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Original Research

A Pilot Study Evaluating the Effectiveness of the 5As of Healthy Pregnancy Weight Gain

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Introduction: Gestational weight gain (GWG) outside of the 2009 Institute of Medicine guidelines may be harmful to women and their fetuses. Prenatal health care providers (HCPs) are important sources of health information, but not all discuss GWG with their patients. The Canadian Obesity Network's 5As (ask, assess, advise, agree, and assist) of Healthy Pregnancy Weight Gain (5As) is a tool developed to help HCPs counsel their patients on GWG. The main objective of this study was to evaluate the impact of the 5As tool on patient perceptions of GWG discussions with their HCP and to identify suggestions to improve the tool.

Methods: A quasiexperimental study design was conducted whereby HCPs were trained in using the 5As tool (intervention). Patients were then queried at baseline and postintervention using an electronic questionnaire measuring patient-perceived 5As counseling. Inclusion criteria for pregnant women were (1) currently attending their first appointment with participating HCPs, (2) English-speaking, and (3) over 18 years of age.

Results: One hundred pregnant women (50 baseline, 50 postintervention) and 15 HCPs (11 midwives, 4 obstetricians) participated. Participants receiving care from 5As-trained HCPs reported scores twice as high ($P = .047$) in being asked about and were approximately 3 times more likely to be advised an exact amount of target weight gain ($P = .03$). HCPs suggested improving patient handouts and HCP education on GWG guidelines as well as reducing the content presented in the 5As tool.

Discussion: The 5As Tool is effective at initiating HCP-mediated GWG counseling; further research is needed to examine the usefulness of the 5As in clinical practice throughout the length of a full pregnancy. Whether the uptake of the 5As tool contributes to prenatal behavior change remains to be established. Future steps include modifying the tool based on HCP feedback, the development of novel knowledge translation tools, and improved HCP and patient education.
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INTRODUCTION

Gestational weight gain (GWG) is a healthy and anticipated aspect of every pregnancy; however, gaining more or less than the Institute of Medicine GWG recommendations poses several health risks for both the pregnant woman and her fetus.[1–7] Independent studies and meta-analyses have shown that inadequate GWG is associated with an increased risk of giving birth preterm[6] and having a small-for-gestational-age newborn.[4,6,8] The effects of excessive GWG, however, constitute a major public health issue.[6] Excessive GWG poses a risk for hypertensive disorders, preeclampsia, caesarian births, abnormal glucose metabolism, gestational diabetes, and downstream type 2 diabetes for women.[2,5,6] In turn, neonates are at increased risk of being large for gestational age and are susceptible to downstream overweight or obesity due to aberrant intrauterine growth development.[2,5–7,9] Suboptimal antepartum weight management is a critical area whereby health care providers (HCPs) can help mitigate the intergenerational cycle of obesity and subsequently lessen the burden of chronic health issues worldwide.[3]

Discussions of weight gain during pregnancy are a recommended best-practice topic for prenatal health promotion.[10] It is essential that pregnant women are aware that regardless of their body mass index (BMI) before conception, healthy lifestyle behaviors during pregnancy improve weight management and limit poor clinical and surgical outcomes.[9] Examples of lifestyle behaviors requiring optimization include caloric and nutritional intake,[11] physical activity,[12,13] and sleep.[14,15] Prenatal HCPs directly impact a woman's confidence and ability to achieve healthy GWG. Several research studies have shown a positive relationship between GWG counseling and improved weight-related outcomes.[16–19] For instance, women who reported receiving GWG advice either below or above Institute of Medicine guidelines were found to gain too little or too much weight, respectively, throughout their pregnancy.[16] These outcomes demonstrate the impact that both counseling and the accuracy of counseling play on maternal weight gain. These findings have been supported by other authors who have found that a patient's accurate knowledge of GWG recommendations is associated with appropriate weight gain in pregnancy.[18]

A recent analysis by our research group demonstrated that women are more likely to achieve appropriate GWG if they

