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A STAKEHOLDER EXAMINATION OF GESTATIONAL WEIGHT GAIN GUIDELINES

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A Stakeholder Examination of Gestational Weight Gain Guidelines

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Abstract

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Obesity is a significant health concern for women of childbearing age. More than 40% of women have a Body Mass Index (BMI) in the overweight or obese ranges at the time they conceive, posing significant health risks for both mother and child. Excessive weight gain during pregnancy is also increasingly common and is associated with numerous maternal and fetal health complications. The Institute of Medicine has published gestational weight gain (GWG) guidelines for expectant mothers based on prepregnancy BMI. However, only 30-40% of women gain weight in a manner consistent with these guidelines, and more than 50% gain in excess of these recommendations. Further, many women report receiving little to no guidance from their healthcare providers regarding weight gain, nutrition, and physical activity during pregnancy. There is a clear need to enhance understanding of patient-provider communication regarding GWG in order to develop relevant and targeted interventions to reduce excessive GWG among expectant mothers. The current study used a mixed-methods approach to assess both perspectives of both pregnant and postpartum women, and obstetric healthcare providers (HCPs') on GWG. Interviews with pregnant and postpartum women with overweight or obesity prior to pregnancy indicated a general sense of deference to providers regarding GWG. However, many women indicated suboptimal receipt of GWG information. Most women also endorsed some level of disagreement with the GWG guidelines, in particular, disapproval of the restrictive weight ranges for women in higher BMI categories. Additionally, parity emerged as a salient topic for women, especially as related to weight retention between pregnancies. HCPs' survey data suggest their desire for improved patient-provider communication about GWG and highlight systematic barriers (e.g. time, training) that could serve as targets for future interventions. Further, data from postpartum women indicate a disconnect between providers' perceptions of GWG information dissemination and patients' reported experiences. In sum, maternal overweight and obesity, excessive GWG, and patient-provider interaction are crucial topics to address to improve maternal and fetal outcomes, and decrease healthcare costs.

Overview

Obesity is a worldwide epidemic; moreover, overweight and obesity are exceptionally prevalent in the United States. Between 2011 and 2014, the Centers for Disease Control and Prevention (CDC) reported that just over 37% of U.S. adults had Body Mass Indices (BMIs) in the obese range. Rates were higher for women (38.3%), than men (34.3%). These gender differences are especially evident among individuals between the ages of 20 and 39 (Ogden, Carroll, & Flegal, 2015).

Obesity is a particular concern for women because it is a specific risk factor for obstetric complications and can negatively affect fertility, childbirth outcomes, health care costs, and weight trajectory (Fisher, Kim, Sharma, Rochat, & Morrow, 2013; Kulie et al., 2011; Samura et al., 2016). Data from the Centers for Disease Control and Prevention (CDC) National Center for Health Statistics indicate that, among women giving birth, approximately 25.6% were categorized as having overweight (BMI 25.0-29.9) and 24.8% were categorized as having obesity (BMI > 29.9) prior to pregnancy (Branum, Kirmeyer, & Gregory, 2016). Further, the prevalence of obesity among women of childbearing age differs significantly across racial/ethnic and socioeconomic groups (Whitaker, Wilcox, Liu, Blair, & Pate, 2016a). For example, Whitaker and colleagues (2016) noted that approximately 75% of non-Hispanic black women and 50% of non-Hispanic white women of childbearing age are overweight or obese. Given the prevalence of these conditions among women of childbearing age, prepregnancy overweight and obesity has been conceptualized as one of the most significant contributors to compromised health during pregnancy among women in developed countries (Dodd & Briley, 2017).

Research suggests that providers report counseling women of childbearing age about diet, nutrition, and exercise in only ~20% of preventive visits (Yamamoto, McCormick, & Burris,

2014). Therefore, it has become increasingly important to address the prevalence and patterns of overweight, obesity, and weight gain among women of childbearing age as these conditions can significantly impact both expectant mothers and the next generation. Given the numerous lifestyle factors influencing this complex issue, additional investigation of influences on gestational weight gain (GWG) and postpartum weight management is warranted (Bick, 2015).

This study examined stakeholders' perspectives regarding GWG guidance. Specifically, this investigation involved assessing awareness of, and agreement with, these guidelines among pregnant and postpartum women, and the healthcare providers (HCPs) who serve them. Further, the current study aimed to identify potential discrepancies between the needs and expectations of patients and those of HCPs. Results of this investigation can assist HCPs in framing their communications regarding GWG guidelines, to maximize perceived feasibility and patient weight management self-efficacy, and enhance maternal and child outcomes.

Women of Childbearing Age and Obesity

Increased Risk of Obesity during Childbearing Years. Weight-related issues in obstetric populations mirror those of the general population; overweight and obesity are linked with serious health concerns for both mother and child (Anderson et al., 2015; Hill et al., 2013). Indeed, maternal overweight and obesity are the primary health issues currently facing expectant mothers, and rates continue to increase (Liu, Wilcox, Whitaker, Blake, & Addy, 2014). Pregravid Body Mass Index (BMI, weight prior to conception) is the strongest predictor of a number of obstetric outcomes including caesarean birth, infant birthweight, and post-partum weight retention (Nohr et al., 2008). In 1983, approximately 24% of women entering pregnancy had BMIs in the overweight or obese ranges. Currently, ~45% of women entering pregnancy are overweight or obese at the time of conception (Hill et al., 2013; Mamun et al., 2011; Nohr et al.,

2008). Rates are particularly high among African American women. As many as 78% of African American women of childbearing age report a BMI over 25, indicative of overweight or obesity (Liu et al., 2014). Moreover, regardless of prepregnancy BMI, excess GWG is associated with increased risk of pregnancy complications and postpartum overweight (Frederick, Williams, Sales, Martin, & Killien, 2008). These trends are of significant concern as both high pregravid weight and excessive GWG are associated with numerous negative short- and long-term health complications for mothers and children (Lan-Pidhainy, Nohr, & Rasmussen, 2013). To address the issue of excess GWG, it is first crucial to understand current GWG guidelines. The following section reviews these guidelines, and the changes that have been made to them over time.

Gestational Weight Gain

Pregnancy is a time of significant physiological change for women, and weight gain is both an expected and healthy component of this change (Mamun et al., 2011). Because many factors contribute to GWG, recommended weight gain is currently based on a woman's pre-pregnancy BMI category (described in detail in the next paragraph). These recommendations are designed to enhance health outcomes for both mother and child (Hill et al., 2013). However, the guidelines have changed dramatically over the past few decades (McDonald et al., 2011; Siega-Riz et al., 2009).

Institute of Medicine (IOM) GWG Guidelines. In 1930, women of all sizes were encouraged to gain only about 15 pounds during their pregnancy. In 1970, the Institute of Medicine (IOM) increased weight gain recommendations, instructing women to gain 20-27 pounds during pregnancy, regardless of prepregnancy weight. Subsequent research suggested that a single set of guidelines for all expectant mothers was unlikely to yield optimal outcomes, and IOM guidelines have continued to change over the years (Sewell, Huston-Presley, Super, &

Catalano, 2006). In 1990, the IOM released BMI-specific GWG guidelines in an effort to improve infant health outcomes (Nohr et al., 2008).

