

BMJ Open Healthcare providers' gestational weight gain counselling practises and the influence of knowledge and attitudes: a cross-sectional mixed methods study

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ABSTRACT

Objective To understand current gestational weight gain (GWG) counselling practices of healthcare providers, and the relationships between practices, knowledge and attitudes.

Design Concurrent mixed methods with data integration: cross-sectional survey and semistructured interviews.

Participants Prenatal healthcare providers in Canada: general practitioners, obstetricians, midwives, nurse practitioners and registered nurses in primary care settings.

Results Typically, GWG information was provided early in pregnancy, but not discussed again unless there was a concern. Few routinely provided women with individualised GWG advice (21%), rate of GWG (16%) or discussed the risks of inappropriate GWG to mother and baby (20% and 19%). More routinely discussed physical activity (46%) and food requirements (28%); midwives did these two activities more frequently than all other disciplines ($P<0.001$). Midwives interviewed noted a focus on overall wellness instead of weight, and had longer appointment times which allowed them to provide more in-depth counselling. Regression results identified that the higher priority level that healthcare providers place on GWG, the more likely they were to report providing GWG advice and discussing risks of GWG outside recommendations ($\beta=0.71$, $P<0.001$) and discussing physical activity and food requirements ($\beta=0.341$, $P<0.001$). Interview data linked the priority level of GWG to length of appointments, financial compensation methods for healthcare providers and the midwifery versus medical model of care.

Conclusions Interventions for healthcare providers to enhance GWG counselling practices should consider the range of factors that influence the priority level healthcare providers place on GWG counselling.

INTRODUCTION

Supporting all women to achieve healthy gestational weight gain (GWG) is of clinical importance because GWG lower or higher than recommended is linked to a range of poor maternal, fetal and childhood outcomes.¹ For mothers, excess GWG increases the risk of gestational diabetes

Strengths and limitations of this study

- This is a large and in-depth examination and comparison of healthcare providers' practices related to monitoring and discussing gestational weight gain (GWG) with pregnant women.
- This study is enhanced by the use of mixed methods. Mixed methods research is well suited for health services, which are complex and influenced by multiple factors.
- The findings from this study may have a wide applicability, as the topics covered in this survey are considered routine and are undertaken as part of standard prenatal care in most developed countries.
- It was not possible to calculate a true response rate for the survey because the survey was distributed using email lists and social media through professional associations and networks although these methods allowed for wider reach and more responses.
- Those who responded may be more likely to engage in activities related to GWG counselling which could lead to inflation of the reported frequency of specific GWG counselling practices. Nevertheless, the rates of some counselling practices reported in this study are quite low.

mellitus and hypertensive disorders in pregnancy, and this is of special concern if excessive GWG occurs early in pregnancy.²⁻⁴ Excess GWG also poses risks at delivery for the mother including increased likelihood of needing an instrumental delivery or a caesarean section, and surgical morbidity and mortality.^{1 3 5} Furthermore, these factors result in an increased risk for the fetus and neonate including the adverse consequences of macrosomia and shoulder dystocia, need for intensive care unit admission and the risk of perinatal death.^{1 3 5} In the long term, the child is at risk of an altered growth trajectory that may lead to obesity.^{6 7} Excess GWG also increases the risk of postpartum weight

retention, which may leave a woman at an increased body mass index (BMI) to begin her next pregnancy.^{1 8} The cycle of excess GWG followed by postpartum weight retention and increasing maternal BMI can lead to increased risk in each subsequent pregnancy.⁹ These risks act synergistically resulting in a higher risk of metabolic and cardiovascular disease in later life for the mother as well as the child.¹⁰ Thus, excess GWG has short-term, long-term and intergenerational effects.¹¹

