PEC Innovation 2 (2023) 100149

Contents lists available at ScienceDirect

PEC Innovation

journal homepage: www.elsevier.com/locate/pecinn

Mixed-method evaluation of fidelity of motivational interviewing-based coaching in *5Minutes4Myself Wellness* Program for caregivers of children with autism

Elizabeth Larson [a,*], Noreen Jeglum [b], Chloe Shmays [c]

[a] Department of Kinesiology, University of Wisconsin, Madison, Wisconsin, USA
[b] Advanced Therapy Solutions, Davenport, IA, USA
[c] Providence Child Development Institute, Portland, OR, USA

ARTICLE INFO

Keywords:
Wellness promotion
Motivational interviewing
Caregivers
Children with disabilities

ABSTRACT

Objective: This mixed method analysis examined fidelity of the motivational interviewing (MI) delivered during the *5Minutes4Myself* wellness program for caregivers of children with Autism Spectrum Disorders.
Methods: Coaches used a manualized MI-approach to collaboratively design participants' individualized wellness programs, and then used it in monthly coaching sessions to support goal pursuit. Audio-recorded consultations and post-participation focus groups were transcribed verbatim. Consultation transcripts were rated for MI adherence using Motivational Interviewing Treatment Integrity Code. Focus group data was coded by the team to identify conceptual categories.
Results: Eighty-seven percent of consultations achieved a beginning (competent) level expert-derived MI standard. Caregivers noted that coaches' MI approach evoked deep emotions and understandings about their lives related to wellness goals, allowed for a permissive flexibility in goal pursuit, and fostered supportive accountability.
Conclusion: MI was used with high levels of fidelity. Participants described the MI approach as more productive, precise, and useful in addressing their needs compared to other available interventions.

1. Introduction

Precision lifestyle prevention approaches–tailored, preventive, and personalized behavior change programs–are increasingly being developed and used to modify lifestyle behaviors [1]. Caregivers of children with autism spectrum disorders need these programs. They face significant health challenges including higher levels of stress and depression, sleep deprivation, compromised immune system functioning and poorer well-being [2–8]. These caregivers may benefit from an approach that is sensitive to the significant time constraints, and to the limited energy parents experience due to caregiving [7,9]. The *5Minutes4Myself* program was designed with and for caregivers in a participatory action project [10]. It is a client-driven, hybrid coaching/app-supported wellness program. Participants attend a community-building focus group; work with a coach to identify wellness goals and plans to achieve them; receive monthly coaching support; use a smartphone app to access mindfulness recordings, set goal reminders, and report weekly progress; and attend a post-participation evaluative focus group. To increase fidelity, coaches use a manualized MI protocol to support caregiver's program design, and personal-tailoring [10].

Miller and Rollnick have argued that many clinical trials utilizing the MI approach have lacked quality assurance and need to attend to the fidelity with which MI is used [11]. MI has been widely and successfully used with diverse clinical populations by many health professionals [12–14]. Using similar lengths of MI training, recent studies examining practitioners' fidelity as assessed by the Motivation Interviewing Treatment Integrity code (MITI 4.2.1) found a range of fidelity with many interventionists failing to reach basic proficiency [15–17]. Variability in providers' MI adherence across studies is not well understood and may be due to provider as well as client factors [18]. Examining how specific MI trainings develop practitioners' capacity to competently deliver MI, how protocols foster consistency in MI delivery, and how this delivery impacts those receiving the intervention may help us gain insight into variability in the fidelity of MI delivery [18–20]. It is important to examine fidelity via both treatment delivery and receipt, whether it is received as intended by participants [21]. With poor fidelity insignificant outcomes in clinical trials could be inaccurately attributed to the intervention rather than its implementation.

Our objective was to examine the fidelity and receipt of MI delivered in this program. This required a mixed-method approach to: 1) assess the

* Corresponding author.
E-mail address: Elizabeth.larson@wisc.edu (E. Larson).

http://dx.doi.org/10.1016/j.pecinn.2023.100149
Received 10 February 2022; Received in revised form 28 February 2023; Accepted 20 March 2023
Available online xxxx

proficiency of MI delivery during the lifestyle consultation using a standardized tool with expert-derived competency criteria (MITI 4.2.1), and 2) describe caregivers' perceptions of the quality of the MI-based coaching and how it supported or failed to support their lifestyle change.