In 2009, these recommendations were updated to include additional considerations for weight gain and maternal health outcomes, and were endorsed by the American College of Obstetricians and Gynecologists (ACOG; Stengel, Kraschnewski, Hwang, Kjerulff, & Chuang, 2012). The 2009 revisions were driven by demographic changes, as several characteristics (age, pregravid weight, etc.) of the average pregnant woman had shifted significantly in the decades since the prior revisions (Gunderson, 2009). The 2009 recommendations are as follows: women with BMIs in the underweight range (i.e., BMI below 18.5) should gain 28-40 pounds, women with BMIs in the normal weight range (BMI between 18.5 and 24.9) should gain 25-35 pounds, women with BMIs in the overweight range (BMI between 25.0 and 29.9) should gain slightly less at 15-25 pounds, and women with BMIs in the obese range (BMI 30.0 or above) should gain only 11-20 pounds ("Center for Disease Control and Prevention," 2015; Stengel et al., 2012). Weight gain in excess of the prescribed range for each BMI category is considered "excessive GWG" (Hill et al., 2013; Mamun et al., 2011). Unlike prior IOM guidelines, the 2009 revisions acknowledge that pregravid BMI is independently associated with poor maternal and child health outcomes. As such, a BMI of 18.5 – 24.9 prior to pregnancy is now explicitly recommended (Buschur & Kim, 2012; Gunderson, 2009). The 2009 guidelines also recommend a smaller GWG range for women with pregravid BMIs in the obese range (11-20lbs.). Previously, women in this BMI range were encouraged to gain at least 15 pounds and no maximum weight gain was noted (Buschur & Kim, 2012; Gunderson, 2009).

Trends in GWG. Although the rationale for the revised guidelines is clear, more than 50% of expectant women exceed current GWG recommendations (Haugen et al., 2014; Hill et

al., 2013; Mamun et al., 2011; McDonald et al., 2011; Stengel et al., 2012). Of particular concern is the fact that women with overweight or obesity prior to conception are two to six times more likely to exceed GWG recommendations, compared with women with BMIs in other categories (Harrison, Skouteris, Boyle, & Teede, 2017; Nohr et al., 2008; Siega-Riz & Gray, 2013). Indeed, approximately 60% percent of women with BMIs in the overweight range, and 45% of women with BMIs in the obese range, gain excessive weight during pregnancy (Anderson et al., 2015; Harrison et al., 2017).

Adverse Health Outcomes of Excessive GWG. The number of women exceeding IOM weight gain guidelines is concerning as excess weight gain is associated with increased risk of multiple negative health outcomes for both mother and child (McDonald et al., 2011; Siega-Riz & Gray, 2013). Specifically, for expectant mothers, excess GWG is associated with several pregnancy complications, including gestational diabetes mellitus, hypertensive disorders, preeclampsia, and maternal anemia, as well as increased risk of preterm birth, prolonged delivery, and emergency caesarean or vaginal operative delivery (Hill et al., 2013; Mamun et al., 2011; McDonald et al., 2011; Siega-Riz et al., 2009). GWG is strongly associated with maternal weight change between conception and 6 months postpartum, and there is evidence that GWG has long-term maternal body weight effects (Harrison et al., 2017; Nohr et al., 2008). As many as 20% of women experience significant weight retention up to 12 months postpartum (Nohr et al., 2008). High prepregnancy BMI and excessive GWG are the strongest predictors of postpartum weight retention (Buschur & Kim, 2012). Indeed, excess GWG is linked to maternal overweight and obesity into midlife (McDonald et al., 2011). Maternal obesity and excessive GWG also appear to impact breastfeeding initiation and duration negatively, which can have developmental implications for offspring, and weight retention implications for mothers

(Viswanathan et al., 2008). Specifically, excessive GWG is associated with a two to three times higher risk of both becoming overweight after delivery, and obesity at middle age (Stengel et al., 2012). Additionally, women with excessive GWG or weight retention have increased risk for obesity-related diseases, such as diabetes, hypertension, arthritis, and cardiovascular disease (Siega-Riz et al., 2009).

Excess GWG has adverse effects for offspring as well (Anderson et al., 2015). Children of mothers who gained weight in excess of IOM GWG guidelines are at increased risk for conditions such as neonatal seizures, low Apgar scores, high birth weight for gestational age (macrosomia), birth trauma and injury, and fetal death (Anderson et al., 2015; Mamun et al., 2011; Siega-Riz et al., 2009; Viswanathan et al., 2008). Moreover, children of mothers with excess GWG are four times more likely to have BMIs in the overweight range by preschool age, and to suffer adverse cardiovascular outcomes (Anderson et al., 2015; McDonald et al., 2011; Viswanathan et al., 2008). GWG is also linked to increased risk of obesity in adolescence among offspring, demonstrating the potential prolonged negative impacts of excessive GWG (Oken, Rifas-Shiman, Field, Frazier, & Gillman, 2008).

Gestational diabetes is often a result of excess GWG, and numerous studies have linked gestational diabetes to negative metabolic outcomes in children (Vohr & Boney, 2008). In addition, fetal adiposity is associated with inflammatory indicators associated with insulin resistance, indicating that for children of obese mothers, infant metabolism might be compromised prior to birth (Poston, Harthoorn, & Van Der Beek, 2011).

Furthermore, the impact of GWG on maternal and child health is particularly troubling for multiparous women. Women who gain in excess of IOM guidelines during pregnancy are more likely to repeat these patterns in subsequent pregnancies (Montpetit, Plourde, Cohen, &

Koski, 2012; Siega-Riz et al., 2009). This poses issues for women who are overweight or obese upon entering pregnancy. Guidelines suggest that women should begin their pregnancies at a "healthy" weight. However, given that more than half of pregnancies in the U.S. are unintended, this guidance is often not feasible (Finer & Zolna, 2014). Additionally, women who are obese are often encouraged to lose weight prior to pregnancy, but discouraged from doing so during pregnancy (Rasmussen et al., 2010). As such, women with BMIs in the overweight and obese ranges when entering pregnancy are at a distinct disadvantage in terms of risk associated with maternal weight and excess GWG. Furthermore, these women will be encouraged by providers to lose postpartum weight, particularly if they plan to have more children.

Finally, excessive GWG poses concerns for the healthcare system, as an increase in pregnancy related complications is often paired with disease burden in women and children, and increased healthcare utilization (Hill et al., 2013; Mamun et al., 2010). There is evidence to suggest a variety of maternal factors influence GWG and postpartum weight retention; however, these factors are not well understood. As such, it is crucial to enhance understanding of women's weight-related experiences during pregnancy and postpartum (Mamun et al., 2010; Viswanathan et al., 2008).

In sum, recent revisions to the GWG guidelines do not appear to have had the desired effects (McDonald et al., 2011). There is a need to learn more about how these recommendations are being communicated by providers, and received by patients. Moreover, there is a need to understand the perceived feasibility of these recommendations. Finally, patients' self-efficacy to achieve recommended levels of GWG should be assessed, and strategies to increase it identified. This knowledge might facilitate identification of appropriate intervention targets that could better address patients' needs (Muktabhant, Lawrie, Lumbiganon, & Laopaiboon, 2015).