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Quick Points

- Gestational weight gain is a healthy component of every pregnancy but gaining outside of the Institute of Medicine weight gain recommendations may be harmful to the health of the pregnant woman and her fetus.
- Weight gain related discussion during pregnancy is a recommended best practice for prenatal health promotion. However, current provider-mediated weight gain counseling appears to be inconsistent as to content, frequency, and accuracy.
- The 5As of Healthy Pregnancy Weight Gain is a health care provider tool that has the potential to offer sensitive, respectful, and effective means of generating patient-centered gestational weight gain discussions, which may result in positive knowledge exchange between health care provider and pregnant patients.
- We found that pregnant participants receiving care from health care providers trained in the use of the 5As tool were significantly more likely to report being *asked* and *advised* about weight gain during their first prenatal visit.
- The integration of the 5As tool into prenatal care practice may improve gestational weight gain dialogue between patient and provider, leading to positive future health outcomes.

possess high self-efficacy over GWG, which HCPs may help them recognize and acquire.[20] Furthermore, a psychological model known as the health belief model suggests that communication targeting self-efficacy, barriers, risks, and benefits is likely to result in more successful behavioral change.[21] In particular, during pregnancy women are motivated to make lifestyle changes for the health of their fetus; therefore, they may be more receptive to behavioral interventions.[22,23]

Current prenatal HCP-mediated GWG counseling appears to be insufficient with respect to content, frequency, and accuracy.[24] A recent literature review examining patient and provider perceptions of GWG communication noted that more HCPs self-reported discussing GWG with their patients than patients reported being counseled in care.[24] Additionally, women of higher socioeconomic status, of older age, who were nulliparous, who had a history of dieting and low physical activity, and who were categorized as overweight or obese were more likely to receive GWG advice, thus showing that GWG does not always occur equally. Knowledge translation aides, such as evidence-based smartphone applications for pregnant women, or electronic health records with GWG trackers for HCPs may be valuable in improving GWG counseling and pregnancy outcomes.[25] One such knowledge translation tool includes the Canadian Obesity Network's 5As of Healthy Pregnancy Weight Gain (5As) adapted from the 5As of Obesity Management in 2009 by an interprofessional team of experts.[26] This tool guides HCPs in their approach to discussing GWG via a respectful, sensitive, and effective manner over the duration of pregnancy and consists of the following: (1) *ask*, nonjudgmentally, for permission to discuss weight; (2) *assess* prepregnancy BMI and pregnancy weight gain throughout pregnancy; (3) *advise* on GWG guidelines and on risks of discordant GWG; (4) *agree* on realistic behavioral goals and create a plan for action; and (5) *assist* patients in identifying and resolving barriers to healthy GWG. Certain concepts of the health belief model such as self-efficacy and barriers to healthy pregnancy weight gain have been incorporated into the 5As theoretical framework to better assist pregnant women with achieving healthy GWG. When adopted, the 5As has been clinically effective in smoking cessation[27] and obesity management.[28,29] The 5As framework aims to address the gaps in patient-provider healthy pregnancy weight gain communication.

The primary objective of this study was to conduct a pilot evaluation of the effectiveness and frequency of use of the 5As in prenatal care settings and to determine the perceptions of HCPs regarding methods for improving the tool. This study was an initial step in investigating whether or not further research and promotion of this tool are warranted and to continue to strengthen the 5As toolkit.

METHODS

Study Design

This study consisted of a quasiexperimental design with 2 observation periods (baseline and postintervention). The intervention for this study consisted of a 60-minute standardized training workshop for participating HCPs. The workshop highlighted the importance of GWG communication with their patients and demonstrated the use of the 5As tool. All participating HCPs were provided instructions on the use of 5As tool using a continuing medical education slide set supplied by the Canadian Obesity Network's 5As of Healthy Pregnancy Weight Gain booklet, developed by the 5As leadership team. At the workshop, all participating HCPs were also given physical copies of the 5As: a stack of 5As checklists, patient handouts, a desktop tool, and an HCP information booklet.

The baseline participants for this study consisted of a sample of pregnant women in the care of participating HCPs (before the HCPs attended the training workshop) at their first prenatal appointment. The postintervention participants for this study consisted of a separate group of pregnant women attending care from the same HCPs, but after the HCPs training.