2. Methods

2.1. Participants

Fifteen primary caregivers for children with autism spectrum disorder (ASD) aged 8-21 years, who indicated a desire to participate in a lifestyle redesign program, and who could dedicate sufficient time to participating in the program were included. This non-probability convenience sample resided in the Midwestern U.S. and participated in the feasibility study for this wellness program. Caregivers were excluded if diagnosed with significant mental illness with the exception of depression since this is common in caregivers [22]. Participants were mostly female (93%), white (100%), and married (87%). They varied in age (36–65 years; mean = 48), income ($10,000–$130,000, mean = 74,643), education (7% H.S., 20%, Associate degree, 7% Bachelor's degree, 60% Graduate degree, and 7% unreported) and employment with 47% working either full- or part-time. Forty percent of these caregivers reported taking medications used to treat depression or anxiety, and 67% were being treated for chronic health conditions.

2.2. Procedures

This study was approved by the University of Wisconsin-Madison Institutional Review Board. Participants were recruited face-to-face at an ASD conference, via autism listservs, local advertisements in clinics, and participants' referrals of other caregivers. Participants were introduced to study procedures and provided in-person written consent.

Participants were coached by six graduate Occupational Therapy students, an undergraduate student, and the principal investigator. The principal investigator's MI expertise included completion of two courses, and experience collaboratively designing and teaching multiple MI courses [23,24]. Over two weeks, the PI trained coaches. Training included 10 hours of intensive practice in developing the spirit of MI and specific skills (affirmations, open-ended questions, complex and simple reflections, and summaries) during simulated client sessions with peers. All coaches next completed a least three additional 5–10-minute-long MI conversations with individuals of their choice and submitted these for review by the PI. Coaches were provided individual feedback to hone their skills. This feedback was reviewed within the group, and alternative strategies for MI compliant language were discussed and practiced. Coaches were not assigned to coach until the PI determined they had met an acceptable performance standard in their submitted coaching sessions.

At the first focus group, after the informed consent was reviewed and obtained, participants were asked what was working/not working in their life, and perceived barriers and needed supports for lifestyle change. Coaches then schedule to meet participants via their preferred method: in-person, by phone, or via videoconferencing. During the first session a lifestyle consultation was completed. Caregivers used the *Adolescent and Youth Activity Card Sort* to identify and prioritized up to five wellness goals [25]. Using a manualized MI guide, coaches evoked caregivers' desired goals, identified the degree of goal importance of and caregivers' confidence in achieving each goal, affirmed motivation to change, and if ready, assisted the caregivers in designing tailored plans to achieve their goal. Following this consultation, participants completed monthly check-ins on goal progress and refined the program as desired using a manualized MI protocol. At the same time, participants used a smartphone app, created for this wellness program, to maintain their goal profile, schedule notifications to prompt goal engagement, check-in electronically on progress, and listen weekly to mindfulness podcasts. Caregivers then participated in a closing focus group that revisited what was working/not working in their lives, and evaluated all program components, including MI-based coaching.

2.3. Data collection

In our mixed methods approach we simultaneously collected data and then sequential analyzed the fidelity of MI use quantitatively, and then qualitatively. Coaching sessions and three post-participation focus groups were audiotaped and transcribed verbatim using HyperTranscribe 1.6 Researchware software to provide written records for data analyses. Transcripts were reviewed and revised for accuracy by a team member. Lifestyle consultations were rated using the *Motivational Interviewing Treatment Integrity Code* (*MITI 4.2.1*) which was followed by qualitative coding of data describing participants' experiences of the MI-based coaching provided across the intervention [26].

2.3.1. Measures

Motivational Interviewing Treatment Integrity Code (MITI 4.2.1). Developed by leading experts in motivational interviewing, the MITI 4.2.1 is the most commonly used tool to evaluate MI fidelity [27]. The MITI 4.2.1 scores are derived from behavior counts of practitioner's behaviors (giving information, persuade, question, simple reflection, complex reflection, affirm, seek collaboration, emphasize autonomy and confront), and global scores of the entire interview in four dimensions (cultivating change talk, softening sustain talk, partnership, and empathy). From these behavioral frequencies and the global scores, summary scores of essential features of high-quality MI are derived. These summary scores have expert derived standards for beginning competence and proficient MI use [26]. The MITI has good to excellent inter-rater reliability on the practitioners' behaviors, global scores, and summary scores .655 (Technical) to .930 (Reflection/question ratio) [27]. In their assessment of reliability of trained undergraduate coders, the reliability was good to high with the exception of % of complex reflections summary measure which was fair when only two coders coded (ICC = .534).