The Health Belief Model

The rationale for current study is based upon the health belief model (HBM). The HBM provides a useful framework for understanding the ways in which individual differences and psychosocial factors influence health behaviors (Abraham & Sheeran, 1996; Daddario, 2007). Originally, the HBM was designed to target preventive health behaviors (e.g., cancer screening), but has since been expanded to include usage and implementation of medical advice, including postpartum weight-management (Baranowski, Cullen, Nicklas, Thompson, & Baranowski, 2003; Lambert et al., 2005).

The HBM focuses primarily on two aspects of health and related behaviors: threat perception and behavioral evaluation. Threat perception consists of two key constructs, an individual's perceived susceptibility to a health problem, and the anticipated severity of that health problem (Abraham & Sheeran, 1996). Behavioral evaluation is also composed of two constructs, those affiliated with the efficacy or benefits of the recommended health behavior, and those associated with the potential costs or, or barriers to, engaging in that health behavior (Abraham & Sheeran, 1996; see figure 1). Additional iterations of the model have included cues to action as important motivators of recommended health behaviors. Cues to action can include an individual's awareness of symptoms, social support, and health education/guidance (Abraham & Sheeran, 1996). The HBM also considers an individual's level of health motivation, that is, her specific concern regarding a given health matter. Lastly, the HBM incorporates an individual's level of self-efficacy, or her belief or confidence in her ability to engage in a particular behavior (Daddario, 2007).

In sum, according to the HBM, individuals are willing to take action to address a particular health condition if: (a) they perceive that they are susceptible to that condition; (b) the

outcomes of that condition are expected to be severe; (c) it is clear that a particular action will yield benefits, and/or d) few (or manageable) barriers exist regarding the necessary action (Lambert et al., 2005).

With respect to weight-management during pregnancy and post-partum, the HBM asserts that for individuals to engage successfully in positive health behaviors they must be convinced that: (a) they are vulnerable to excessive GWG or weight retention postpartum; (b) the consequences of these conditions are potentially severe; (c) following GWG guidelines and healthy weight management practices during pregnancy and postpartum will yield benefits; (d) there are few barriers to healthy weight management, and (e) they possess adequate self-efficacy to overcome barriers potentially encountered (Lambert et al., 2005).

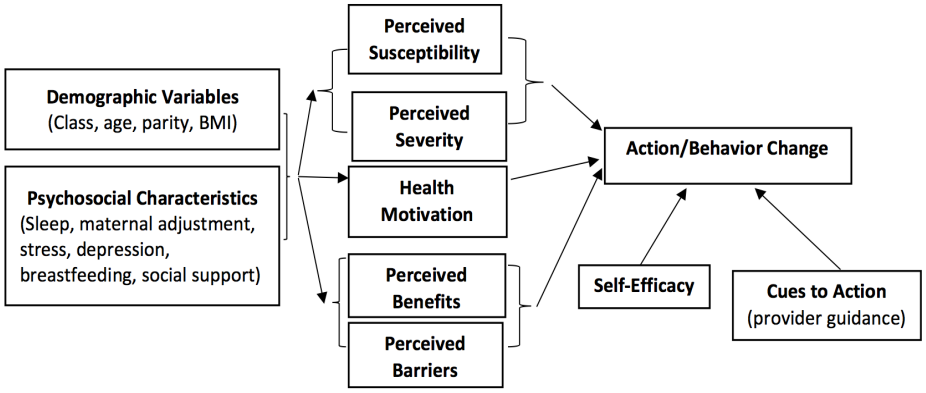

Figure 1.1 Health Belief Model

Perceived Susceptibility to Excessive GWG

Perceptions and awareness of weight gain guidelines. Women's adherence to GWG guidelines seems to depend on their knowledge, understanding, and comfort with these recommendations (Brown et al., 2012; Lutsiv et al., 2012). Despite extensive evidence indicating the adverse maternal, fetal, and childhood health outcomes of excessive GWG, few studies have investigated women's perceptions of these guidelines. It is also critical to understand women's

knowledge of the risks associated with overweight and obesity prior to pregnancy and excessive GWG.

Research with Australian women demonstrates that many are aware that excessive GWG is harmful for pregnancy and childbirth, but there is less awareness of potential negative neonatal outcomes (Nitert et al., 2011; Shub, Huning, Campbell, & McCarthy, 2013) . Studies in the United States indicate similar results, finding that approximately 49% of women recognized that obesity increases overall pregnancy risks (Kominiarek, Vonderheid, & Endres, 2010). Moreover, women with obesity seem to have even greater awareness of the risks of excessive GWG and gestational diabetes, but otherwise BMI is generally not associated with differences in knowledge among expectant mothers (Kominiarek et al., 2010).

According to both this research and the Health Belief Model, for behavioral interventions to be effective, individuals must consider themselves to *be at-risk* and *be willing to make changes to reduce their risk* (Gould Rothberg, Magriples, Kershaw, Rising, & Ickovics, 2011). Therefore, it is crucial to understand not only which women are receiving GWG-related counseling from healthcare providers (HCP), but also how women interpret, understand, and implement these guidelines.

Knowledge of BMI. Several studies have noted that when asked about ideal weight gain, most expectant mothers indicated weight gain goals that fall within IOM recommendations (Phelan et al., 2011). However, there are some discrepancies based on prepregnancy weight. Specifically, women with BMIs in the overweight and obese ranges are more likely to report ideal weight gain goals that exceed guidelines, and women in the normal BMI range are more likely to report ideal weight goals below IOM recommendations (Phelan et al., 2011). Indeed, across BMI categories, both pregnant and non-pregnant women consistently underestimate their

own BMI. Some women with BMIs in the overweight range might view themselves within the normal weight range and consequently, adopt weight gain goals and expectations more closely aligned with their perceived BMI (Gould Rothberg et al., 2011). Particularly concerning is the finding that women with higher BMIs are especially likely to underestimate their weight (Gould Rothberg et al., 2011; Shub et al., 2013). One explanation for this phenomenon posits that the rapid escalation of obesity rates in the general population has influenced individuals' perceptions of "normal" weight (Shub et al., 2013).

Perception and awareness of recommendations to prevent excess GWG. Research indicates that women of childbearing age (14-50) in the United States have sub-optimal nutritional intake before, during, and after pregnancy (Kaiser & Allen, 2008). These behaviors are in direct conflict with recommendations of clinicians and researchers, who state that women should aim to be in good nutritional standing prior to conception, indicating early intervention is required for women of childbearing age (Kaiser & Allen, 2008).

Pregnant women have also historically been instructed to curtail physical activity based on concerns about their child's well-being (Duncombe, Wertheim, Skouteris, Paxton, & Kelly, 2009). ACOG now recommends mild to moderate exercise in healthy pregnant women as a routine part of prenatal care; however many women are still concerned about the safety of exercise during pregnancy (Duncombe et al., 2009). To address GWG effectively, it is important also to consider women's knowledge and assumptions regarding diet and physical activity during pregnancy. Interventions targeting women's dietary intake, physical activity and lifestyle behaviors during pregnancy have resulted in reduced GWG, yielding positive health outcomes for both mother and child (Thangaratinam et al., 2012).