To mitigate the risks of inappropriate GWG, many countries, including Canada, have released GWG guidelines.^{12 13} Many of these are based on the Institute of Medicine (IOM) (USA) guidelines for GWG in pregnancy, which outline a range of total GWG over the course of pregnancy that is associated with optimal health outcomes for mother and child.¹⁴ In order for these guidelines to be of benefit to pregnant women, the IOM recommends that healthcare providers advise women on the recommended range of GWG based on prepregnancy BMI, and that they track and discuss weight progress over the course of pregnancy, as well as offering tailored counselling on dietary intake and physical activity.¹⁵ Many countries provide guidance to healthcare providers in the form of evidence-based guidelines in order to support them in providing physical activity and nutrition counselling to pregnant women.^{16–19}

There is growing evidence to suggest that the quality of GWG counselling interactions needs improvement, as women and healthcare providers report conflicting views of these interactions.²⁰ Many women report that their healthcare provider did not provide recommendations for GWG during their prenatal care, nor provide counselling about nutrition and physical activity behaviours during pregnancy.^{21 22} Healthcare providers have reported taking a reactive approach, initiating a discussion about weight in pregnancy only after weight exceeds the recommendations.^{23 24} Healthcare providers may lack knowledge or skills to undertake this type of counselling,^{25 26} or consider GWG to be a low priority in the context of a typical prenatal visit.²³

Women may see a variety of healthcare provider disciplines for prenatal care including general practitioners, obstetricians, midwives, nurse practitioners and registered nurses.²⁷ There is some evidence to suggest that the approach to GWG counselling may vary by healthcare provider discipline^{28 29}; however, this area has not been fully explored. In order to better support healthcare providers to have positive GWG counselling interactions with women, there needs to be a detailed understanding of current practices, and what is influencing these practices. This information can be used to develop interventions to promote appropriate GWG in routine prenatal care. As such, the objectives of this study were to characterise and compare the GWG counselling practices of healthcare providers who provide prenatal care; and to examine potential influences on advice and counselling practices.

METHODS

Study design

This study was conducted using a concurrent mixed methods design, consisting of an online survey and semi-structured qualitative interviews. Qualitative and quantitative data were collected in tandem, analysed separately and integrated.³⁰ Mixed methods research is well suited for research questions that call for real-life contextual understandings and multilevel influences, and lends itself well to the development of complex interventions.³¹

Ethics approval for this study was obtained from the Health Research Ethics Board at the University of Alberta (Study identification Pro00045899). All participants provided informed consent to participate in this study.

Quantitative methods

Survey development

A survey questionnaire was developed, pilot-tested and assessed for content validity by a team of researchers with expertise in the areas of obstetrics, nutrition, exercise physiology, health promotion and health psychology (online supplementary file).

Recruitment and data collection

Healthcare providers including general practitioners, obstetricians, midwives, nurse practitioners and registered nurses in primary care settings from across Canada were recruited through professional associations and networks who agreed to distribute survey information to their members. All healthcare providers who provided prenatal care were eligible to participate. The survey was available from December 2014 to May 2015 on Research Electronic Data Capture software hosted at the University of Alberta.³²

Outcomes

Survey participants provided information about their professional characteristics, and were asked to respond to questions regarding their practices, knowledge and attitudes related to GWG, nutrition and physical activity. Specifically, participants were asked about the proportion of their pregnant patients with whom they undertook selected GWG counselling practices as outlined in the IOM recommendations,¹⁵ using a scale from 1 (<10% of pregnant patients) to 5 (>90% of pregnant patients). Respondents were also asked for their self-assessment of their general knowledge to support GWG counselling, their detailed knowledge of the content of practice guidelines related to GWG (specifically the IOM/Health Canada GWG guidelines,³³ and Health Canada's nutrition guidelines³⁴ and physical activity guidelines³⁵) and the priority level they placed on discussing, assessing and assisting women with GWG (eg, *Given all the issues of concern during a typical prenatal visit, I consider discussing GWG a high priority*). Responses indicated level of agreement with each statement on a scale from 1 (strongly disagree) to 5 (strongly agree). The survey also examined whether healthcare providers considered

themselves to be the most appropriate person within their practice setting to provide GWG counselling (*I am the most appropriate provider in my practice setting to discuss GWG*).