We used transcribed segments of lifestyle consultations where caregivers discussed each goal's importance, their confidence in goal achievement, and their plans. Each coach's statement was coded as one or more than one of the MITI behaviors codes as appropriate; multiple behavior codes can be assigned for a single statement. These behavioral counts were grouped into categories of MI-adherent (affirm, seek collaboration, emphasize autonomy) and non-adherent behaviors (persuade, confront).

Global scores consider the gestalt of the whole interview. These global scores characterize four MI aspects: Cultivating Change Talk, Softening Sustain Talk, Partnership, and Empathy. Ratings on a five-point scale (1 = low to 5 = high) were assigned based on a rubric that uses clear descriptive criteria to characterize each rating. For example, the cultivating change talk rubric uses a rating of 1 to note the clinician showed no explicit attention to client's language in favor of changing, to a rating of 5 where the clinician showed a marked and consistent effort to increase the depth, strength or momentum of client's change talk.

Lastly, from the behavior counts and the global scores, summary scores of technical global (= change talk + softening talk/2), relational global (= Partnership + Empathy/2), percentage of complex reflections (= CR/(CR + Simple Reflections), Reflections-to-Questions Ratio (= Total reflections/Total questions), Total MI-Adherent (= Seeking collaboration + Affirm + Emphasizing Autonomy) and Total MI Non-Adherent (= Confront + Persuade) are calculated. Good MI is expected to foster change talk, build partnership and empathy with the client, utilize more frequent complex reflections than simple ones, use more reflections (R) than questions (Q) with a R:Q ratio is greater than one, affirm the client's autonomy, and avoid persuasion or confrontation [26]. According to expert opinion, beginning competence (basic fidelity) and proficiency (advanced fidelity) are indicated by the summary scores noted in Table 1 [26]. Following Small and colleagues we use the terms basic and advanced fidelity for clarity and readability [17].

2.3.2. Data analysis

In this mixed-method analysis the lifestyle consultations were first coded using the MITI 4.1.2 and then relevant transcribed focus group

Table 1
MITI 4.1.2 Expert standards for proficiency in motivational interviewing.

Standard	Relational Mean (Partnership + Empathy)	Technical Mean (Cultivating Change + Softening Sustain Talk)	% Complex Reflections Mean	Reflection: Question Ratio Mean	Total MI Adherent	Total MI Non-Adherent
Basic	4.0	3.0	40%	1:1	Not available	Not available
Advanced	5.0	4.0	50%	2:1	Not available	Not available

Note: The Basic standard is considered performing at a beginning competence level in MI and Advanced is being proficiency in MI. Following Small and colleagues (2020), we are using the terms basic (fair cutoff on MITI) and advanced (proficient cutoff on MITI) to describe coaches' performance as rated on the MITI.

segments where participants provided evaluative feedback on coaching were coded qualitatively using codes theoretically derived from the MITI as well as open or generative coding. Two researcher team members practiced coding two sample MI interviews provided online by MITI 4.2.1 authors; these were compared to expert-derived coding provided [26]. Interview transcripts were coded once; inter-rater agreement on practice materials was established at ≥90%. Next two research team members used the MITI 4.2.1 to independently coded the fifteen lifestyle consultations. To assure continued reliability, three caregivers' interviews were coded by both coders and compared for agreement. This was again calculated at 90% agreement. To minimize bias, the team members did not code lifestyle consultations where they served as the coach.

2.3.2.1. Quantitative analysis. Lifestyle consultations lasted between 37-147 minutes (mean = 70 minutes). One lifestyle consultation was not recorded due to technical difficulties and so the first coaching check-in transcript was substituted. The monthly check-in used also used a similar manualized MI approach as the lifestyle consultations. Given we were examining MI fidelity, we believed this was an appropriate substitution. Transcripts ranged from 9 - 49 pages (mean = 24 pages). In all there was 1053 minutes of audio-recorded data and 361 pages of single-spaced transcripts. After coders independently coded all transcripts, the MITI 4.2.1 behavioral frequency scores, global scores and summary scores were generated according to the MITI 4.1.2 guidelines [26].

