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Interest in an Instagram-delivered gestational weight gain intervention among pregnant women with pre-pregnancy overweight or obesity

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Background: Barriers to attending in-person lifestyle interventions are common during pregnancy. The majority of young adults use Instagram, and pregnancy-related content abounds on this social media platform. The aims of this study were to assess interest in an Instagram-delivered gestational weight gain (GWG) intervention, examine characteristics associated with program interest, describe interest in specific program components, and to explore perceived advantages of and concerns about the proposed intervention.

Methods: English-speaking pregnant women with pre-pregnancy overweight or obesity in the US who use Instagram completed a cross-sectional online survey (N=229). Participants reported interest in a proposed Instagram-delivered GWG intervention (very/quite a bit versus somewhat/a little bit/not at all interested), demographics, and Instagram use habits. Characteristics associated with program interest were examined using logistic regression models. Responses to open-ended questions about program likes and concerns were content-analyzed.

Results: Thirty-four percent were very or quite a bit interested in an Instagram-delivered GWG intervention, and women with children, those who were more extraverted, and those with greater engagement on Instagram were more likely to report interest. Among participants with high program interest, 63–95% were interested in specific intervention components and 52–82% were willing to engage in different aspects of the intervention. Participants liked the potential for information, peer support, convenience, and accountability, but reported concerns about privacy/confidentiality, social pressure, time required, and negative psychological consequences.

Conclusions: Fostering a positive, supportive group culture may be key to leveraging Instagram to deliver a GWG intervention.

Keywords: Pregnancy; gestational weight gain (GWG); Instagram; social media; intervention

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Introduction

In the US, more than half of women with pre-pregnancy overweight or obesity gain more than recommended during pregnancy (1), increasing risk for negative maternal and child health outcomes (2). Pregnant persons, especially those with young children, face barriers to attending in-person lifestyle interventions (3,4), and many desire digital support for healthy gestational weight gain (GWG) (5,6). A recent meta-analysis of digital GWG interventions (e.g., websites, texting, mobile apps) found these interventions did not have a significant impact on total GWG or proportion with excessive GWG (7). As greater engagement has been associated with better weight outcomes in digital lifestyle interventions (8-10), future digital GWG interventions should be designed to promote and sustain participant engagement.

One approach to keep participants engaged is to deliver intervention content via a social media platform used by the target audience to leverage their existing daily social media habits. On Instagram, users share images or short videos and interact by commenting on or liking others'

content. The majority of adults of childbearing age in the US use Instagram, with higher rates among younger adults; 71% of 18–24 years old, 54% of 25–29 years old, and 48% of 30–49 years old use this social media platform (11). Sixty-five percent of US women of typical childbearing age (18–39 years) use Instagram, of whom 68% engage on the platform daily (12). Pregnancy is popular on Instagram, with 22.2 and 25.6 million posts including the hashtags #pregnancy or #pregnant, respectively, in July 2023. In our previous work testing a Facebook-delivered post-partum weight loss intervention (13), posts asking women to share photos of their children were effective at eliciting replies from participants. In post-intervention focus groups, participants noted they enjoyed sharing photos and seeing other women's photos, further suggesting that an image-based platform may foster engagement in a GWG intervention—and thus, potentially improve rates of GWG within recommended ranges. As part of a user-centered process to develop an Instagram-delivered GWG intervention (14,15), the current study assessed interest in our proposed intervention among the target population of pregnant women with pre-pregnancy overweight or obesity who use Instagram.

This study had three aims: (I) to describe the proportion of women who were very or quite a bit interested in an Instagram-delivered GWG intervention and characteristics associated with high program interest; (II) to describe interest in specific program components and willingness to engage in different ways by overall program interest; (III) to explore what women liked and were concerned about the proposed intervention, overall and by overall program interest. We present this article in accordance with the STROBE reporting checklist (available at https://mhealth.amegroups.com/article/view/10.21037/mhealth-23-43/rc).

Highlight box

Key findings

• Pregnant women with overweight or obesity are interested in an Instagram-delivered gestational weight gain (GWG) intervention but have concerns about this intervention modality.