Data analysis

GWG counselling practices of each healthcare provider group were calculated as frequency and percentage of responses, dichotomised into 'Routine (undertaken with >90% of pregnant patients)' and 'Not routine' (all other response choices) based on the IOM recommendations that these practices occur with every woman (IOM, 2013).¹⁵ Cases with missing data were removed from analyses. Principal components analysis was used to reduce the numerous survey questions into a smaller number of factors. The mean score of the items loading onto each factor was used to represent that factor score for respondents.³⁶ For example, four questions loaded onto a factor that was named 'providing weight gain advice and discussing risks' and were averaged together into a composite score for that factor. Mean scores were calculated for the remaining factors of general knowledge, detailed knowledge of practice guidelines and the priority level healthcare providers place on GWG, in a similar manner. Differences in mean composite scores were compared among healthcare provider disciplines using one-way analysis of variance (ANOVA) with Bonferroni post hoc tests; residuals for all composite scores were normally distributed. Mean scores for each factor were used in multiple linear regression models to evaluate the relationship between the predictors of interest and GWG counselling practices. For all models, multicollinearity was not an issue with all tolerance values >0.36 and variance inflation factors <2.8.

Qualitative methods

Materials

A semistructured interview guide was developed by the study team based on the study objectives and included questions and prompts regarding healthcare provider practices in relation to GWG, as well as the reasons behind these practices. The interview guide also included questions regarding provider knowledge in and attitudes towards GWG.

Recruitment and data collection

Potential participants were identified through collaborating members of the study team. A purposive sample of maximum variation was recruited to gather the perspectives of healthcare providers from the different disciplines practising in urban or rural locations in two Canadian provinces (Alberta and British Columbia). When these contacts were exhausted, an advertisement was distributed by email to medical clinics relevant to the requirements for variability in the sample. Interviews were conducted over the telephone, audio-recorded and transcribed verbatim.

Data analysis

Qualitative content analysis was used to describe and inductively interpret the data.^{37 38} Qualitative content analysis is a process that is a 'reduction and sense making effort that takes a volume of qualitative material and attempts to identify core consistencies and meanings' (Patton, p45).³⁹ Audio recordings and transcripts were reviewed, and reviewed again while making notes about key words and phrases. Key concepts were categorised and recategorised as patterns emerged. Data analysis occurred concurrently with data collection, and sampling adequacy was demonstrated by saturation of the data, as replication occurred in categories as new participants were included in the analysis.⁴⁰ Findings were discussed and approved by the study team.

Data integration

The categories emerging inductively from the interviews were compared with the results from the quantitative survey to determine if findings from each method confirmed the other, as well as to expand the strength of each type of data to better explain the phenomenon.⁴¹

RESULTS

Participant characteristics

Overall, 1189 healthcare providers responded to the survey. Of these, 122 did not meet the eligibility criteria (ie, did not see pregnant women in their practice), 27 did not specify their healthcare provider discipline, 155 did not answer any questions beyond practice characteristics and 377 indicated a healthcare provider discipline that was outside the scope of these analyses. Thus, 508 responses from general practitioners, obstetricians, midwives, nurse practitioners and registered nurses in primary care settings from across Canada are included in this analysis (table 1). Twenty-three healthcare providers from these same disciplines participated in the interviews.

GWG counselling practices of healthcare providers

Providing weight gain advice and discussing risks

A small proportion of healthcare providers routinely provided women with a GWG target based on their prepregnancy BMI and discussed the recommended rate of GWG based on their GWG target (21% and 16%; table 2). Few indicated that they routinely discussed the impacts of inappropriate GWG on mother (20%) and baby (19%). The composite score for providing weight gain advice and discussing the risks did not differ between healthcare provider disciplines (table 3).