Using the eight behavior counts frequencies or the global scores, summary scores were calculated using the recommended MITI formulas and totaled to create an average [26]. The following summary scores were calculated: average technical (degree change talk was promoted), relational (degree partnership and empathy was displayed), percentage of complex reflections (% CR, how often deeply probing verbal reflections were used), reflection to question ratio, total MI adherent behavior (MIA), and total MI non-adherent behavior (MINA) ratings for each consultation. Global technical scores and relational scores were calculated. The percentage of complex relations (% CR) score was calculated by dividing the total number of complex reflections by total number of complex plus simple reflections. The R:Q ratio was calculated by dividing the total number of reflections (complex reflection plus simple reflections) by the total number of questions. Total MIA scores were calculated by adding the total number behavior counts for seeking collaboration, affirm, and emphasizing autonomy behavior codes. Total MINA behaviors were calculated by adding together the behavior counts for confront and persuade behavior codes. These individual interview and group summary scores were then compared against the expert-derived clinician basic competence and proficiency thresholds (see Table 1) [26]. The MITI 4.1.2 does not yet provide competence scores for MIA/MINA behaviors.

2.3.2.2. Qualitative analysis. During the closing group, participants were asked their perceptions of program elements including MI-based coaching. All data segments referring to a coach or coaching were selected for qualitative analysis; 115 segments were subset from the transcripts, totaling around 18 single-spaced pages. The research team used both theoretical MI-derived codes and open codes. This allowed us to examine whether participants noted experiences beyond those defined in MI literature. After recursive rounds of coding by the team, codes were grouped into conceptual categories of accountability, evocation of deep emotion and understanding, social connection and flexibility.

3. Results

3.1. Quantitative

Results of MITI 4.1.2 coding of initial lifestyle consultations by coaches are reported in Table 2. This table includes the summary scores for each caregiver consultation for the relational and technical domains, percentage of complex reflections, the ratio of questions to all reflections, the total MI adherent behaviors, and the total MI non-adherent behaviors for each participant's initial lifestyle consultation. Levels of beginning and proficient competency across each MITI domain are provided in Table 2.

In 87% of the fifteen consultations, coaches achieved basic competency or advanced standards in the global relational (partnership and empathy summary score) and global technical summary scores (cultivating change & softening sustain talk). In every interview but one, coaches reached the advanced standard for the percentage of complex reflections used as compared to simple reflections (% CR). Higher scores in CR (complex reflections) versus SR (simple reflections) indicate that coaches went beyond what was explicitly stated by participants to reflect on the underlying or deeper sentiments. Scores for the reflection:question ratio approached basic competency for the group mean; 33% of interviews reached the basic competency standard. While no standards exist for the MI adherent and non-adherent scores (MIA and MINA), our results showed a large number of total MIA scores and very limited MINA scores, with 87% of the interviews having no MINA behaviors.

3.2. Qualitative analysis

Codes that emerged were grouped into three categories that described participants' experiences of coaching: 1) evocation of deep emotion and understandings underlying lifestyle change, 2) flexibility in the process of goal achievement supporting participant's autonomy, and 3) importance of accountability in goal achievement. Quotes supporting each code are provided to support veracity of the analysis.

3.2.1. Evocation of deep emotion and understandings

From participants' perspectives, coaches clearly created empathetic, safe and supportive environments that evoked deep emotion and understandings that undergirding lifestyle issues and barriers to lifestyle change. For example, one mother noted, "You're talking about hard stuff … It was emotional." The coaches' facilitation of these focused conversations led to self-revelations that were uncomfortable: "It made me think about things, and when I was saying them like, 'Oh! I've probably never said that about me before!' … But some of the questions pushed me to really think about, well why do you feel that way? … I was glad that I was pushed that way, but it was uncomfortable." Participants as a group affirmed the coaching process was powerful emotionally, drawing out things to work on in their lives.

It was important that the time allotted to this lifestyle exploration was unrushed and sufficient for formulating previously unconsidered thoughts and goals, "Our time spent think was productive, definitely felt … supported, and, definitely lots of time for me to say what I needed to say …

Table 2
Summary scores for each lifestyle consultation & group average percentages of competence and proficiency of summary scores.