A one-month washout period was implemented before the postintervention data collection phase to allow time for the HCPs to get used to the 5As tool and to implement it into their practice. This adjustment period also aimed to reduce bias associated with potentially higher HCP motivation level directly after an intervention, as opposed to in real practice. To

reduce bias, HCPs were blinded during both the baseline and the postintervention measurements (ie, they were not aware of when the research personnel would be assessing their patients and were not privy to the details of the questionnaire questions).

Following the entire study period, participating HCPs completed a brief open-ended online form to describe their experience with the 5As and provide suggestions for improvement after they had the chance to implement the 5As into their routine practice.

Data Collection

Pregnant participants were recruited through 2 participating prenatal health centers in Ottawa, Ontario. The first study location was a clinic with 4 participating obstetricians, and the second location was a midwifery clinic with 11 participating midwives. English-speaking women over the age of 18 who were receiving prenatal care in participating study locations were invited to participate in the study at the end of their first prenatal visit. Participants were recruited either in person by research personnel or by study flyers in the waiting rooms of participating clinics. Consenting patients had the choice to complete the 5As survey in person on an electronic tablet or via a survey link forwarded to their email. Each survey took between 10 and 15 minutes to complete.

Data were captured and stored in the Research Electronic Data Capture, a secure online data-collection tool (Children's Hospital of Eastern Ontario, Ottawa, Ontario). The first section of the patient questionnaire contained questions related to self-reported anthropometric and socioeconomic data. The second section of the patient questionnaire contained questions regarding each of the 5As for GWG counseling, adapted from the validated and reliable Patient Assessment of Care for Chronic Conditions.[30] Items in the questionnaire were composed of a combination of ordinal questions as well as scales from one to 100. The Patient Assessment of Care for Chronic Conditions questionnaire has also been adapted to the 5As framework in previous research.[28] Questions pertaining to the *ask* and *assess* parts of the 5As were used to assess the frequency of GWG-related dialogue, whereas questions related to the *advise*, *agree*, and *assist* aspects were used to interpret the patient-perceived effectiveness of GWG communication. Last, the questionnaire provided to HCPs consisted of Likert scale questions and free text to qualitatively assess their opinions of the 5As tool.

Statistical Analysis

Descriptive statistics (mean, number, percentage) for categorical variables were used to describe characteristics of the sample and questionnaire results. Comparisons between the characteristics of the baseline and postintervention populations were performed by Pearson's chi-square and Fisher's exact tests for categorical variables and Student's *t* tests for continuous variables. In advance of analysis, all variables of interest were assessed for normality.

Ethical Approval

All aspects of this study were approved by the University of Ottawa Research Ethics Board, and informed consent was obtained from all participating patients and HCPs.

RESULTS

The sample consisted of a total of 100 (50 baseline and 50 postintervention) eligible pregnant women. In addition, there were 15 prenatal HCPs (11 midwives and 4 obstetricians) in the study. Table 1 presents the sociodemographic and health characteristics of the pregnant participants. The majority of participants were of normal weight prepregnancy (57%), receiving care from an obstetrician (60%), between 25 and 39 years of age (92%), white (83%), and of high socioeconomic status. Certain medical diagnoses such as high blood pressure (8%), overweight or obesity (7%), previous difficulties with GWG (1%), and depression (7%) were reported. There were no statistically significant differences in sample characteristics between the pre- and postintervention groups other than household income. Reported sources of non-HCP GWG advice for pregnant participants primarily consisted of online resources (59%), followed by friends (48%), family (45%), books (43%), and personal experiences (32%).

Table 2 describes the assessment of each of the 5As items (*ask*, *assess*, *advise*, *agree*, and *assist*). There was a statistically significant increase in patients being *asked* about their ideas on how to manage their weight gain in the postintervention when compared with patients receiving care from untrained HCPs (baseline group) in which the mean (SD) doubled from 11.19 (22.04) in the baseline group relative to 22.66 (29.39) in the postintervention group. There were no significant increases in the other *ask* items presented in the survey. Concerning *assess*, approximately half of participants in each group (54% in the baseline, 50% in the postintervention) had their weight measured at the prenatal visit in which they completed the survey. In the *advise* category, there was a statistically significant threefold increase in the number of postintervention participants counseled on the exact recommended amount of weight to be gained throughout their pregnancy in the postintervention group (34%) compared with the baseline group (12%). There were no statistically significant differences in the *agree* and *assist* categories of the 5As-related discussions with HCPs.