Key concepts and quotes relating to counselling practices that emerged from the interviews are outlined in table 4. Interviewees described the first prenatal visit as including measurement of weight, calculation of BMI and a large amount of information sharing, including general information on GWG. Some healthcare providers advised women on a total GWG target; however, this was not always congruent with guidelines. The amount of

Table 1 Characteristics of participating Canadian healthcare providers

	Survey participants, n=508		Interview participants, n=23	
	n	%	n	%
Healthcare provider discipline				
General practitioner	159	31	7	30
Obstetrician	139	27	5	22
Midwife	97	19	5	22
Registered nurse—primary care	75	15	4	17
Nurse practitioner	38	7	2	9
Province				
British Columbia	55	11	9	39
Alberta	149	30	14	61
Saskatchewan and Manitoba	56	11	NA	
Ontario	168	33		
Quebec	17	3		
Maritimes*	47	9		
Territories†	11	2		
Location of practice				
Urban	296	58	NC	
Rural	125	25		
Urban and rural	86	17		
Proportion of all patients who are pregnant women (%)				
<10	103	20	NC	
10–30	94	19		
30–60	119	23		
60–90	46	9		
>90	146	29		
Stage of pregnancy at first visit				
Before pregnancy	30	6	NC	
First trimester	328	65		
Second trimester	74	15		
Third trimester	34	7		
Don't know/too variable to say	41	8		

*Maritimes=Newfoundland and Labrador, New Brunswick, Nova Scotia.

†Territories=Northwest Territories, Yukon Territory (no respondents from Nunavut).

NA, not applicable; NC, not captured.

information provided in the first visit was perceived by the healthcare providers to be overwhelming for women.

Weight assessment

Approximately three-quarters of respondents weighed women at every visit (76%), while half of respondents would routinely relay GWG information to women every time they are weighed (table 2). Midwives reported measuring weight at every visit less frequently than all other disciplines (table 3).

Interviewees noted that weight was typically measured at each visit, except for midwives who generally measured women's weight if clinically necessary, or if women requested them to do so (table 4). After the first visit, interview participants indicated that they revisited the topic to varying levels of depth, typically only when the healthcare provider or woman expressed concern about her weight.

Discussing physical activity and food requirements

Nearly half (46%) of healthcare providers reported routinely discussing physical activity with women while about one-third routinely discussed appropriate extra food requirements (28%), and only about one-third felt they could routinely give examples of appropriate changes that women could make to meet extra food requirements (32%) (table 2). In contrast, over two-thirds would discuss the importance of prenatal vitamins (67%). The composite score for the three survey questions regarding discussing physical activity and food requirements differed between healthcare provider disciplines (table 3). Midwives did this more frequently than all other disciplines except for nurse practitioners.

Healthcare providers of all disciplines described providing general information on GWG, physical activity and nutrition in the early stages of pregnancy, and many indicated providing women with printed resources in this area (table 4). The midwives interviewed described spending more time assessing women's current lifestyle and providing individualised advice than did physicians (table 4).

Predictors of counselling practices

Healthcare providers, regardless of discipline, reported similar responses for having appropriate general knowledge of GWG, physical activity and nutrition, as well as knowledge of related practice guidelines (table 3); only the difference between midwives and registered nurses responses was significant. There were significant differences in the level of priority placed on GWG. Midwives and obstetricians had lower composite scores for the priority level they place on GWG than general practitioners and nurse practitioners, but did not differ significantly from each other (table 3). The majority of healthcare providers considered discussing GWG with women to be within their role (77%).

Predictors of providing weight gain advice and discussing risks

The composite score for providing weight gain advice and discussing risks of inappropriate GWG was most strongly related to the priority level that healthcare providers placed on GWG (table 5), followed by their detailed knowledge of GWG, physical activity and nutrition guidelines.

Generally, healthcare providers in the interviews reported that GWG discussions may receive lower priority due to the time constraints in a typical appointment (table 4). This was related to their compensation

Table 2 Survey responses regarding gestational weight gain counselling practices routinely undertaken (with >90% of pregnant patients) by Canadian healthcare providers