Participant	Relational Mean (Partnership + Empathy)	Technical Mean (Cultivating Change + Softening Sustain Talk)	% Complex Reflections Mean	Reflection: Question Ratio Mean	Total MI Adherent	Total MI Non-Adherent
1	4.5*	2.0	66.6%**	.42:1	46	0
2	4.5*	3.0*	57.0%**	.88:1	21	0
3	4.0*	3.5*	55.6%**	.55:1	17	0
4	5.0**	3.5*	83.3%**	.91:1	45	0
5	5.0**	4.0**	58.3%**	.53:1	23	0
6	4.0*	4.0**	61.0%**	1.30:1*	25	0
7	3.0	3.5*	16.0%	.65:1	18	0
8	5.0**	3.5*	53.0%**	1.70:1*	18	0
9	5.0**	4.5**	80.0%**	.76:1	14	0
10	4.5*	4.0**	53.0%**	1.20:1*	40	2
11	4.5*	4.0**	51.0%**	1.60:1*	19	1
12	3.0	3.5*	54.0%**	.78:1	23	0
13	5.0**	3.5*	76.7%**	.71:1	50	0
14	5.0**	4.5**	59.0%**	1.70:1*	35	0
15	4.5*	4.5**	80.0%**	.90:1	15	0
Mean	4.43*	3.7*	60.0%**	.97:1	27	.21
Standard Dev.	+/−.67	+/−.65	+/−.16	+/−.43	+/−12	+/−.56
% Basic Fidelity	47%	47%	0%	33%		
% Advanced	40%	47%	93%	-		
Total Basic/ Advanced	87%	94%	93%	33%		

* = Meets Basic Fidelity Standard.
** = Meets Advanced Fidelity Standard.

it was just really hard to formulate what I was feeling because I hadn't really thought about it until she posed some of those questions … so it was productive." Likewise, this caregiver noted that the MI coaching process illuminated self-discovery because the coach was aligned with MI principles being empathic and focused on her life, "You have to be set at ease, you have to feel like you're being heard, and it is interesting how you'll say something, and [the coach will] be like teasing it out, and I'd be like, 'Wait a minute? How did we get here? What was all that?' [Laughter from others] 'Cause, you know, it's such a very intimate emotional thing, and if you don't feel comfortable with them, or if they don't know the right thing to say, or if you feel like they're looking at the clock …."

The coach's directive questioning gave this caregiver permission to reconsider her mothering role: "She gave me, through her questions perhaps, empowered me to let go of some things … gave me the power to turn to my family and say this is a team effort, not a mom effort … I always thought that, but I never gave myself the power to say that out loud … So, the process I think helped me to get there, so definitely the coaching was very resourceful." In other counseling experiences, caregivers described feeling less focused and productive in sessions. "[Other practitioners spend] so much time trying to skirt around the issue or get background information–they never really get anywhere. We were very specific[ally] driven– we had a specific topic and we stuck to it." They noted a marked preference for the MI approach to get to the heart of lifestyle issues in a focused way.

3.2.2. Flexibility in goal achievement process supporting autonomy

Participants noted that coaches' facilitation supported formulation and evolution of goals to be more practical and successful over time. "That first phone call was really good and, just that whole deciphering of the goals … Taking those big thoughts and breaking them apart, all that was really good … I don't even know what [my coach] asked. Like 'Why do you feel like this isn't getting done?' … But I said something like, 'I just don't believe I can ever really get my house under control' … just that whole process–just thinking about it for days afterward. 'What does that mean? Why did I say that?' After and sometimes in the midst of these self-revelations, with the coach's support, participants selected and honed their wellness goals. "[After doing the card sort together my coach] knew where I was coming from and that's where she worked from."

Caregivers appreciated the flexibility to revise goals and work at their own pace through lifestyle change: "So it was good to just know that you can have those goals and you can be achieving them more slowly, and that's okay because another one you've really hit off the bat." This felt permission to be flexible in self-designing their program was echoed by another mother: "Cause you kind of felt, like you always gave me options or anything that I want to tweak or whatever." This permissiveness was firmly rooted in the coach's empathetic support and firm belief that the caregivers' autonomy should drive the process.

3.2.3. Importance of accountability in goal achievement

Coaches' use of questions to direct the conversation combined with the accountability of checking-in facilitated lifestyle change for caregivers. "I actually at times was pretty impressed with some of the ways she directed her questions – I was like, 'Wow, you're not giving me a break are you!' Sometimes I would try to skirt around the questions, and I'd be like, 'Damn!' [Laughter] … she really … in a very kind compassionate way held me accountable." Knowing at the next coaching session coaches would check-in on goal progress was a key incentive to keeping on track. "Checking-in with someone, made it much more real, made me much more accountable."