Eleven of 15 HCPs (73%) provided feedback on their experience with the 5As tool (Table 3). Most HCPs (45%) had been practicing for 10 years or greater. The majority (63%) of HCPs discussed the 5As and/or workshop with other HCPs during the study period. Most HCPs reported using the 5As tool either at the very first prenatal appointment (64%) and/or at any time during the first trimester (64%), but fewer HCPs reported using the tool at each visit (9%). Barriers to discussing GWG with patients included competing medical priorities (45%), a lack of time (45%), a concern that their patient may be upset discussing the topic of weight gain (27%), and a self-perceived insufficient knowledge of the 5As (9%). Nearly half of participating HCPs (46%) agreed that the 5As tool provided them with more knowledge to discuss GWG, and over half (55%) strongly agreed that it gave them greater confidence to engage in the discussion. The 5As and workshop were deemed relevant and useful for

Table 1. Sociodemographic and Health Characteristics of Pregnant Participants (N = 100)

Characteristic	Baseline Group (n = 50) n (%)	Postintervention Group (n = 50) n (%)	Combined Total (n = 100) n (%)
BMI			
Underweight	1 (2)	2 (4)	3 (3)
Normal weight	27 (55)	29 (58)	56 (57)
Overweight	12 (24)	10 (20)	22 (22)
Obese	9 (18)	9 (18)	18 (18)
Receiving care from			
Midwife	18 (36)	22 (44)	40 (40)
Obstetrician	32 (64)	28 (56)	60 (60)
Age group, years			
18-24	2 (4)	1 (2)	3 (3)
25-29	13 (26)	15 (30)	28 (28)
30-34	15 (30)	18 (36)	33 (33)
35-39	16 (32)	15 (30)	31 (31)
≥40	4 (8)	1 (2)	5 (5)
Ethnicity			
White	27 (84)	41 (82)	68 (83)
Black	0 (0)	3 (6)	3 (4)
Asian	4 (13)	5 (10)	9 (11)
Arab	1 (3)	1 (2)	2 (2)
Relationship status			
Relationship	32 (97)	49 (98)	81 (98)
Single	1 (3)	1 (2)	2 (2)
Education			
High school or less	2 (6)	2 (4)	4 (5)
Some postsecondary	8 (24)	5 (10)	13 (16)
University degree	23 (70)	43 (86)	66 (80)
Income[a]			
<$30,000	6 (19)	1 (2)	7 (9)
$30,000-59,999	1 (3)	10 (22)	11 (14)
$60,000-89,999	5 (16)	10 (22)	15 (19)
$90,000-119,999	4 (13)	11 (24)	15 (19)
≥$120	16 (50)	14 (30)	30 (38)
Region			
Urban	17 (52)	21 (42)	38 (46)
Suburban	13 (39)	22 (44)	35 (42)
Rural	3 (9)	7 (14)	10 (12)
Pre-existing condition			
High blood pressure	4 (8)	4 (8)	8 (8)
Overweight or obesity	4 (8)	3 (6)	7 (7)
GWG issues[b]	0 (0)	1 (2)	1 (1)
Depression	4 (8)	3 (6)	7 (7)

(*Continued*)

Table 1. Sociodemographic and Health Characteristics of Pregnant Participants (N = 100)

Characteristic	Baseline Group (n = 50) n (%)	Postintervention Group (n = 50) n (%)	Combined Total (n = 100) n (%)
Reported sources of non-HCP weight gain information for pregnant participants			
Family	–	–	45 (45)
Friends	–	–	48 (48)
Online	–	–	59 (59)
Books	–	–	43 (43)
Personal experience	–	–	32 (32)

Abbreviations: BMI, body mass index; GWG, gestational weight gain; HCP, health care provider; '–' refers to not applicable.
[a]Statistically significant ($P < .05$).
[b]Defined as either inadequate or excessive gestational weight gain in previous or current pregnancy.

all obstetricians, but only 22% of midwives. Up to 45% of HCPs found both the workshop and tools in combination to be most useful for their practice.