Dietary recommendations to prevent excess GWG. It is imperative that women of childbearing age maintain proper nutritional intake before, during and after pregnancy to facilitate positive health outcomes for both mother and child (Kaiser & Allen, 2008). Previous studies have identified associations between excessive GWG and high fat and sugar intake, and low fiber intake, suggesting that healthy eating is critical to the prevention of excess GWG (Phelan, 2010). However, most women do not adhere closely to dietary guidelines during pregnancy, often consuming excess fat and sugar, and inadequate amounts of vegetables, fruits, grains, and proteins (Ferrari, Siega-Riz, Evenson, Moos, & Carrier, 2013). Indeed, the social norm of "eating for two," the colloquial phrase that encourages women to view pregnancy as a time to eat freely, is relatively commonplace (Kraschnewski & Chuang, 2014; Poston, 2017). Among healthy lifestyle interventions for expectant mothers, efforts focusing specifically on dietary modification have reduced risk for conditions such as pre-eclampsia, gestational hypertension, gestational diabetes, and preterm birth (Thangaratinam et al., 2012). As such, dietary recommendations appear increasingly appropriate due to their effectiveness, safety, and relatively low-cost of implementation (Thangaratinam et al., 2012). However, qualitative studies reveal that many women experience nutrition and dietary recommendations during pregnancy as overwhelming, exhausting, and too generalized (Ferrari et al., 2013).

Additionally, there is evidence to suggest that women deemed "healthy" by providers, and those who appear to have adequate dietary intakes (as determined by the provider), are less likely to receive nutritional counseling from health care professionals (compared with women viewed as "unhealthy" or as having negative dietary habits) (Lutsiv et al., 2012). However, other recent work indicates that weight-related information appears to influence the content and the information provision style of the provider through implicit bias (Washington Cole et al., 2017).

Indeed, it appears that providers use fewer concern and approval statements with patients with overweight and obesity. Yet, providers simultaneously express belief that healthy lifestyle discussions with this patient population are frequently ineffective and time-consuming (Washington Cole et al., 2017).

This is concerning, as outward physical appearance is not necessarily indicative of health habits (Tomiyama, Hunger, Nguyen-Cuu, & Wells, 2016). As such, it appears that many women are not getting sufficient nutritional, weight, and physical activity guidance from providers. In addition to seeking information from their providers, women often seek nutrition/diet and weight gain guidance from other sources during pregnancy. For example, many pregnant women receive an abundance of advice and recommendations from family members, friends, the internet, television and other media (e.g. books, magazines, cellular applications, (Ferrari et al., 2013). Further, in many instances, women might rely on incorrect or misleading information or tactics to control weight gain during pregnancy (Lucas, Charlton, & Yeatman, 2014; Weir et al., 2010). For example, previous work has indicated that many pregnant women mistakenly believe that strategies such as eating an organic diet, increasing fruit juice consumption, choosing full fat dairy options, and refraining from eating after 8pm are safe and acceptable ways to manage GWG (Shub et al., 2013). Additionally, some women endorse believing that pregnancy is the "only time to eat what you want" or that pregnancy "gives you a free pass" (Groth & Kearney, 2009; Keely, Cunningham-Burley, Elliott, Sandall, & Whittaker, 2017).

These inaccurate beliefs and potentially unsafe weight management methods during pregnancy could play a role in the increasing prevalence of excess GWG (Shub et al., 2013). However, despite the influence of external information, studies report that women often attempt to follow their providers' advice and value their opinions highly (Ferrari et al., 2013). Therefore,

it seems critical to understand ways in which patient-provider communication regarding nutrition and weight during pregnancy can be improved.

Physical Activity recommendations to prevent excess GWG. Prior research has also indicated that pregnant women are not very physically active, and, rather, engage in high levels of sedentary behavior. Physical activity also decreases across the progression of pregnancy (Ferrari et al., 2013; Montpetit et al., 2012; Stotland, Tsoh, & Gerbert, 2012). It is possible that women do not understand or receive information about healthy approaches to diet and physical activity during pregnancy, or might have mistaken beliefs about these issues. Prior work in this area has indicated that despite many sources (e.g., healthcare providers, family, friends, media) of information regarding physical activity during pregnancy, women often find this issue confusing, overly conservative, or vague (Evenson & Bradley, 2010; Ferrari et al., 2013). Many women express frustration that physical activity suggestions lack specificity (e.g., being told to "listen to their bodies"). Other women report advice that is largely restrictive, or too conservative (with respect to intensity or frequency), with many noting they were told only that they should increase walking (Evenson & Bradley, 2010; Ferrari et al., 2013; Whitaker, Wilcox, Liu, Blair, & Pate, 2016c). This has serious implications for GWG and postpartum weight retention, as women might not prioritize both engagement in physical activity and avoidance of sedentary activities if these behaviors are not actively highlighted by their providers (Montpetit et al., 2012).

Perceived Severity of GWG

Knowledge of negative outcomes associated with excessive GWG. Many women of childbearing age also under-estimate the risk excess GWG has on maternal and child outcomes (Shub et al., 2013). Some women endorse knowledge of personal health complications of excess

GWG for the mother in the long-term; however many are seemingly unaware of the negative influences excess maternal weight and GWG pose for their offspring (Shub et al., 2013). Recent work with obstetric providers demonstrates that the overwhelming majority is aware of the adverse maternal and infant health outcomes associated with excess maternal weight and GWG. However, as few as 13% communicate these risks to their patients (Lutsiv et al., 2012). Furthermore, many providers do not feel comfortable with their ability to deliver counseling on this topic (Lutsiv et al., 2012).

Additionally, specific subgroups of expectant mothers are at increased risk for negative weight-related health outcomes. Low-income women appear to be at increased risk for obesity compared with women from higher socio-economic backgrounds (Anderson et al., 2015; Phelan, 2010). Indeed, African American women have the highest risk for postpartum weight retention (Anderson et al., 2015). However, most research has targeted primarily White women (Liu et al., 2014). This absence of research targeting African American women is of particular concern given the high-risk for negative weight-related health outcomes associated with GWG in this group (Liu et al., 2014).

Perceived Benefits of GWG Management

A key component of the HBM in relation to GWG management is the degree to which women believe that enacting specific health behaviors will yield positive outcomes for their offspring (Stout, 1997). These perceived benefits are believed to compel action based on anticipated outcomes (Stout, 1997). Indeed, the HBM posits that, if perceived risks are understood, and a mother has self-efficacy to make positive health changes, she will choose health behaviors that she believes maximize the health of her offspring (Stout, 1997). Therefore, it is crucial that women are not only aware of the risks associated with excessive GWG (as

discussed above), but also that they recognize the perceived benefits of adhering to GWG guidelines.

Self-Efficacy for Managing GWG

Psychosocial and Environmental Barriers to Weight Management. Prior research with obstetric samples has indicated that maternal psychosocial factors (i.e. maternal stress, maternal adjustment, depression) influence GWG trajectories (Hill et al., 2013). Women with high levels of depressive symptomatology during pregnancy are at increased risk for excessive GWG (Hill et al., 2013). Similarly, parental stress is associated with a decreased ability to manage weight during pregnancy or the postpartum period (Hill et al., 2013).