This analysis shows that coaches provided an empathetic, supportive and client-led process that allowed the plumbing of emotionally charged topics and motivations that impacted wellness-directed lifestyle change. Coaches' MI-coherent use of questions guided caregivers to thoughtful self-examination of their motivations, choices and lifestyles that in turn moved them to pursue desired lifestyle changes. Monthly check-ins spurred progress, allowed for flexible changes in plans and further discernment—all of which participants felt served them well. Caregivers contrasted this approach with other counseling services they had experienced and felt the approach used was more productive, precise, directive, and useful in addressing their needs.

4. Discussion & conclusion

4.1. Discussion

We assessed the use of MI used in a feasibility study of the *5Minutes4Myself* wellness program for caregivers. MITI results indicate that the coaches delivered MI with advanced levels of fidelity according to expert-derived standards set for entry-level practitioners on many

indicators [26]. Across lifestyle consults in this study, global summary relational scores suggest high levels of collaboration, evocation, empathy, and support of client autonomy occurred with 87% of coach's sessions meeting basic or advanced standards [26]. Qualitative focus group analysis supported that these high scores reflected participants' experiences of coaching. Caregivers viewed their coaching interactions favorably noted feeling compelling partnership with and empathy from their coaches. In addition, participants' statements indicated that coaches encouraged high levels of autonomy in sessions, allowed them to drive the conversation, and held them accountable for their lifestyle changes.

Similarly, 94% of sessions met technical criteria for basic or advanced standards, suggesting coaches supported caregivers' change talk. Again, this was confirmed by participants' comments where they clearly described how they felt coaches understood and supported them in working towards their goals in ways prior practitioners had not. The global relational mean (4.43) of our coaches exceeded other small sample intervention studies who also used MITI 4.2.1 to assess fidelity (2.8–3.8) [15,16,28]. The technical mean (3.7) of our coaches was higher than three of the four available current studies we identified that assessed fidelity using the MITI 4.2.1 [15,16,28].

Our coaches' MITI data showed a high percentage of complex to simple reflections in most consultations. This indicates that coaches moved beyond echoing participant statements to reflect on deeper sentiments and underlying participant feelings. In qualitative data, participants described the critical importance of coaches' questions and reflections in empowering them and allowing them to explore previously unarticulated feelings and thoughts, resulting in new insights. Overall, the qualitative analysis of focus group data converged well with MITI results to suggest that coaches implemented MI in a way that was indeed client-driven and adhered to the essential relational components necessary for basic proficiency and which in turn supported efforts toward lifestyle change.

4.2. Innovation

As Gitlin and Czaja advocate [21], fidelity in the delivery *and* receipt of an intervention is critical to assuring outcomes can be attributed to the intervention delivered; Bellg and colleagues also suggests we need to attend to training as an element of fidelity [29]. This study is unique in several ways. First, to our knowledge, this study is the first to describe both a detailed training protocol as well as assessing both delivery and receipt of an MI-based intervention. Second, our timing of this fidelity assessment, early in the development of the intervention, prior to a larger clinical trial, is economical judicious, which led to a clear specification of this intervention element, clarified how it should be implemented, and provided evidence for how its use promoted lifestyle change. Our approach demonstrated one way to address common problems in intervention implementation [29].

Specifically, this study demonstrates 1) an innovative mixed-method approach to assessing fidelity in both treatment delivery and receipt of an intervention in the early stages of intervention development and 2) a systematic MI training protocol that effectively trained pre-service professionals at basic/advanced MI competency which studies note is difficult to achieve. Combining a standardized assessment with a qualitative method gave us confidence that the intervention was delivered with fidelity and insight into the client's experience of motivational interviewing and whether it supported lifestyle change. This illustrates how both intervention fidelity delivery and receipt can be concurrently studied to assure interventions are delivered in a standardized way and received as expected. Using a training sequence that also includes personalized feedback and informal competency assessments, we demonstrated that pre-service professionals could be trained to basic or advanced MI competency to serve as interventionists. Our approach can improve fidelity early in the process to more effectively and efficiently develop interventions before clinical trials, especially those using an MI-approach.

4.3. Conclusion

While this study and others report similar number of hours and focus of training, it appears that the level of practitioner MI competency varied widely in current intervention studies that also used the MITI 4.2.1 [15,16,28]. Given our small sample size, there are limitations in generalizing this data; yet we believe we have developed a template guiding training for and assessment of MI fidelity in intervention research. In our coaches' MI training, we emphasized frequent interactive practice, provided personalized feedback to hone each coach's skills and assessed each coach's readiness to coach albeit in a non-standardized way (the PI's judgement of their MI skills). These strategies may be important to development of competencies in MI skills. It may also be that some professionals are better able to master the MI approach which requires a unique skill set and conversational style that is counter to usual everyday interactions, and that practitioner competency assessments using the MITI and expert review should precede participation in an intervention study. Jelsma and colleagues and Bellg and colleagues provided detailed recommendations for measuring fidelity in randomized clinical trials that address the issues that arose here as well as others [30].