	Healthcare provider discipline											
	GP		OB		MW		NP		RN		All	
	n	%	n	%	n	%	n	%	n	%	n	%
I provide women with a weight gain target based on their prepregnancy BMI	27	17	35	25	23	24	8	21	15	21	108	21
Missing											4	1
I discuss the recommended rate of weight gain based on their weight gain target	22	14	19	14	15	16	11	29	15	21	82	16
Missing											6	1
I discuss the impact of inappropriate weight gain on the mother during pregnancy	22	14	33	24	21	22	13	34	11	15	100	20
Missing											4	1
I discuss the impact of inappropriate weight gain on the baby	21	13	30	22	21	22	15	40	10	14	97	19
Missing											7	1
I weigh women at every visit	146	92	122	88	34	35	32	84	47	65	381	76
Missing											4	1
I relay weight gain information to women every time I weigh them	82	52	62	45	38	40	25	66	41	57	248	50
Missing											7	1
I discuss appropriate physical activity with pregnant women	75	48	53	38	61	64	20	53	22	31	231	46
Missing											7	1
I discuss appropriate extra food requirements with pregnant women	41	26	26	19	37	39	14	37	21	30	139	28
Missing											7	1
I can easily give examples of appropriate changes that women could make to meet extra food requirements	40	26	30	22	48	50	17	46	23	32	158	32
Missing											9	2
I discuss the importance of taking prenatal vitamins	124	79	85	61	49	51	34	90	44	61	336	67
Missing											6	1

BMI, body mass index; GP, general practitioner; MW, midwife; NP, nurse practitioner; OB, obstetrician; RN, primary care registered nurse.

method, as general practitioners and obstetricians were remunerated in a fee-for-service model that resulted in restriction on the length of appointments, as well as the topics covered. Midwives were compensated by course-of-care, which resulted in longer and more flexible appointments. However, midwives described a lower priority level placed on GWG, as their practice was less focused on weight, in particular weight assessment, and more focused on a woman's overall health and well-being. Healthcare providers' perceptions of the sensitivity of discussing GWG with pregnant women were also related to their providing weight gain advice and discussing risks (table 4). Some healthcare providers noted their

discomfort with initiating GWG discussions, or discussing GWG too frequently, as they were concerned that this may cause psychological distress for the woman.

Predictors of discussing physical activity and food requirements

The priority level that healthcare providers place on GWG, their detailed knowledge of GWG, nutrition, and physical activity guidelines, and their general knowledge of this area were all significantly related to their discussing physical activity and food requirements with women during a prenatal visit (table 6). After adjustment for practice characteristics, being a midwife remained a significant predictor of this activity within a prenatal visit.

Table 3 Composite scores for gestational weight gain (GWG) counselling practices and influences on practices compared by healthcare provider discipline

	Healthcare provider discipline Mean (SD)							Sig.	Post hoc
	GP	OB	MW	NP	RN	All			
Providing weight gain advice and discussing the risks	2.95 (1.1)	3.03 (1.2)	2.95 (1.2)	2.91 (1.5)	2.54 (1.3)	2.91 (1.2)	0.072	NA	
Weighing women at every visit	4.87 (0.54)	4.75 (0.80)	3.36 (1.56)	4.61 (1.10)	4.03 (1.55)	4.41 (1.22)	<0.001	MW<All*	
Discussing physical activity and food requirements	3.65 (1.1)	3.37 (1.1)	4.23 (0.8)	3.81 (1.1)	3.31 (1.4)	3.65 (1.1)	<0.001	MW>(GP, OB, RN)*	
General knowledge in GWG, physical activity and nutrition	3.50 (0.75)	3.61 (0.75)	3.77 (0.70)	3.42 (0.80)	3.36 (0.94)	3.56 (0.78)	0.017	MW>RN†	
Detailed knowledge of GWG, physical activity and nutrition guidelines	2.85 (0.98)	2.96 (0.91)	3.22 (0.88)	2.85 (1.02)	3.00 (1.01)	2.97 (0.95)	0.047	MW>GP†	
Priority level of discussing, assessing and assisting women with appropriate weight gain	4.09 (0.61)	3.82 (0.82)	3.59 (0.86)	3.8 (0.87)	4.25 (0.65)	3.89 (0.78)	<0.001	MW<(GP, NP)* OB-(GP, NP)†	

*Significant at 0.01; scale of 1=lowest to 5=highest score

†Significant at 0.05.

‡Compared by one-way analysis of variance (ANOVA).