In addition to psychosocial factors, there are environmental influences on GWG and weight retention, including sleep cycles and breastfeeding. For example, short sleep duration in the postpartum period is associated with weight retention (Gunderson et al., 2008). In contrast, women who explicitly follow breastfeeding recommendations (i.e. breastfeeding exclusively for 6 months) report significantly lower weight retention compared with women who do not explicitly follow guidelines (Baker et al., 2008). As such, future research must consider both maternal psychosocial and environmental barriers to guideline-adherent GWG and postpartum weight retention.

Achievability of GWG Guidelines. There is very little research addressing weight-related advice offered by providers to patients during pregnancy. The few extant studies suggest that providers' advice regarding GWG is positively associated with weight gain within target levels (consistent with IOM recommendations) and provider counseling about gestational weight management appears to be an important component of excessive GWG prevention (Olson,

2008). However, even among women who report receiving counseling from providers, adherence is suboptimal (Ferrari et al., 2013; Olson, 2008).

Self-efficacy regarding GWG guidelines. Women report various reasons for failing to adhere to provider advice. Many feel as though they cannot uphold the standards given to them, and others are simply adverse to the recommendations (Ferrari et al., 2013). For example, some women choose not to follow provider weight, diet, and physical activity suggestions because they disagree with the advice, find it too difficult to follow, or do not want to make changes to their health behaviors (Ferrari et al., 2013).

Social psychology research posits that although many health behavior changes are easy to recommend to others, in practice, many health goals are difficult to attain and manage (Mann, de Ridder, & Fujita, 2013). For many, challenges arise due to the energy required to attend to and engage in health behaviors over the long-term. Self-regulation and motivation appear to play powerful roles in achieving health related goals (Mann et al., 2013; Teixeira, Silva, Mata, Palmeira, & Markland, 2012). In terms of goal adoption, individuals typically have either an intrinsic interest or motivation for pursuing a goal (i.e., they want to change their own behavior), or an extrinsic interest or motivation (i.e., they attempt goals due to the expectations of another person). Research has demonstrated that individuals are more likely to adapt their behavior towards a particular goal when they are intrinsically motivated to achieve it (Mann et al., 2013).

Goal setting literature posits that in order for goal-attainment to be successful, goals must themselves be specific and challenging (Ordóñez, Schweitzer, Galinsky, & Bazerman, 2009). Setting specific and challenging goals enhances motivation compared with vague, "do your best" approaches. Further, specific goals provide unambiguous markers against which one can measure success or progress (Ordóñez et al., 2009). Specific goals also focus attention, and

increase motivation and persistence by creating a discrepancy between the current and expected outcome (Ordóñez et al., 2009).

However, sometimes exceptionally specific goals, like those seen in the GWG literature, focus an individual's attention so closely that they fail to account for other important aspects of the situation at hand (Ordóñez et al., 2009). For example, having a very narrow focus on a particular weight goal might cause an individual to overlook important contextual issues that impact GWG, such as stress, emotional instability, or other psychological factors (McDonald et al., 2013). Similarly, challenging goals are meant to inspire effort, commitment, and improved performance in the individual. Nonetheless, when goals are perceived as too challenging, individuals sometimes start thinking that attempting to achieve them is not worth the effort (Ordóñez et al., 2009). When individuals feel that a challenging goal is outside of their grasp, self-efficacy is reduced (Ordóñez et al., 2009). This is concerning, as self-efficacy is strongly linked to engagement, commitment, and effort put forth to achieve a goal (Ordóñez et al., 2009). Indeed, often individuals abandon health goals early on in their behavior change attempts. Several explanations for this early goal abandonment have been outlined in the literature, including improper goal-setting, misplaced motivation for adopting goals, and conflict between the goals and other immediate concerns (Mann et al., 2013).

Thus, the goal-setting and goal-maintenance literature has important implications for the obstetrics field. Specifically, the literature recognizes the difficulty individuals encounter when a particular goal is applied broadly to a large number of people (Ordóñez et al., 2009). Given the considerable range of characteristics and behaviors across individuals, the goal will inevitably be too easy for some, and much too challenging for others (Ordóñez et al., 2009). Furthermore, individual characteristics such as previous weight management attempts and pregravid weight

status might also play a role in GWG outcomes. It is clearly important to communicate the IOM GWG guidelines effectively to decrease negative health outcomes for both women and children. However, it is also vital for the field to be aware of the ways in which patients conceptualize, internalize, and react to these specific goals to enhance their self-efficacy to achieve recommended GWG in a healthy and safe manner (Brown et al., 2012).

Cues to Action Regarding GWG and Weight Management

Importance of intervention in primary care settings. Though it is widely known that appropriate GWG is crucial for the health outcomes of mother and child, and pregnancy presents an ideal opportunity for intervention, little is known about how healthcare providers disseminate weight gain information to their expectant patients (Stengel et al., 2012). Pregnancy is a critical period in which HCPs are uniquely positioned to shape patients' health and weight behaviors. Indeed, healthcare providers are often described as "gatekeepers" to health, and occupy a key role for assessing and addressing health care concerns early and frequently (van der Pligt, Campbell, Willcox, Opie, & Denney-Wilson, 2011). Prenatal appointments yield frequent contact with HCPs, and mothers are often highly motivated to make changes that benefit their babies (Adamo et al., 2013; Herring et al., 2010). Early detection and support of issues related to weight, nutrition, and physical activity are key to improving the health of both women and children (Funnell, Naicker, Chang, Hill, & Kayyali, 2018).

Previous findings regarding provider counseling. Prior research with obstetric providers has largely demonstrated that they are aware that obesity is a significant health concern for their patients (Herring et al., 2010). However, despite ACOG recommendations that all prenatal patients receive counseling about weight management, research conducted with postpartum women reveals that the current counseling pregnant women receive from their HCPs

regarding GWG and physical activity is either insufficient or inappropriate (Stengel et al., 2012; Waring et al., 2014). Some reports indicate as few as 10% of women recall receiving guidance about appropriate GWG from their HCPs. In contrast, other reports indicate up to 81% of women receive GWG guidance (Adamo et al., 2013; Deputy, Sharma, Kim, & Olson, 2018; Stengel et al., 2012). These widely varying estimates are alarming given research indicating that women receiving appropriate counseling from HCPs during their pregnancies were more likely to gain within IOM weight guidelines, and to manifest lower overall average GWG (Østbye, Peterson, Krause, Swamy, & Lovelady, 2012; Stotland et al., 2012).

Although the ACOG guidelines might be difficult for many women to achieve, GWG within the recommended ranges is linked to several important health outcomes for both mothers and children (Adamo et al., 2013; Mamun et al., 2011; Siega-Riz et al., 2009). Further, with appropriate guidance, women do seem able to achieve these GWG goals (Brown et al., 2012). However, the reality remains that most women do not meet these recommendations (Deputy et al., 2018). Thus, more research is needed to investigate whether lack of adherence to these guidelines is linked to communication issues, perceptions of their feasibility, and/or beliefs about effective implementation of these guidelines in an obstetric clinic setting.