What is known and what is new?

• Digital GWG interventions can overcome barriers to in-person attendance during pregnancy.

• A third of pregnant women surveyed were very or quite a bit interested in an Instagram-delivered GWG intervention. Interest was higher among women with children, those who were more extraverted, and those with greater engagement on Instagram. Participants liked the potential for information, peer support, convenience, and accountability, but reported concerns about privacy/confidentiality, social pressure, time required, and negative psychological consequences.

What is the implication, and what should change now?

• Fostering a positive, supportive group culture may be key to leveraging Instagram to deliver lifestyle interventions.

Methods

Pregnant women were recruited via Facebook/Instagram ads and ResearchMatch (16) to complete a cross-sectional online survey in March 2021. Recruitment materials advertised for pregnant women to complete a brief survey "about interest in a program to help women gain a healthy

amount of weight during pregnancy" and linked to a brief eligibility screener (17). Eligible individuals were currently pregnant, 18+ years old, pre-pregnancy body mass index (BMI) 25–45 kg/m^2, weekly Instagram users (i.e., posted photo, posted Story, commented, and/or liked posts at least once in the past 7 days), current residents of the United States, and comfortable completing the survey in English. Eligible individuals received a personalized survey invitation and two reminders. Participants reviewed an information sheet describing the study and then were asked to provide consent before proceeding to the survey. Participants who completed the survey received a $20 gift card. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The University of Connecticut Institutional Review Board approved this study (protocol # L19-050).

To gauge women's interest in an Instagram-delivered GWG program, the survey first described the proposed intervention:

"We would like to know if you would be interested in participating in a program on Instagram to help you be physically active, eat a healthy diet, and meet your pregnancy weight gain goals. Through this program, you and other pregnant women would connect with a health coach who is an expert in weight management counseling. To keep the conversations private, we would ask you to create a second Instagram account and set it on a privacy setting such that only the coach and other women in the program can see your posts and photos. Each day, the coach would post to share information or start a conversation, for example, asking you to set goals for the week, share challenges or successes, report progress towards your goals, and share your weight gain. We would encourage you to interact with the other pregnant women in the group by sharing your experiences with posts and photos, and by commenting on and liking other women's posts. We would ask you to use an app or online tracker, like MyFitnessPal, to track your food, physical activity, and weight gain during pregnancy. The coach would provide you feedback on what you're eating and your exercise routine, and help you problem-solve to overcome things that are getting in the way of achieving your goals."

Participants reported how interested they would be in participating in a healthy pregnancy program like this on Instagram on a 5-item Likert scale, which was dichotomized as very/quite a bit interested versus somewhat/a little bit/not at all interested, to focus on those with substantial interest in the proposed intervention (5,18). Next, participants were asked how interested they were in specific program components (very/quite a bit versus somewhat/a little bit/ not at all interested). Participants also indicated whether they would be willing to create a new Instagram account for use in the study and how willing they would be to post photos about various topics on a 4-item Likert scale (very willing/willing versus not at all/somewhat willing). Finally, participants responded to two open-ended questions about what they liked about a healthy GWG program via a private group on Instagram and concerns about such a program.

Participants self-reported characteristics including age, Hispanic/Latina ethnicity, race, education, presence of children in their household, and rurality of residence. Participants reported their race(s) from several options, and race/ethnicity was categorized as non-Hispanic White, non-Hispanic Black, Hispanic/Latina [any race(s)], non-Hispanic Asian, and non-Hispanic other race/multiracial. As roughly three-quarters of the sample was non-Hispanic White, with small numbers of women identifying as specific other races/ ethnicities, race/ethnicity was dichotomized. Pre-pregnancy BMI was calculated from self-reported height and pre-pregnancy weight and categorized BMI as overweight (25≤ BMI <30 kg/m^2) or obesity (30≤ BMI ≤45 kg/m^2) (2). Participants reported whether they had ever used an app to lose weight. As extraversion has been linked to higher social media use (19), participants completed the 2-item extraversion subscale of the Ten-Item Personality Inventory (TIPI) (20). Scores are a mean of the two items and range from 1–7, with higher scores indicating higher extraversion.