DISCUSSION

This study found that use of the 5As was clinically effective at helping HCPs initiate GWG discussions with their patients. Midwives and obstetricians trained in the 5As tool were more likely to (1) ask their patients for their ideas on how to best manage their pregnancy weight gain and (2) inform their patient of the exact range of pounds or kilograms they should gain for optimal health. The significant increase in *ask* and *advise* components of the 5As in our study is similar to previous work.[29,31] In particular, an observational study using audio recordings to assess the use of 5As in standard prenatal care found that *advise* was one of the most commonly used components.[31] Similarly, in an evaluation of the 5As for obesity management in nonpregnant participants, *advise* was a frequently implemented practice, with *agree* and *assist* more rarely used.[29]

It is not surprising to see an increase in *ask* and *advise* interactions considering that we only evaluated the first prenatal visit and that these components of the 5As tool may be the most straightforward and most efficient of the counseling process. To fully *assess* or *assist* a patient with her pregnancy weight gain, more in-depth listening, 2-way dialogue, holistic approaches, and especially time are necessary. It is also noteworthy that despite no statistically significant increases in the *assess*, *agree*, and *assist* components of the 5As, the small improvements between the baseline and intervention groups may nonetheless be considered clinically meaningful. Although significant increases were observed in *ask* and *advise*, the overall number of women reporting counseling, even in the intervention group, was low. The increase in *ask* and *advise* but not in the other 5As items may also be a result of the need for HCPs to be trained more rigorously in the 5As tool or to conduct another study assessing why efficacy items other than advise were not implemented in their practice. Therefore, further study is necessary to evaluate the 5As beyond the first prenatal visit and to decipher precisely how the tool may be used to improve all aspects of GWG guidance and HCP engagement, as well as verify that the content of the GWG counseling is valid.

Of note, study participants had a low prevalence of preexisting medical conditions, which, if present, might have taken precedence over GWG discussions. Although HCPs are considered one of the most reliable sources of prenatal information,[24] we found that women reported weight gain information through external sources such as the internet, friends, family, books, and/or previous personal experience. The use of such external sources may provide a reason as to why pregnant women may not be interested in initiating discussions of weight gain preemptively with their HCPs. This study also found that only half of women had their weight taken at the visit. Although it is unclear how common routinely weighing pregnant patients is in Canada, the 5As tool does encourage this practice.

Health care provider perceptions of the 5As and training workshops were generally favorable and free from any major complaints or concerns. Although all HCPs reported discussing GWG with their patients, it is interesting that, in contrast, patients reported fewer weight-related discussions. Such differences in perception between patient and HCP may be due to either self-reporting bias by the HCPs or inefficient knowledge translation between the HCP and patient. Most HCPs agreed that the 5As gave them more knowledge and confidence to discuss GWG with their patients. The barriers to addressing GWG reported by the HCPs in this study were concordant with barriers reported in a recent narrative review,[24] in which HCPs perceived that GWG counseling may be ineffective or were uncertain whether their role involves GWG counseling. In this study, obstetricians indicated barriers such as competing medical issues more often than midwives, whereas midwives more frequently indicated worries about their patient becoming upset if GWG was discussed. The discrepancies in responses between obstetricians and midwives may be due to the differences in nature of practice between these 2 professions; obstetricians are more likely to receive high-risk pregnant patients, and midwives have more time to focus on patient sensitivities and patient-centered care. Suggestions for improving the 5As tool included providing more than one training workshop for the HCP, making the tool more engaging,

Table 2. 5As Measures of Gestational Weight Gain Counseling as Perceived by Pregnant Women Receiving Care from Health Care Providers (HCPs) Before (n = 50) and After (n = 50) HCP Intervention[a]