GP, general practitioner; GWG, gestational weight gain; MW, midwife; NA, Not applicable; NP, nurse practitioner; OB, obstetrician; RN, primary care registered nurse.

Midwifery practices in relation to discussing physical activity and food requirements also emerged from the interview data (table 4). Midwives reported that their approach focused on overall health and wellness, and centred on support for women. Knowledge was another key factor that came to light in the interviews, as some healthcare providers noted a need for additional knowledge, particularly in nutrition and maternal obesity. For healthcare providers working within a multidisciplinary team, access to dietetic services was an important enhancement to GWG counselling practices.

DISCUSSION

GWG counselling by healthcare providers falls below the recommendations from the IOM and other national health agencies.¹⁵ Although many of the healthcare providers interviewed indicated that they regularly calculate and record women's prepregnancy BMI, few survey respondents from any discipline routinely provided women with a comprehensive GWG recommendation and advice on their rate of GWG based on their prepregnancy BMI. In addition, few survey respondents reported discussing the risks of inappropriate GWG with women. While many healthcare providers reported providing a general message of the importance of prenatal vitamins, fewer reported routinely discussing topics such as appropriate extra food requirements. Weight was typically measured at each prenatal appointment, but not discussed unless it was a concern. This is in contrast with what women report they need from their healthcare provider, as other studies from our research group have indicated that women would like their healthcare provider to initiate a discussion about GWG early in pregnancy, and continue the discussions throughout pregnancy and postpartum so that they are updated on their GWG progress.²²

The low rates of some of these counselling practices are concerning since it is likely that survey respondents are those who would be most likely to counsel women about GWG. There is evidence suggesting that women whose healthcare providers discuss GWG and related lifestyle behaviours in pregnancy with them have lower GWG and lower likelihood of having a baby that is large for gestational age.⁴²⁻⁴⁴ This underlines the potential level of influence that healthcare providers have with pregnant women and the importance of refining their training or antenatal care pathways to support such conversations.

To our knowledge, this is the first mixed methods study to examine GWG counselling, in particular for the specific counselling practices recommended by IOM.

While survey and qualitative research studies from various parts of the world have also found low rates of GWG counselling as reported by patients, other surveys of healthcare providers have found high self-reported rates of counselling.²⁰⁻²⁸ This discrepancy may be due to the frequency with which healthcare providers undertake counselling, as studies from the US have found that they report discussing GWG more often with women who are overweight or obese at the start of their pregnancy.²⁴

Table 4 Overarching categories and key concepts emerging from qualitative content analysis of interviews with healthcare providers

