analysis: implications for conducting a qualitative descriptive study, *Nurs. Health Sci.* 15 (2013) 398–405.
- [31] H.F. Hsieh, S.E. Shannon, Three approaches to qualitative content analysis, *Qual. Health Res.* 15 (2005) 1277–1288.
- [32] V. Braun, V. Clarke, *Successful Qualitative Research: A Practical Guide for Beginners*, Sage Publications, Thousand Oaks, 2013.
- [33] B. Saunders, J. Sim, T. Kingstone, S. Baker, J. Waterfield, B. Bartlam, et al., Saturation in qualitative research: exploring its conceptualization and operationalization, *Qual. Quant.* (2017) 1–15.
- [34] M.K. Campbell, C. Carr, B. De Vellis, B. Switzer, A. Biddle, M.A. Amamoo, R. Sandler, A randomized trial of tailoring and motivational interviewing to promote fruit and vegetable consumption for cancer prevention and control, *Ann. Behav. Med.* 38 (2009) 71–85.
- [35] M.M. Ciccone, A. Aquilino, F. Cortese, P. Scicchitano, M. Sassara, E. Mola, et al., Feasibility and effectiveness of a disease and care management model in the primary health care system for patients with heart failure and diabetes (Project Leonardo), *Vasc. Health Risk Manag.* 6 (2010) 297–305.
- [36] E.M. Rash, Clinicians' perspectives on motivational interviewing-based brief interventions in college health, *J. Am. Coll. Health* 57 (2008) 379–380.
- [37] K.I. Pollak, P. Nagy, J. Bigger, A. Bilheimer, P. Lyna, X. Gao, et al., Effect of teaching motivational interviewing via communication coaching on clinician and patient satisfaction in primary care and pediatric obesity-focused offices, *Patient Educ. Couns.* 99 (2016) 300–303.
- [38] L.A. Roggman, G.A. Cook, C.A. Peterson, H.H. Raikes, Who drops out of early head start home visiting programs? *Early Educ. Dev.* 19 (2008) 574–599.