5As Item Question	Baseline Group Mean (SD)	Postintervention Group, Mean (SD)
Ask		
Were you asked what you would like to discuss about your pregnancy weight gain at this visit?	54.30 (39.98)	49.28 (43.86)
Were you asked if you would like to talk about your goals for dealing with pregnancy weight gain?	11.07 (23.26)	21.79 (32.39)
Were you asked about how your weight affects your life?	7.86 (17.79)	9.24 (20.59)
Were you asked for your ideas on how to best manage your pregnancy weight gain?[a]	11.19 (22.04)	22.66 (29.39)
Assess		
Did your doctor/midwife measure your weight today?[b]	27 (54)	25 (50)
Were you sure that your doctor/midwife thought about your values and traditions when they recommended treatments?	49.37 (38.17)	48.97 (39.04)
Were you asked how your work, family, social, or financial situation related to taking care of your pregnancy and/or pregnancy weight gain?	36.71 (38.65)	32.53 (39.79)
Advise		
Did your HCP tell you how many pounds you need to gain in this pregnancy?[a,b]	6 (12)	17 (34)
Were you shown how what you did to take care of your weight influenced your health or the health of your baby?	20.83 (30.60)	30.03 (35.40)
Were you told how important what you do to take care of your pregnancy weight gain (eg, exercise, diet) is for your health?	25.24 (35.41)	40.69 (38.42)
Agree		
Were you helped to set specific goals to improve your eating or physical activity?	16.26 (28.11)	19.38 (29.40)
Were you helped to make a pregnancy weight management plan that you could do in your daily life?	10.86 (20.40)	12.12 (21.90)
Were you helped to plan ahead so you could take care of your pregnancy weight gain even in hard times?	10.22 (22.15)	17.00 (26.48)
Did you set a pregnancy weight gain goal together with your doctor/midwife?	15.16 (29.65)	26.44 (35.50)
Assist		
Did your doctor/midwife talk with you about how to deal with barriers to weight management (such as stress, pain, sleep, finding time)?	25.14 (3.79)	32.24 (5.16)
Were you given weight management options to think about?	11.19 (22.90)	17.61 (26.26)
Were you given a written list of things you should do to manage your pregnancy weight gain?	7.95 (17.27)	10.37 (18.87)
Were you given a copy of your pregnancy weight management plan?	6.02 (14.52)	4.90 (10.37)
Were you encouraged to go to a specific group or class to help you manage your pregnancy weight gain?	4.40 (12.92)	2.71 (5.18)
Were you referred to a dietitian, health educator, or counselor?	10.67 (23.02)	6.90 (13.87)
Were you given alternatives to help you record the progress you are making on your pregnancy weight management goals?	4.63 (12.26)	10.13 (22.14)

Note: All values presented above were compared with Student's paired *t* tests unless otherwise specified.
[a]Statistically significant ($P < .05$).
[b]Results for categorical (yes or no) variables indicated as n (%) and Pearson's chi-square value.

reducing the content, providing improved patient handouts, and more HCP education. However, these narrative HCP perception results should be interpreted with caution because of the low number of HCP respondents who completed the questionnaire.

Limitations

As a pilot study, there were several limitations related to study design and analysis that may be improved in future, more extensive intervention studies. To begin, although the participating HCPs were initially blinded to the full nature of

Table 3. Health Care Provider Perceptions on the 5As Tool, Following the Entire Study Period