Category	Concept	Representative quote(s)
Practices	The first visit involves a large amount of information sharing	“That’s the trouble with prenatal care. There’s so much information that women need, especially in the first trimester. Genetic screening, and lifestyle, and alcohol, and smoking, and family, and you know, on and on and on.” (General Practitioner)
	Weight is assessed routinely, but not discussed in detail unless there is a concern	“Weight is something I would bring up with everyone at the first visit and only - well, I always check the weight every single other visit. But if there’s no problem, I wouldn’t bring it up. I might make a comment like, ‘Oh, your weight looks good.’” (General Practitioner)
	Midwives have a different approach to gestational weight gain	“We are aware of their weight gain. But more important to us than their weight gain is their nutrition and how they’re feeling about it and, you know, providing encouragement, support and education so that they can be empowered to make healthy choices.” (Midwife) “I feel like it’s really important to discuss healthy eating and exercise, but the actual focus on the weight gain and the number of pounds that a woman should gain, I don’t really feel that’s important at all, that piece of it.” (Midwife)
Individual-level influences on practice	Priority level	“But certainly there are definitely times where I feel constricted by time. I think nutrition and exercise is a huge priority, so that’s just my personal opinion. I think that I wouldn’t - I don’t know, I would make the time.” (Midwife)
	Sensitivity of the discussion	“Any discussion around weight can be a very charged issue and, depending on the woman and her BMI, and her history, she may have had a history of an eating disorder or whatever. You don’t always know what issues she’s had in the past and they can be very significant, so there could be a lot of anxiety on the patient’s side around weight gain and so that will always cover a conversation, especially if you don’t know her very well.” (General Practitioner)
	General knowledge of gestational weight gain, nutrition and physical activity	“I do find that nutrition is not covered at all in my medical school and through residency. I don’t remember any teaching sessions at all on weight gain in pregnancy, obesity in pregnancy or that. We have one teaching session every two years for an hour on it.” (Obstetrician)
System-level influences on practice	Detailed knowledge of practice guidelines	“I have to know so many rules about all sorts of things. I always kind of go by, you know, 5, 10, 15. So those three numbers I remember, 5, 10, 15. If you’re overweight, if your BMI is higher than, you know, 26 or 27, or higher than 28 or so, I would say, 5 kilos. If your weight is pretty well normal I’d say 10 kilos. And if your weight is under I’d say 15 kilos.” (General practitioner)
	Time and compensation	“And that’s a different model for us because we’re not billing per fee code. So when I see a woman, I can talk to her or counsel her or do anything in that visit, it doesn’t - so, it’s different than the physicians, I guess, because they’re constrained by billing for what they’re talking to the people about.” (Midwife) “I guess the biggest structural problem is the short prenatal visit and the amount of information that has to be gathered and disseminated in that visit, which is typically anything from ten to 15 min long.” (General Practitioner)
	Access to allied health services	“So I find the most successful story of patients achieving their [weight] goals and continuing postpartum, were women who I initially brought up the topic [with], referred to our dietitian and psychologist and they [women] continued to follow up with me and with them. So they had that longer term follow-up and this goal setting and checking in with someone.” (Obstetrician)

Table 5 Predictors of Canadian healthcare providers providing advice to pregnant women about gestational weight gain (GWG) and discussing risks of inappropriate weight gain during a prenatal visit

Variable	Model†		
	Unstd β	SE of β	Std β
Constant	-1.14**	0.38	
General practitioner (<i>reference</i>)			
Obstetrician	0.242	0.145	0.093
Midwife	-0.076	0.199	-0.026
Primary care RN	-0.029	0.177	-0.008
Nurse practitioner	-0.057	0.206	-0.012
Detailed knowledge of GWG, physical activity and nutrition guidelines	0.26**	0.069	0.202
General knowledge in GWG, physical activity and nutrition	0.098	0.081	0.065
Priority level of discussing, assessing and assisting women with appropriate weight gain	0.71**	0.071	0.459
Role (I am the most appropriate provider to discuss gestational weight gain)	0.172	0.133	0.056
R ²	0.392		

**P<0.01.

†Model is adjusted for: urban/rural location, proportion of all patients who are pregnant and trimester of pregnancy at first visit. GWG, gestational weight gain; RN, registered nurse; Std, standardised; Unstd, unstandardised.

Therefore, they may report that they provide GWG counselling, but not to every pregnant woman. Further, when the depth of this counselling is explored, the self-reported rates are likely to diminish. Future studies should objectively assess the quality of these discussions and evaluate their impact on GWG, health behaviours like physical activity and diet and women's perceptions of support. Furthermore, research is needed to elucidate the most effective counselling methods that will help women achieve appropriate GWG. This additional information could help guide or refine approaches to antenatal care undertaken by different groups of care providers.

This study identified multilevel influences on GWG counselling. Most notably, the priority level that healthcare providers placed on GWG had the strongest relationship with their practices. The qualitative results provided context to this finding, linking the priority level of GWG to factors at the healthcare system level, such as the time available in a typical prenatal appointment, and the compensation that healthcare providers receive for their time. Additionally, this study identified factors at the individual level. This included the importance of detailed knowledge of practice guidelines, which also was strongly associated with counselling practices.