Women reported their Instagram habits, including whether they had one or multiple Instagram accounts, whether their main account was private or public, and how often they had posted, shared a Story, and replied to and liked others' posts in the past 7 days (never, once, at least twice but not every day, or every day). Due to distributions in the sample, these engagement variables were dichotomized as yes versus no in the past 7 days. Women were asked if they have ever posted or shared a Story on Instagram about what they eat, pregnancy cravings, exercise or workouts, how their body has changed, or how much weight they've gained. Participants reported whether they follow any Instagram accounts because they post about pregnancy (yes versus no) and how often they searched on Instagram's discovery page for information or advice about pregnancy in the past 4 weeks (never, at most once a week, at least once a week but not every day, every day). Due to

a small number of women reporting daily information-seeking, responses of at least once a week but not every day and daily were combined.

Statistical analysis

We aimed to enroll 200 participants in this descriptive study. First, the proportion of women who were very or quite a bit interested in an Instagram-delivered GWG intervention was described, and characteristics associated with high program interest were examined using logistic regression models. To identify multivariable predictors of program interest, variables associated with program interest at $P<0.05$ in crude models were included in an initial adjusted model, and variables that remained associated with program interest at $P<0.05$ were retained in the final adjusted model. Second, interest in specific program components and willingness to engage in different ways was described by overall program interest.

Third, the research team conducted a content analysis (21) of participants' likes and concerns about the proposed interventions. The team reviewed the responses to open-ended questions about likes and concerns and developed a codebook of coding categories to represent common responses. The team then reviewed a random sample of 20 responses and refined the codebook. Then, two members of the team independently coded all responses. Across coding categories, coder agreement ranged from 82–100% (kappas: 0.5477–1.0). The first author reviewed and adjudicated discrepantly coded responses. Topic categories were described by overall program interest. Analyses were conducted using SAS 9.4 (SAS Institute, Inc., Cary, NC, USA).

Results

Survey participants missing any characteristics examined (n=3) were excluded, resulting in an analytic sample of 229 pregnant women. Participants were on average 32.1 [standard deviation (SD): 4.4] years old and 23.6 (SD: 9.1) weeks gestation, and 73% were non-Hispanic White. Eleven percent had at most an Associate's degree, 45% had a Bachelor's degree or some graduate coursework, and 44% had a graduate degree. Half (46%) lived with one or more children. Participants lived in 36 US states, Washington, DC, and the US Virgin Islands, and 27% lived in a large city, 43% lived in a suburb near a large city, and 31% lived in a small town or rural area. Forty-eight percent had pre-

pregnancy obesity, and 74% had previously used an app to help them lose weight. Median extraversion scores were 4.0 [interquartile range (IQR), 2.5–5.5] on scale of 1–7. In terms of Instagram use habits, 20% had multiple accounts, and 73% reported that their main account was private. In the past 7 days, 44% reported that they had posted photos or videos, 47% had shared Stories, 79% had replied to others, and 99% had liked posts or Stories. Two-thirds (68%) follow Instagram accounts that post about pregnancy and 34% reported they have posted on Instagram about diet, exercise, or weight during their pregnancy. Twenty-nine percent had searched the Instagram discovery page for information or advice about pregnancy multiple times weekly over the past 4 weeks, 30% searched at most once a week, and 41% had never searched Instagram for pregnancy-related content.

A third (34%) of participants were very or quite a bit interested in the proposed intervention (17% very, 17% quite a bit, 29% somewhat, 22% a little bit, and 15% not at all interested). After adjusting for other characteristics associated with program interest, the proportion very or quite a bit interested in an Instagram-delivered GWG intervention was higher among women living with children [adjusted odds ratio (adjusted OR): 3.2, 95% confidence interval (CI): 1.6–6.4], those with higher levels of extraversion (aOR: 1.2, 95% CI: 1.0–1.5 per point higher score), those who posted a photo or video to Instagram in the past 7 days (aOR: 2.0, 95% CI: 1.1–3.9), participants who follow Instagram accounts that post about pregnancy (aOR: 3.3, 95% CI: 1.4–7.8), and those who searched for pregnancy-related content on Instagram multiple times weekly (aOR: 3.7, 95% CI: 1.6–8.7; *Table 1*). In contrast, women with multiple Instagram accounts (aOR: 0.3, 95% CI: 0.1–0.7) and women whose primary account is private (aOR: 0.4, 95% CI: 0.2–0.9) were less likely to be very or quite a bit interested in the proposed intervention (*Table 1*).