Characteristic	Midwife (n = 9) n (%)	Obstetrician (n = 2) n (%)	Total (N = 11) n (%)
After the workshop, did you discuss the 5As tool with your colleagues?			
Yes, regularly	1 (11)	0	1 (9)
Yes, sometimes	3 (33)	0	3 (27)
Yes, rarely	3 (33)	0	3 (27)
No	1 (11)	2 (100)	3 (27)
When did you most use the 5As tool?			
First appointment	6 (67)	1 (50)	7 (64)
First trimester	7 (78)	0	7 (64)
Second trimester	1 (11)	1 (50)	2 (18)
Third trimester	1 (11)	0	1 (9)
Each prenatal visit	0	1 (50)	1 (9)
What are your barriers to discussing pregnancy weight gain with your patients?			
Competing medical issues	3 (33)	2 (100)	5 (45)
Lack of time	4 (44)	1 (50)	5 (45)
I think patient may get upset	3 (33)	0	3 (27)
Lack of knowledge	1 (11)	0	1 (9)
The 5As tool gave me more knowledge to discuss pregnancy weight gain with my patients			
Disagree completely	2 (22)	0	2 (18)
Disagree	0	0	0
Neutral	4 (44)	0	4 (36)
Agree	3 (33)	2 (100)	5 (46)
Agree completely	0	0	0
The 5As tool gave me more confidence to discuss pregnancy weight gain with my patients			
Disagree completely	1 (11)	0	1 (9)
Disagree	1 (11)	0	1 (9)
Neutral	2 (22)	0	2 (18)
Agree	0	0	0
Agree completely	4 (44)	2 (100)	6 (55)
The 5As tool gave me more motivation to discuss pregnancy weight gain with my patients			
Disagree completely	1 (11)	1 (50)	2 (18)
Disagree	0	0	0
Neutral	5 (56)	0	5 (46)
Agree	0	0	0
Agree completely	3 (33)	1 (50)	4 (36)
This tool was relevant and useful for discussing pregnancy weight gain with my patients			
Disagree completely	0	0	0
Disagree	1 (11)	0	1 (9)
Neutral	5 (56)	0	5 (45)
Agree	0	0	0
Agree completely	2 (22)	2 (100)	4 (36)

(*Continued*)

Table 3. Health Care Provider Perceptions on the 5As Tool, Following the Entire Study Period

Characteristic	Midwife (n = 9) n (%)	Obstetrician (n = 2) n (%)	Total (N = 11) n (%)
Which aspect of this intervention did you find most useful?			
5As checklist tool	2 (22)	1 (50)	3 (27)
Training workshop	3 (33)	0	3 (27)
Both	4 (44)	1 (50)	5 (45)
How would you improve the training workshop?			
Make more stimulating	1 (11)	0	1 (9)
Host more than one	5 (56)	0	5 (45)
How would you improve the tool?			
Reduce the content in the tool	3 (33)	0	3 (27)
Better client handout	1 (11)	0	1 (9)
More HCP education	1 (11)	0	1 (9)

Abbreviation: 5As, 5As of Healthy Pregnancy Weight Gain; HCP, health care provider.
Note: Only 11 of the 15 HCPs that participated in the study provided their feedback in the survey presented above.

the study for the baseline assessment, blinding was not fully achieved. HCPs at baseline were originally made aware of the study variables during the consent and briefing process, possibly increasing GWG discussions at baseline before the intervention. Despite assessment days taking place at random, the HCPs were aware of who the research assistant was and may have increased their GWG discussions with the patients they knew were being evaluated on that day. Further, self-reporting biases from both the patients and HCPs were possible. Next, the 5As-related GWG discussions were only evaluated during the first prenatal visit. The 5As and GWG counseling are designed to be an ongoing process that require dialogue between patient and HCP throughout a woman's entire pregnancy, making note of evolving issues, barriers, and weight trends. Considering that women were recruited during the first prenatal appointment with their pregnancy health provider, the authors acknowledge that this can encompass a variety of different gestational ages (not just the beginning stages of pregnancy). Finally, there was no assessment of HCP knowledge, skills, or attitudes before and after receiving the intervention training; instead this assessment was conducted through the perceptions of the patient. We acknowledge this as a limitation of this pilot investigation and plan to improve the design with larger-scale testing. Despite these limitations, this pilot investigation does indicate promising results.

CONCLUSION

Pregnant participants receiving care from HCPs trained in the 5As were significantly more likely to report being *asked* and *advised* about weight gain during the first prenatal visit. Although slight improvements were reported, there were no significant changes in the *assess*, *agree*, or *assist* components of the 5As. Incorporating patient and HCP feedback received from this pilot evaluation into institutional education strategies for HCP and smartphone applications may facilitate knowledge uptake and encourage dialogue concerning GWG and healthy lifestyle behaviors in pregnancy. Future prospective research from preconception to postpartum should focus on evaluating the 5As longitudinally, allowing for a more accurate and holistic picture of pregnancy weight gain counseling.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to disclose.

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