Table 6 Predictors of Canadian healthcare providers discussing physical activity and food requirements with women as part of a prenatal visit

Variable	Model†		
	Unstd β	SE of β	Std β
Constant	0.688	0.345	
General practitioner (<i>reference</i>)			
Obstetrician	0.022	0.13	0.009
Midwife	0.518**	0.179	0.192
Primary care RN	0	0.160	0
Nurse practitioner	0.342	0.189	0.077
Detailed knowledge of GWG, physical activity and nutrition guidelines	0.277**	0.063	0.229
General knowledge in GWG, physical activity and nutrition	0.311**	0.073	0.22
Priority level of discussing, assessing and assisting women with appropriate weight gain	0.341**	0.064	0.236
Role (I am the most appropriate provider to discuss gestational weight gain)	0.18	0.12	0.063
R ²	0.434		

**P<0.01.

†Model is adjusted for: urban/rural location, proportion of all patients who are pregnant and trimester of pregnancy at first visit. GWG, gestational weight gain; RN, registered nurse; Std, standardised; Unstd, unstandardised.

One novel finding was the new insights into the different approach reported by midwives. Midwives noted that their focus on the overall well-being of the women meant they discussed physical activity and nutrition in more depth than did physicians, and they measured weight less frequently. Even after controlling for multiple other predictors, midwives were significantly more likely than other healthcare providers to report discussing physical activity and food requirements with women during routine prenatal care. In other research, patients of midwives were more likely to recall having discussed physical activity with their healthcare provider as compared with patients of general practitioners and obstetricians,²⁹ and midwives themselves report providing physical activity counselling to women more frequently than other disciplines.^{20–28} While the present study considered physical activity and nutrition counselling practices as one composite score, there seems to be growing evidence that midwives provide more lifestyle counselling than other healthcare provider disciplines. The impact of counselling by a midwife as compared with other disciplines on the health outcomes for women is an area for future exploration.

Strengths and limitations

A major strength of this study is the use of mixed research methods. This allowed for some verification of findings between methods, and provided a broader picture of ‘who is doing what’, as well as ‘why and how are they doing it’. To our knowledge, this is the largest and most comprehensive survey on this topic to date. While prenatal care varies between countries, the topics covered in this survey are considered routine and are undertaken as part of standard prenatal care in most developed countries.

This study has limitations that should be considered. It was not possible to calculate a true response rate for the survey since the survey was distributed using email lists and social media through professional associations and networks. While this method of recruitment allowed for a wider reach, and ultimately more responses, those who responded may be more likely to engage in activities related to GWG counselling. This could lead to inflation of the reported frequency of specific GWG counselling practices. This is concerning as they are already quite low for some counselling practices and further highlights the need for targeted interventions in this area.

The qualitative interviews were only conducted in two provinces, and there is the potential that this does not accurately capture the practices and predictors in other geographic areas. However, the congruency of the qualitative and quantitative findings suggests that this is unlikely. Furthermore, a recent systematic review found few differences in barriers and facilitators to pregnancy weight management in studies from around the world, suggesting that the findings of the current study may help inform practice in various healthcare systems.⁴⁵

Recommendations

Interventions to implement the best practices should consider the multilevel influences on GWG counselling practices, as well as the discipline of the healthcare provider, in order to be effective at changing healthcare provider behaviours. Providers across disciplines require knowledge of GWG, physical activity and nutrition guidelines and some may need system-level changes such as more time in an appointment to help them make it a priority in their practice. A different model for dissemination of this knowledge needs consideration. Multidisciplinary clinics that include professionals with a background in nutrition and physical activity, and group educational sessions may be important in this regard.⁴⁶ The latter approach could allow participants to discuss these issues among themselves and may provide positive reinforcement of new knowledge and help to shift old beliefs.⁴² Furthermore, discussion of healthy GWG and maintenance of a healthy weight trajectory with women by health providers is a missed opportunity for positive feedback for a healthy and potentially long-term behaviour.

Expanding discussions on GWG to a healthier lifestyle is highly relevant given the growing body of evidence related to its impact on disease in later life.¹⁰ Healthcare providers are well positioned to help women identify plans to change behaviour and improve health outcomes. Strong communication between healthcare providers and pregnant women is a key component to moving forward. Supporting healthcare providers to better counsel their pregnant patients on appropriate GWG is one important step towards breaking the intergenerational cycle of obesity, and improving the health of generations to come.

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