The majority of participants who had high interest in an Instagram-delivered GWG intervention were also very or quite a bit interested in specific aspects of the proposed intervention (63–95%; *Table 2*). The proportion interested in specific program components was lower among participants with lower overall program interest (*Table 2*). The majority (88%) of participants interested in the proposed program indicated they would be willing to create a new Instagram account to participate in the program, and 76% were willing to use a digital scale to share their weight with the program coach. Most participants interested in the proposed program were also

Table 1 Interest in an Instagram-delivered gestational weight gain intervention, among pregnant women with pre-pregnancy overweight or obesity who use Instagram at least weekly

Participant characteristics	Very or quite a bit interested, n [%]	Crude OR (95% CI)	Adjusted OR (95% CI)
Age (per 5 years)		1.1 (0.8–1.5)	
Race/ethnicity			
Non-Hispanic White	51 [30]	Reference	
Other race/ethnicity	27 [44]	1.8 (1.0–3.3)	
Education			
Less than bachelor's degree	10 [38]	1.0 (0.4–2.4)	
College graduate or graduate coursework	29 [28]	0.6 (0.4–1.1)	
Graduate degree	39 [39]	Reference	
Place of residence			
Large city	30 [49]	Reference	
Suburb near large city	30 [31]	0.5 (0.2–0.9)	
Small city or town or rural area	18 [26]	0.4 (0.2–0.7)	
Children in the household			
No children	29 [24]	Reference	Reference
1+ children	49 [46]	2.8 (1.6–4.9)	3.2 (1.6–6.4)
Pre-pregnancy body mass index			
Overweight	37 [31]	Reference	
Obesity	41 [38]	1.4 (0.8–2.3)	
Has used an app to help lose weight			
No	17 [28]	Reference	
Yes	61 [36]	1.4 (0.8–2.7)	
Extraversion (per 1 point)		1.5 (1.2–1.7)	1.2 (1.0–1.5)
Has multiple Instagram accounts			
One account	69 [38]	Reference	Reference
Multiple accounts	9 [20]	0.4 (0.2–0.9)	0.3 (0.1–0.7)
Main Instagram account privacy setting			
Public	31 [50]	Reference	Reference
Private	47 [28]	0.4 (0.2–0.7)	0.4 (0.2–0.9)
Posted a photo or video in the past 7 days			
No	31 [24]	Reference	Reference
Yes	47 [47]	2.8 (1.6–4.9)	2.0 (1.1–3.9)
Shared a story in the past 7 days			
No	33 [27]	Reference	
Yes	45 [42]	2.0 (1.1–3.4)	

Table 1 (*continued*)

Table 1 (*continued*)

Participant characteristics	Very or quite a bit interested, n [%]	Crude OR (95% CI)	Adjusted OR (95% CI)
Commented on someone else's post or Story in past 7 days			
No	8 [17]	Reference	
Yes	70 [38]	3.0 (1.3–6.9)	
Posted on Instagram about diet, exercise, or weight gain during this pregnancy			
No	42 [28]	Reference	
Yes	36 [47]	2.3 (1.3–4.1)	
Follow Instagram accounts because they post about pregnancy			
No	12 [16]	Reference	Reference
Yes	66 [43]	3.8 (1.9–7.7)	3.3 (1.4–7.8)
Searched on Instagram discovery page for information or advice about pregnancy in past 4 weeks			
Never	16 [17]	Reference	Reference
At most once a week	25 [37]	2.8 (1.4–5.9)	1.7 (0.7–4.0)
Multiple times per week	37 [55]	6.0 (2.9–12.4)	3.7 (1.6–8.7)

OR, odds ratio; 95% CI, 95% confidence interval.

willing to share photos of their diet, exercise routines, and selves (59–82%; *Table 2*). In contrast, willingness to engage in these ways was lower among participants with lower overall program interest (*Table 2*).