Patients' perceptions of GWG counseling. Recently, researchers have begun to explore providers' dissemination and application of the 2009 IOM guidelines with their patients. Results suggest many women receive little to no counseling regarding diet and physical activity during pregnancy (McDonald et al., 2013; Oken et al., 2013). Moreover, when women do receive information, they often find it overwhelming, and inapplicable to their personal situation (Ferrari et al., 2013). Prior research has also noted that women prefer individual (vs. group) nutrition and physical activity counseling so that information can be appropriately customized (Lucas et al.,

2014). Women often report that the weight, nutrition, and physical activity guidance they receive from practitioners is not tailored to their specific needs (Ferrari et al., 2013). This is particularly true for women with BMIs in the overweight or obese ranges (Ferrari et al., 2013). Additionally, expectant mothers prefer detailed educational information regarding nutrition and physical activity, including written materials (with online supplements) like a pamphlet, book, or calendar (Lucas et al., 2014). Furthermore, pregnant women report they would be more likely to read such information if they also believed that their provider viewed it as important and applicable (Lucas et al., 2014). Indeed, it appears that women are more likely to adhere to provider counseling regarding methods to manage GWG when the provider directly communicated to the patient why the recommendations are important (Lucas et al., 2014).

The medium of counseling on GWG is also important as women infrequently only retain one type of messaging. Some evidence suggests that as much as 40-80% of information communicated at provider visits is immediately forgotten by patients (Lutsiv et al., 2012). As such, it is often recommended that verbal information be supplemented with written or visual materials for women to take home with them to aid information retention (Lutsiv et al., 2012). Moreover, the use of materials that visually communicate key concepts might be exceptionally useful in low literacy populations (Lutsiv et al., 2012). Additionally, recent research has indicated that many women are transitioning away from the more traditional pregnancy books and relying more heavily on internet-based information (Funnell et al., 2018; Tripp et al., 2014). Indeed, the internet has become increasingly popular source of health information for pregnant women and smartphone applications and mobile media are popular extensions of this trend (O'Donnell, Lewkowitz, Vargas, & Zlatnik, 2016; Sayakhot & Carolan-Olah, 2016). Further examination of phone applications is warranted as questions have arisen about the type,

frequency, and quality of information disseminated (O'Donnell et al., 2016; Sayakhot & Carolan-Olah, 2016).

Expectant mothers have also expressed frustration that dietary recommendations and restrictions are constantly in flux; patients note they feel confused and exhausted attempting to adhere to information they have been given (Ferrari et al., 2013). Many women express low self-efficacy for following the guidelines (Ferrari et al., 2013). Additionally, many women report receiving little to no advice regarding physical activity, or indicate that they had to request this type of information. Even when pregnant women do receive physical activity counseling, they report that the information received was vague or largely limited to walking (Ferrari et al., 2013). Thus, it is unlikely that women, particularly women with overweight and obesity, will be able to benefit from this advice as it is currently administered (Stengel et al., 2012).

Dissemination of GWG guidelines: Counseling from providers. Despite patients' reports suggesting weight-related counseling during pregnancy is lacking, more than 85% of providers indicate discussing GWG with their patients, highlighting a disconnect between patient and provider perceptions (Stotland et al., 2010). Further work is required to address this mismatch in knowledge transfer between providers and patients (Lutsiv et al., 2012). Additionally, for the past 20 years, the IOM has recommended providers' tailor GWG counseling to an individual woman's prepregnancy weight. However, research indicates that less than two thirds of providers make modifications to the existing guidelines based on this factor (Oken et al., 2013). This might, in part, explain why so many expectant mothers report frustration with the lack of individually tailored counseling (Ferrari et al., 2013).

Provider barriers to counseling. Qualitative research has identified several barriers to practitioner counseling regarding GWG. Specifically, many providers report concerns regarding

their lack of training in nutrition, weight gain, and physical activity (Lucas et al., 2014). This concern might be warranted, as research has found that only ~63% of obstetric health providers understand and can identify approximate BMI limits for obesity (Herring et al., 2010). This is alarming, given that HCPs knowledge of BMI categories is a critical first step in appropriate assessment, treatment, and management of GWG and related health concerns. This knowledge deficit has been demonstrated across medical disciplines; for example, as many as 60% of internal medicine residents are unaware of, or inaccurate in their appraisals of, the minimal BMI score considered obese (Herring et al., 2010). Therefore, it appears that efforts are needed to reduce knowledge gaps regarding BMI and weight categories among HCPs. Further, some data suggest that providers may use outward physical appearance and weight status as a proxy for healthy lifestyle and dietary intake (Lutsiv et al., 2012). Other providers indicate that counseling is only necessary for individuals with BMIs in the normal range if the patient explicitly voices weight gain as a concern (Lutsiv et al., 2012; van der Pligt et al., 2011). Thus, it appears that providers may rely on reactive, rather than proactive, approaches to counseling, particularly among women viewed as "low risk" based on prepregnancy BMI (Lutsiv et al., 2012; Stengel et al., 2012; Stotland et al., 2010; Tomiyama et al., 2016).

Given providers' relative lack of training in weight management, many refer their patients to dieticians (Lutsiv et al., 2012). However, nutritional counseling appointments are often unavailable, inconvenient, or expensive (Herring et al., 2010). Other providers note that diet and activity recommendations offered via alternate social influences (friends, family, culture) likely have greater influence on their patients, and might undermine counseling given by the provider. Providers also express concern that weight gain and nutrition counseling might be ineffective, and that some aspects of weight gain might be outside of the control of the expectant

mother (Stotland et al., 2010).Additionally, providers report that weight gain is a sensitive topic, and they express concern that patients would be offended, angered, saddened, or embarrassed if the provider brought up weight during prenatal visits (Stotland et al., 2010).

Conversely, it is important to consider the ways in which providers' attitudes and perceptions about body weight might influence communication patterns with patients as this could significantly impact both the patient-provider relationship and the patient's appraisal of provider guidance (Phelan et al., 2015; Washington Cole et al., 2017). Data suggest the quality of the patient-provider relationship is discrepant across BMI categories (Wong, Gudzune, & Bleich, 2015); expectant mothers with overweight or obesity report fearing judgment or criticism from providers (Lindheim, Glenn, & Whigham, 2018; Phelan et al., 2015). Further, data suggest that providers ask fewer lifestyle questions of patients with overweight or obesity, and utilize fewer rapport-building techniques such as approval statements and self-disclosure (Washington Cole et al., 2017). It is critical for researchers to understand potential weight-biases and stigma held by healthcare providers and create targeted interventions to reduce the impact of these attitudes on clinical care (Phelan et al., 2015).

According to HCPs, another factor influencing communication and counseling about GWG is the extent to which they believed the information would positively impact the patient (Lutsiv et al., 2012). Studies have indicated that only 67% of obstetric providers believe that the advice they communicate significantly impacts their patients' actual GWG (Herring et al., 2010). Additionally, only 40% expressed the belief that their patients with obesity are motivated to change their health behaviors (Herring et al., 2010).