Research ethics

The study procedures and informed consent were reviewed and approved by the UW-Madison Educational and Social/Behavioral Institutional Review Board. In-person informed consent was obtained from participants prior to participation in the study. The *5Minutes4Myself:* A Wellness Program for Caregivers, University of Wisconsin-Madison

Trials

Protocol Record NCT03771001, 2015-1004 was registered with ClinicalTrials.gov.

Declaration of Competing Interest

None declared.

Acknowledgments

This work was supported by an American Occupational Therapy Foundation Intervention Research Grant and Virginia Horne Henry Grant. This work was presented at the 2017 AOTA Annual Conference in Philadelphia, PA (Jeglum, N., Shmays, C. & Larson, E.A (2017). Assessing fidelity of Motivational Interviewing in *5Minutes4Myself Program for caregivers of youth with ASD).* We wish to acknowledge our co-researchers, the participants who shaped and informed this work; and the research team: Megan Bjella, Vanessa Eisch, Naomi Frisch, Laura Hewitt, Kathleen Kubiasak, Toni Solaru, and Andrea Sorelle.

References

[1] Ma J, Rosas LG, Lv N. Precision lifestyle medicine: a new frontier in the science of behavior change and population health. Am J Prev Med. 2016;50:395–7. https://doi.org/10.1016/j.amepre.2015.09.035.

[2] Abbeduto L, Seltzer MM, Shattuck P, Krauss MW, Orsmond GI, Murphy MM. Psychological wellbeing and coping in mothers of youths with autism, Down syndrome, or fragile X syndrome. Am J Ment Retard. 2004;109:237–54. https://doi.org/10.1352/0895-8017(2004)109<237:PWACIM>2.0.CO;2.

[3] Bailey DB, Golden RN, Roberts J, Ford A. Maternal depression and developmental disability: Research critique. Ment Retard Dev Disabil Res Rev. 2007;13:321–9. https://doi.org/10.1002/mrdd.20172.

[4] Baker ET, Hartley SL, Seltzer MM, Floyd FJ, Greenberg J, Orsmond GI. Trajectories of emotional well-being in mothers of adolescents and adults with autism. Dev Psychol. 2011;47:551–61. https://doi.org/10.1037/a0021268.

[5] Gallagher S, Whiteley J. The association between stress and physical health in parents caring for children with intellectual disabilities is moderated by children's challenging behaviours. J Health Psychol. 2013;18:1220–31. https://doi.org/10.1177/1359105312464672.