When asked what they thought of an Instagram-delivered GWG intervention, 87% of participants (n=199) shared what they liked about the proposed intervention and 86% (n=198) shared their concerns. In terms of what women liked about the proposed intervention, the most common themes were access to information and advice (42% of responses) and sharing experiences and receiving support from other pregnant women (38%; *Table 3*). A few (3%) explicitly said they were not interested in the program, and others (4%) expressed general interest in the proposed program. The most common concerns related to privacy/confidentiality (15%), feeling pressured to engage more than desired (14%), feeling self-conscious sharing or concern about being shamed by other women (11%), time commitment (11%), and concern that the program might lead to an unhealthy fixation on weight gain or eating habits (10%; *Table 3*). Eleven percent said they had no concerns about the proposed program.

Participants with lower program interest were more likely to report concerns about feeling pressured to engage more than desired (19% versus 4% of those with high program interest), concerns about feeling self-conscious sharing or being shamed by other women (15% versus 4%), and concerns that the program might lead to unhealthy fixation on weight gain or eating habits (15% versus 1%; *Table 3*).

Discussion

In this sample of pregnant women with pre-pregnancy overweight or obesity who use Instagram at least weekly, 34% were very or quite a bit interested in an Instagram-delivered GWG intervention. Having children, extraversion, and Instagram use characteristics were associated with program interest. Participants liked the idea of having access to GWG-related information, support from other pregnant women, convenience, and accountability, but were concerned about privacy/confidentiality, feeling pressured to engage, feeling self-conscious about sharing or being shamed by other women, the time commitment, and that the program might lead to unhealthy fixations on weight gain or eating habits.

In this study, women with children were about twice as likely to express interest in receiving weight management support via Instagram compared to women without children (46% versus 24% very or quite a bit interested),

Table 2 Interest in components of an Instagram-delivered gestational weight gain intervention and willingness to engage in different ways by overall program interest, among pregnant women with pre-pregnancy overweight or obesity who use Instagram at least weekly

Interest in intervention components and willingness to engage in the intervention in different ways	Overall interest in an Instagram-delivered gestational weight gain program, N [%]	
	Not at all, a little bit, or somewhat interested (n=151)	Very or quite a bit interested (n=78)
Very or quite a bit interested in …		
Learning evidence-based strategies to help you gain a healthy amount of weight during pregnancy	73 [48]	74 [95]
Having a group of pregnant women to share your pregnancy experiences with	49 [32]	71 [91]
Getting help to problem solve challenges around activity and healthy eating	51 [34]	70 [90]
Links to healthy recipes	75 [50]	69 [88]
Reading about other women's experiences	64 [42]	68 [87]
Being able to ask a dietitian questions	69 [46]	66 [85]
Seeing coach's photos from her personal life (workouts, meals)	20 [13]	55 [71]
Using a mobile app like My Fitness Pal to track your diet and exercise	28 [19]	54 [69]
Watching videos of healthy cooking demonstrations	39 [26]	49 [63]
Willing or very willing to…		
Create a 2nd Instagram account to participate in this program	35 [23]	69 [88]
Weigh yourself with a WiFi or Bluetooth scale and share your weight with the coach	50 [33]	59 [76]
Post photos of your meals	52 [34]	64 [82]
Post photos of the contents of your fridge	48 [32]	58 [74]
Post photos of workouts	33 [22]	51 [65]
Post photos of screenshots of your diet records	23 [15]	50 [64]
Post photos of yourself	34 [23]	46 [59]

which could be related to the convenience of an online program, given that childcare is a common barrier to attending in-person programs and exercising (4,22). It may also be that previous experiences with GWG play a role in this association; in our sample, 92% of women living with children compared to 24% of women without children in their household had been pregnant before, and women with excessive GWG in one pregnancy are more likely to have excessive GWG in their next pregnancy (23). Higher extraversion was associated with interest in the proposed intervention, not surprising in light of previous research linking extraversion and social media use (19,24). While frequency of sharing Stories, commenting, and posting about diet, exercise, or weight were associated with program interest in crude regression models, they were