Limited clinic visit time is another barrier for HCPs regarding communication about GWG and nutritional guidelines (Anderson, Camacho, & Balkrishnan, 2007; Bleustein et al.,

2014). Providers are pressured to communicate guidance on a wide array of topics in addition to routine preventive care (Konrad et al., 2010). However, as many as 46% of providers endorse time as a barrier to appropriate and thorough counseling with their patients (Lutsiv et al., 2012). Indeed, reviews of the literature on this topic found that more time spent with patients was related to more attentiveness to psychosocial issues and greater patient satisfaction (Konrad et al., 2010). In addition, patient wait time is negatively correlated with patient satisfaction and rates of return to clinic (Anderson et al., 2007; Dugdale, Epstein, & Pantilat, 1999; Ogden et al., 2004). However, significant practical barriers to increasing direct patient-provider interaction time frequently exist in clinic environments. Nonetheless, many providers indicated that both increased knowledge about nutrition and increased time with patients would improve their ability to communicate effectively about GWG (Herring et al., 2010; Lutsiv et al., 2012).

In sum, extant research highlights several unaddressed concerns in the obstetric patient-provider relationship regarding GWG guidance (Ferrari et al., 2013). In spite of women's reports that advice regarding diet and physical activity is often lacking, confusing, or difficult to adhere to, many women report attempting to adhere to providers' recommendations in general (Ferrari et al., 2013). Therefore, improving patient-provider communication, and more closely aligning the needs of providers and patients, might yield greater adherence to GWG guidelines, and decrease risks associated with excess GWG.

Rationale for Mixed-Methods Approach

Previous research has relied heavily on focus group or interview methods to assess the ways in which GWG information has been communicated in women's health clinic settings. Typically, these methods examine only one stakeholder perspective (patient or HCP). Consequently, it is difficult to determine what, if any, discrepancies exist between patients and

providers with respect to GWG, nutrition, and maternal health. As such, there is a strong need for a study design that integrates the perspectives of multiple stakeholders to yield a more complete understanding of the identified problem. The use of mixed methodology is warranted, as it will allow for the integration of multiple sources of qualitative and quantitative data. The mixing of both qualitative and quantitative data allows for a more complete type of analysis that neither form of data collection would yield in isolation. Further, results from mixed methods research frequently allow for better-contextualized measures and interventions to address complex health issues (Classen et al., 2007; Creswell, Fetters, & Ivankova, 2004). Identifying and exploring patient-provider communication issues will provide relevant information for targeted interventions in the primary care setting, with the ultimate goal of helping women achieve optimal GWG, and improving maternal and child health.

Purpose of the Current Study

Despite the 2009 revisions to the IOM GWG guidelines, more than 50% of pregnant women gain more weight than is recommended during pregnancy. Overweight, obesity, excess GWG, and subsequent postpartum weight retention all pose serious negative health outcomes for both mother and child. Although both the IOM and ACOG currently endorse the 2009 GWG guidelines, little is known about how patients and HCPs actually perceive and communicate about these recommendations. Prior research suggests provider guidance on weight gain is often lacking, or is perceived as inadequate or confusing by patients. Thus, there is a significant need for HCPs to provide effective weight-related counseling during routine obstetric visits for all mothers, not just those at highest risk for overweight and obesity. Improving women's knowledge of, and understanding about, the importance of guideline-adherent GWG should

improve maternal and fetal health in the short- and long-term, as well as decrease the burden placed on the healthcare system by weight-related health issues.

This study used qualitative and quantitative methods to examine pregnant and postpartum women's understanding of, and agreement with GWG guidelines. Additionally, the current study evaluated possible discrepancies between the needs and expectations of patients, and the perspectives and experiences of their HCPs. This topic merited a mixed-method approach to provide a more comprehensive understanding of the problem than a purely quantitative or qualitative study could yield alone. A sequential transformative two-phase design was used in which qualitative data are collected first followed by quantitative data (Hanson et al., 2005). Given the limited qualitative data collected in these populations, qualitative data was collected first, to better inform items chosen for the quantitative portion of the study.

This study had four primary aims. The first aim was to understand pregnant and postpartum women's experiences with GWG and the ways in which their expectations aligned with the reality of their pregnancy weight trajectories and/or their postpartum weight retention. The second aim was to evaluate associations among psychosocial factors (including self-efficacy, social support, sleep, and maternal psychological functioning), GWG, and postpartum weight retention. In addition, patient-provider communication was assessed. The third aim was to evaluate the perspectives and experiences of multidisciplinary HCPs working with pregnant women regarding GWG recommendations and counseling during clinic visits. The fourth and final aim was to compare feedback from patients and providers regarding GWG guidelines and their dissemination in the OBGYN clinic setting.

Method

Aim I

Participants and recruitment. Researchers in the current study were interested in obtaining varied perspectives regarding gestational weight gain. This included a desire to capture both immediate and retrospective participant experiences. As such, both pregnant and postpartum women were recruited for Aim I to ensure a diverse patient population. Participants in mid-late (24-40 weeks) pregnancy (when weight gain is greatest) were recruited from the Obstetrics and Gynecology (OBGYN) clinics at the Virginia Commonwealth University Health System (VCU-HS). Participants in the late postpartum period (6-12 months weight loss or retention is likely to be most salient) were recruited from the Pediatrics clinic at VCU-HS. Chart review conducted by OBGYN/Pediatrics clinic HCPs and study staff identified eligible participants. A total of 21 participants (11 pregnant, and 10 postpartum) completed the semi-structured interviews.

Demographic information. Participants in Aim I ranged in age from 20-36 years, with an average age of 28.1 years (*SD* = 5.3). The total sample identified as 52.4% White (*n*=11), 33.3% Black (*n*=7), 9.5% multiracial/multiethnic (*n*=2) and 4.8% identified as another race (*n*=1).

Table 1.

Qualitative Interview Participant Demographics

	Pregnant Women *n* = 11		**Postpartum Women *n* = 10**		**All Participants *n* = 21**	
Race	*n*	%	*N*	%	*n*	%
White/Caucasian	5	45.5	6	60	11	52.4
Black/AA	4	36.4	3	30	7	33.3
Biracial/multiracial	2	18.2			2	9.5
Other			1	10	1	4.8
Prepregnancy BMI						
25-30	4	36.4	8	80	12	57.1
30-35	5	45.5	2	20	7	33.3
40-45	1	9.1			1	4.8
50+	1	9.1			1	4.8

Household Income						
Less than 15,000	4	36.4			4	19
15,000 – 24,999	1	9.1			1	4.8
25,000 – 34,999	1	9.1			1	4.8
35,000 – 44,999	1	9.1	2	20	3	14.3
45,000 – 54,999	1	9.1	2	20	3	14.3
55,000 – 64,999	1	9.1	1	10	2	9.5
65,000 – 74,999			1	10	1	4.8
More than 75,000	1	9.1	4	40	5	23.8
Declined to provide	1	9.1			1	4.8
Education						
Less than H.S. diploma	1	9.1			1	4.8
H.S. diploma/GED	3	27.3			3	14.3
Some college	2	18.2	1	10	3	14.3
Associates degree	1	9.1			1	4.8
Bachelor's degree	3	27.3	2	20	5	23.8
Some graduate school	1	9.1	2	20	3	14.3
Master's degree			3	30	3	14.3
PhD/MD/JD			2	20	2	9.5
Relationship Status						
Single (never married)	1	9.5	1	10	2	9.5
In a relationship	6	54.4	1	10	7	33.3
Married	4	36.4	8	80	12	57.1

The majority was in partnered relationships (33.3% in a relationship, 57.1% married). Average participant pre-pregnancy BMI was 30.3 (*SD* = 6.5) and current BMI averaged 33.2 (*SD* = 8.4). Of note, four participants in the qualitative portion of the study had also participated in the VCUHS centering pregnancy program located in the clinic from which the PI recruited. See Table 1 for the complete demographic characteristics of participants in Aim I.