[6] Herring S, Gray K, Taffe J, Tonge B, Sweeney D, Einfeld S. Behaviour and emotional problems in toddlers with pervasive developmental delay: Association with parental mental health and family functioning. J Intellect Disabil Res. 2006;50:874–82. https://doi.org/10.1111/j.1365-2788.2006.00904.x.
[7] Lee J. Maternal stress, well-being, and impaired sleep in mothers of children with developmental disabilities: A literature review. Res Dev Disabil. 2012;34:4255–73. https://doi.org/10.1016/j.ridd.2013.09.008.
[8] Lovell B, Moss M, Wetherell M. The psychosocial, endocrine and immune consequences of caring for a child with autism or ADHD. Psycde. 2012;37:534–42. https://doi.org/10.1016/j.psyneuen.2011.08.003.
[9] Larson EA, Miller-Bishoff T. Family routines within the ecological niche: An analysis of psychological well-being of U.S. caregivers of children with disabilities. Front Psychol. 2014;5:495. https://doi.org/10.3389/fpsyg.2014.00495.
[10] Larson EA. (submitted). 5Minutes4Myself: Development of a Wellness Program for Caregivers of Children with Autism.
[11] Miller WR, Rollnick S. The effectiveness and ineffectiveness of complex behavioral interventions: Impact of treatment fidelity. Contemp Clin Trials. 2014;37:234–41. https://doi.org/10.1016/j.cct.2014.01.005.
[12] Sepulveda AR, Wise C, Zabala M, Todd G, Treasure J. Development and reliability of a motivational interviewing scenarios tool for eating disorders (MIST-ED) using a skills-based intervention among caregivers. Eat Behav. 2013;14:432–6. https://doi.org/10.1016/j.eatbeh.2013.07.010.
[13] Bridges LS, Sharma M. A systematic review of interventions aimed at reducing binge drinking among college students. J Alcohol Drug Educ. 2015;59:25–47.
[14] Miller WR, Rollnick S. Motivational Interviewing: Preparing People for Change. 2nd Edition. 2nd ed. New York: The Guilford Press; 2002.
[15] Leske AM, Mustchin C, Bhujel N, Rajan S, Satur J. Fidelity of motivational interviewing with families in high-caries-risk children. Community Dent Oral Epidemiol. 2020;00:1–10. https://doi.org/10.1111/cdoe.12614.
[16] Fortune J, Breckon J, Norris M, Eva G, Frater T. Motivational interviewing training for physiotherapy and occupational therapy students: Effect on confidence, knowledge, and skills. Patient Educ Couns, 102, 694-700. https://doi.org/10.1016/j.pec.2018.11.014
[17] Small JW, Frey A, Lee J, Seely JR, Scott TM, Sibley MH. Fidelity of motivational interviewing in school-based intervention and research. Prev Sci. 2020;22:712–21. https://doi.org/10.1007/s11121-020-01167-7.
[18] Hallgren KA, Dembe A, Pace BT, Imel AE, Lee CM, Atkins DC. Variability in motivational interviewing adherence across sessions, providers, sites and research contexts. J Subst Abuse Treat. 2018;84:30–41. https://doi.org/10.1016/j.jsat.2017.10.011.
[19] Barac R, Kimber M, Johnson S, Barwick M. The effectiveness of consultation for clinicians learning to deliver motivational interviewing with fidelity. J Evid-Inf Soc Work. 2018;15:510–33. https://doi.org/10.1080/23761407.2018.1480988.
[20] Brandford A, Adegboyega A, Combs B, Hatcher J. Training community health workers in motivational interviewing to promote cancer screening. Health Promot Pract. 2018;20:239–50. https://doi.org/10.1177/1524839918761384.
[21] Gitlin LN, Czaja SJ. Behavioral Intervention Research. New York: Springer Publishing Company; 2016.
[22] Bailey DB, Golden RN, Roberts J, Ford A. Maternal depression and developmental disability: Research critique. Ment Retard Dev Disabil Res Rev. 2007;13:321–9.
[23] Larson EA, Martin B. Assessing Motivational Interviewing course outcomes in promotion of interprofessionalism in pre-service healthcare professional students. Ann Int Occup Ther. 2018;1:85–94.
[24] Larson E, Martin B. Measuring motivational interviewing self-efficacy of pre-service students completing a competency-based motivational interviewing course. J Explor Res Clin Soc Pharm. 2021;1:100009. https://doi.org/10.1016/j.rcsop.2021.100009.
[25] Berg C, Mccollum M, Cho E, Jason D. Development of the adolescent and young adult sort. OTJR. 2015;35:221–31. https://doi.org/10.1177/1539449215578651.
[26] Moyers TB, Manuel JK, Ernst D. Motivational Interviewing Treatment Integrity Coding Manual 4.1.2 Unpublished manual. Retrieved from: https://casaa.unm.edu/download/MITI4_2.pdf; 2014.
[27] Moyers TB, Rowell LN, Manuel JK, Ernst D, Houck JM. The motivational interviewing treatment integrity code (MITI 4): Rationale, preliminary reliability and validity. J Subst Abuse Treat. 2016;65:36–42. https://doi.org/10.1016/j.jsat.2016.01.001.
[28] Copeland L, Merrett L, McQuire C, Grant A, Gobat N, Tedstone S, et al. Feasibility and acceptability of a motivational interviewing breastfeeding peer support intervention. Matern Child Nutr. 2019;15:e12703 doi:10.111/mcn.12703.
[29] Bellg AJ, Borrelli B, Resnick B, Hecht J, Minicucci DS, Ory M, et al. Enhancing treatment fidelity in health behavior change studies: best practices and recommendations from the NIH Behavior Change Consortium. Health Psychol. 2004;23(5):443–51. https://doi.org/10.1037/0278-6133.23.5.443.
[30] Jelsma JGM, Mertens V-C, Forsberg L, Forsberg L. How to measure motivational interviewing fidelity in randomized controlled trials: Practical recommendations. Contemp Clin Trials. 2015;43:93–9. https://doi.org/10.1016/j.cct.2015.05.001.