no longer statistically significant after controlling for post frequency, likely because women who posted also shared Stories, commented, and posted about GWG-related topics more often. These findings are similar to previous research assessing interest in digital health interventions among pregnant women (5) and non-pregnant adults (18,25) that found that participants who engaged in online health information-seeking and used social media more frequently were more likely to report high interest in digital interventions. Together, available evidence suggests that social media-delivered health interventions may be best suited for those already engaged in managing their health on these platforms.

Most women interested in the proposed intervention were interested in specific aspects of the intervention and

Table 3 Likes and concerns about an Instagram-delivered gestational weight gain program, among pregnant women with pre-pregnancy overweight or obesity who use Instagram at least weekly

Likes and concerns	Entire sample, n [%]	Somewhat, a little bit, or not at all interested, n [%]	Very or quite a bit interested, n [%]	Illustrative examples
Likes (n=199)				
Access to information and advice	84 [42]	53 [42]	31 [43]	"Easy access to advice specific to my pregnancy"
				"Learning new ways to cook and eat healthy foods"
Share experiences with and get support from other pregnant women	75 [38]	45 [35]	30 [42]	"Being able to talk to other women going through similar things and encouraging each other"
				"I like the camaraderie of fellow women experiencing pregnancy and sharing stories and other information."
Convenience or ease of access	34 [17]	23 [18]	11 [15]	"Easy reminder as I'm scrolling"
				"The ease of it being on Instagram, an app I already use each day"
Motivation and accountability for healthy eating or exercise	26 [13]	14 [11]	12 [17]	"Having people who can keep you motivated and accountable and can answer your questions"
				"I struggle to motivate myself, especially since getting pregnant. Accountability and a group support system would be helpful!"
Other specific aspect of program	15 [8]	8 [6]	7 [10]	"Private group"
				"As long as they're free"
Concerns (n=198)				
Lack of privacy/confidentiality	30 [15]	19 [15]	11 [15]	"Privacy, I'm not sure how to ensure privacy on Instagram"
				"Posting pictures that I may feel uncomfortable doing. Once it's on the internet, there's no taking it back."
Feeling pressured to engage more than desired	27 [14]	24 [19]	3 [4]	"I would be concerned about feeling the need to participate rather than wanting to participate on my own terms and when I feel up to it"
				"Wouldn't necessarily want to engage with others in the group"
Feeling self-conscious sharing or fear of being shamed by other women	22 [11]	19 [15]	3 [4]	"I'd be concerned that it would affect how I feel about my body and that I'd feel frustrated or annoyed. It can be hard to see other people and not help but compare myself"
				"Women can be mean...Having too much interaction with others can sometimes lead to comparison and then disappointment when comments lead to feelings getting hurt."
Time commitment	21 [11]	14 [11]	7 [10]	"The amount of time it can take to tune into Instagram videos, etc."
				"Not having enough time to pay attention to it"
Program might lead to unhealthy fixation on weight gain or eating habits	20 [10]	19 [15]	1 [1]	"The tracking of food and exercise can sometimes lead to a negative experience especially with those who have had or are having issues with body image and food"
				"Too triggering for body dysmorphia"
Lack of accountability or efficacy	15 [8]	7 [6]	8 [11]	"That I wouldn't be motivated to keep up with it"
				"Readings and not actually be accounted to follow the advice"
Intervention content too generic	14 [7]	8 [6]	6 [8]	"I'm worried that the information might be too general to be of benefit especially to women with dietary restrictions or severe morning sickness"
				"If it is going to fit everyone's needs since every pregnancy is very different from each other"
Having to manage multiple social media accounts	14 [7]	11 [9]	3 [4]	"It may be a bit cumbersome to create a separate account"
				"Not interested in making a separate Instagram account solely for this purpose."
General negativity in the group	8 [4]	4 [3]	4 [6]	"That people will talk about their negatives in pregnancy and scare new moms"
				"Some participants in groups like these can be negative or emotionally draining"
Presence of misinformation in group	6 [3]	3 [2]	3 [4]	"other participants spreading misinformation"
				"The group becoming a mommy everything group with unmanaged threads and non-evidence based sharing"
Other specific concern	23 [12]	13 [10]	10 [14]	"The cost or other catch involved"
				"I already track my fitness on a separate app, and am not interested in tracking my food as much, so I am not as interested in the tracking aspect."

would be willing to create a second Instagram account, use a digital scale, and post photos related to their diet and exercise. While willingness to engage does not guarantee high engagement would be observed in an intervention study, these findings are encouraging, as more engaged participants tend to have better weight outcomes in digital lifestyle interventions in pregnant (8) and non-pregnant populations (9,10). In contrast, only 15–34% of women with low program interest reported willingness to create a study Instagram account, use a digital scale, or post photos, suggesting that an Instagram-delivered GWG intervention may be a better fit for some pregnant women than others.

Participants reported they liked that the proposed digital lifestyle intervention would provide access to information, support from other pregnant women, convenience, and accountability, similar to our previous research with women of childbearing age (18) and post-partum women (26). It is not surprising that information and support were common responses, as many pregnant women in this study and previous research report turning to social media to share experiences, seek support, and get information in this study and previous research (27,28). Participants liked the convenience of engaging on Instagram, a social media platform already part of their weekly or daily routines, but several had privacy concerns. As with any social media-delivered intervention, the recruitment, consent, and orientation phases of the study should include clear communication about risks and benefits of participation, including potential loss of confidentiality and who will have access to content shared in the intervention group (29). While 14% of participants were concerned about feeling pressured to engage, this concern appeared less common among women with high interest in the proposed intervention, further suggesting that the proposed intervention may be a good fit for some, but not all, pregnant women.

In this study, women expressed concern about two potential negative psychological consequences of the proposed intervention. First, 10% of participants were concerned that an intervention focused on weight gain, diet, and exercise might lead to an unhealthy fixation on their weight, or trigger body dysmorphia, or cause previous experiences with disordered eating to resurface. Instagram may not be an ideal fit for women with a history of eating disorders (30). Researchers and clinicians may want to assess the presence and history of eating disorders during eligibility screening for research studies and as part of

prenatal care, and encourage participants to avoid content on Instagram that may undermine their healthy eating goals. Additionally, some participants expressed concern that other women would make negative judgments about their bodies, weight gain, food choices, or exercise habits. This finding echoes concerns about being shamed and stigmatized shared by women with pre-pregnancy obesity in previous studies (15,31). Women also referenced the possibility of feeling bad about themselves after comparing themselves to other women in the group, which aligns with the results of a survey of pregnant women in the UK which found that half compared their pregnancy to others on Facebook, and the more women compared themselves on Facebook, the more negative they felt about their body (32). However, social comparison processes have also been shown to be beneficial in the context of weight-related health behavior change (33). More research is needed to understand the complex role upward and downward social comparisons play in engagement in behavior change during pregnancy and optimal methods for addressing problematic comparisons in both research and clinical settings.

Together, our results suggest a focus on fostering a positive, supportive group culture may be key to engaging women in Instagram-delivered lifestyle interventions. In a previous study, pregnant women suggested that setting clear expectations that photos don't have to be "Instagram worthy" and having the interventionist model sharing unedited photos of their own imperfect life as ways to create a supportive group culture and promote engagement in an Instagram-delivered GWG intervention (15). Social media-delivered intervention components focused on body positivity and self-compassion have been perceived positively by pregnant women (34) and new mothers (35), and may buffer against the potential for developing unhealthy behaviors. This notion requires formal testing in future research to determine its utility in the context of a GWG intervention. Alternatively, some pregnant women might prefer individual coaching (in-person or via social media) to reduce chance of negative interactions or social comparison with peers, or a lifestyle intervention delivered via a social media platform less image-focused, such as Facebook. Concerns about potential negative psychological consequences may also drive overall program interest, as these concerns appeared to be much more common among participants with lower interest in an Instagram-delivered GWG intervention than among those with high interest.

This study has additional strengths and limitations.

Table 4 Summary of recommendations for researchers and clinicians leveraging Instagram for health promotion during pregnancy

Teams leveraging Instagram to deliver lifestyle interventions or create an online community for pregnant persons	Clinicians caring for pregnant patients	Researchers developing and testing Instagram-delivered lifestyle interventions for pregnant persons
• Help potential participants decide whether an Instagram-delivered lifestyle intervention or support community is a good fit for them	• Evaluate presence or history of eating disorders, and encourage participants to avoid content on Instagram that may undermine their healthy eating goals or lead to an unhealthy fixation on their weight gain, diet, or exercise during pregnancy	• Include more participants from historically under-represented racial/ethnic backgrounds, those of lower socioeconomic status, those with limited English proficiency, and pregnant persons who do not identify as women
• Assess potential participants' Instagram use habits and comfort/willingness to share about their lives by sharing photos and replying to others' posts	• Initiate or be receptive to conversations about pregnancy-related content their pregnant patients see on Instagram, especially content that may contain health misinformation or that has a negative impact on patients' health behaviors or body image	• Examine the complex role upward and downward social comparisons play in engagement in behavior change during pregnancy
• Evaluate presence or history of eating disorders, and whether engagement in the intervention/community may lead to unhealthy fixations on weight gain, diet, or exercise	• Recommend Instagram accounts that share evidence-based information and foster a positive community for peer support	• Test whether having the interventionist share unedited photos of their own life helps to foster a supportive group culture
• Clearly communicate risks and benefits of participation, including who will have access to content shared in the intervention group		• Examine whether including intervention content focused on body positivity and self-compassion can buffer the potential for developing unhealthy behaviors as a result of social comparisons made to other pregnant persons on Instagram
• Foster a positive, supportive group culture, including setting clear expectations that the group is a judgement-free zone and that photos shared don't have to be "Instagram worthy"		

While our sample included women from urban and more rural areas across the US, and women with and without children, the sample has a higher proportion of women who identify as non-Hispanic White and college-educated women than childbearing women nationally (36). Future research should strive to include more racially/ethnically diverse samples that better reflect the higher rates of Instagram use among Black and Hispanic adults (11), and explore needs and desires of women of lower socioeconomic status (37) or who do not speak English (22). Future research could also include exploring the unique needs and desires of pregnant persons who do not identify as women (38). Data were collected in March 2021, and it may be that interest in digital interventions was heightened during the COVID-19 pandemic (39). Finally, only 35 participants reported they were not at all interested in the proposed intervention, limiting our ability to examine characteristics associated with minimal versus no program interest.

Conclusions

Findings from this study will inform future research to develop and test the efficacy of GWG interventions (*Table 4*). An Instagram-delivered GWG intervention may be a better fit for women who engage regularly and seek content and conversations related to pregnancy and healthy behaviors on this social media platform. To tackle the public health problem of excessive GWG, multiple intervention approaches are needed to fit women's communication and platform preferences, and address barriers to participation in in-person weight management programming. Our findings suggest that from the perspective of potential program participants, it is critical for program designers and interventionists—in both research or clinical settings—to promote a positive atmosphere around GWG, eating, and physical activity during pregnancy (*Table 4*). For example, further

development of our proposed Instagram-delivered GWG intervention will include protocols and intervention materials that promote positive body image, create a supportive group culture, and counsel participants on how to avoid demoralizing imagery on social media (*Table 4*).

Our finding that the majority of pregnant women in this study followed Instagram accounts posting pregnancy-related content and searched for pregnancy-related information on Instagram has clinical implications for the care of pregnant persons (*Table 4*). Obstetric providers may want to discuss with patients the pregnancy-related content they see on Instagram, especially content that may contain health misinformation or that has a negative impact on patients' health behaviors or body image. Obstetric care teams may also wish to recommend to their pregnant patients Instagram accounts that share evidence-based information and foster a positive community.

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Footnote

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