Inclusion criteria. Participants were either pregnant (24-40 weeks gestation) or recently postpartum (6-12 months), over 18 years of age, and sought primary care services at either the VCU-HS Obstetrics and Gynecology or Pediatrics clinics. Eligible women received prenatal care at VCU-HS and reported having been overweight or obese prior to conception (as determined by self-reported height and weight BMI $\geq$ 25 (CDC, 2015). Prior research has demonstrated the overall accuracy of self-reported height and weight of women of reproductive age (Brunner Huber, 2007). Self-reported weight was unable to be compared to weight noted in medical charts due to inconsistency of weight charting across medical records.

Exclusion criteria. Women who self-reported a height and weight prior to conception below the BMI threshold for overweight (e.g. normal weight or underweight) were excluded from the current study. Additionally, women who presented with non-singleton pregnancies (most recent for postpartum), clinical history of significant psychiatric disorders (e.g. thought disorder, schizophrenia) as noted by provider, physical disability significantly impacting or curtailing exercise during pregnancy, medical conditions that would significantly impact body weight or diet during pregnancy (e.g., untreated thyroid disease), and problematic pregnancy (e.g., preeclampsia, placenta previa, premature labor) were excluded. Women who primarily spoke Spanish were excluded from the current study. This information was from either the medical chart (patient preferred language), or from provider report as several HCPs provide services in both English and Spanish). All women were asked about medical complications during pregnancy verbally by the primary investigator; only women who denied significant complications were enrolled in the study. Individuals who reported pregnancy complications immediately before birth (preeclampsia, preterm labor) were included in the sample if the condition did not significantly impact the woman's pregnancy weight trajectory (according to the provider). Additionally, if a woman indicated a condition early in pregnancy (e.g. placenta previa) that resolved prior to delivery, she was included in the sample. Women who were pregnant due to in-vitro fertilization or other fertility treatments were excluded as their experiences might differ from women those who conceived in the traditional manner.

Procedures. Approval by the Virginia Commonwealth University Internal Review Board was obtained for this study. Eligible women were identified by HCP or PI through medical chart review. Once identified, eligible women were approached by the PI in clinic, informed about the study, and asked about their interest in participation. The project aimed to recruit a diverse

sample of women across age, race, gestational age, and parity. Participants completed informed consent procedures prior to participation. All signed consent forms were kept in a sealed manila envelope and transported back to the researcher's lab and stored in a locked filing cabinet separate from other data. After providing informed consent, interested participants completed a brief screener assessing demographic and pregnancy information (e.g., age, gestational status, previous pregnancies). Women were asked to report whether their doctor had diagnosed them with a variety of conditions during pregnancy and (if applicable) when during pregnancy they received this diagnosis. The initial survey also assessed for substance use (alcohol, tobacco, illegal narcotics) in the three months prior to pregnancy for expectant mothers and in the past three months for postpartum women. Women who reported past or current substance use were not excluded from the study unless this behavior was a significant concern (as communicated by the doctor) during the course of their most recent pregnancy as noted in the medical record or through in-person communication between provider and PI.

Interviews took place in a private space within the clinic to ensure confidentiality and anonymity. Interviews typically lasted between 20-40 minutes and occurred after the woman met with her provider. The primary investigator (PI), or trained doctoral student conducted interviews.

Interviews utilized a semi-structured interview format. Questions were developed based on prior literature. The interview protocol can be found in Appendix B. As interview data informed postpartum survey development, interviewers were given freedom to explore other topic areas related to weight and healthy lifestyle during pregnancy and postpartum, as it was important not to allow a priori assumptions to direct the conversation. Interviews were conducted until saturation was reached. Interviews were audio recorded. Data from recordings were safely stored

and password protected on laboratory computers. Interview data were deleted from recording devices following transcription. Participants were given $20 for their time and participation.

Interviewer characteristics and potential biases. The PI conducted 20 interviews and a trained doctoral student conducted one interview due to PI unavailability. Both interviewers were White women between the ages of 28 and 32 with previous training and experience conducting qualitative research and clinical interviews. Efforts were made to reduce potential bias on the part of interviewers. Indeed, both interviewers were counseling psychology graduate students who had received extensive training in multicultural sensitivity and interviewing techniques. However, it is important to consider that participants might have been uncomfortable due to interviewer characteristics (race, age, maternal status) and this could have presented a barrier within the interview space. Special care was taken to ensure that participants were aware of interviewer's independence from the clinic in which recruitment occurred to minimize participants' concern that the interviewer would report back to healthcare providers.

Measures. Participants completed a brief demographic questionnaire assessing age, race, pre-pregnancy height and weight, weight gain during pregnancy, current weight, number of previous pregnancies/children, gestational age, health diagnoses during the prenatal period, and current substance use. The study attempted to reduce researcher bias through the use of a semi-standardized interview procedure (Appendix C). The interview protocol was moderately structured, which attempted to control for potential bias while still allowing the interview to occur comfortably and organically. Interview materials assessed perceptions of GWG, barriers to successful weight management, knowledge and education regarding "appropriate" GWG, and guidance from prenatal HCPs about this issue (See Appendix C). To enhance validity of responses, interviewers asked clarification questions, requested elaborations, and summarized

and restated participant feedback, as appropriate. Once all topic areas were exhausted, interviewers asked participants if there was additional information they wished to share on the topics of GWG, healthy lifestyle management, and/or postpartum weight retention.

Qualitative data analyses. Interview recordings were transcribed by trained research assistants and authenticated by the PI. Prior to transcription, the PI met with research staff to train them in data transcription and orient transcribers to the procedure and process. Transcription occurred in Microsoft Word and was aided by the Express Scribe Transcription Software, as needed. Transcribers were instructed to include relevant nonverbal information (e.g. laughter, hesitation, pauses, tone of voice, or emphasis) in brackets. Once transcription was complete, another trained research assistant verified the transcript. The PI reviewed all transcripts again. When finalized, transcriptions were imported into ATLAS.ti, a qualitative data analysis software program that facilitates importation, coding, and analysis of large amounts of textual data.

The PI was aware of potential for research bias to enter data interpretation and implemented several strategies to reduce this bias during analysis. The PI made a concerted effort to address variation in the data rather than overemphasizing common (or expected) themes that emerged from the data. Lastly, member checks from trained research assistants in transcription and analysis procedures were implemented in an attempt to ensure that participants' data were recorded accurately.

Thematic analysis was conducted to identify themes within the data. Thematic analysis is a flexible data analytic approach that can be used in a variety of research frameworks (Fereday & Muir-Cochrane, 2008). Thematic analysis was used to identify opinions and expectations about GWG, and the feasibility and acceptability of the developed measures for the postpartum survey

for Aim II. An inductive approach to coding and analysis was used to ensure results were data driven (Fereday & Muir-Cochrane, 2008). Consistent with the literature on thematic analysis (Braun & Clarke, 2006), the PI carefully reviewed each interview transcript, and identified notable themes that emerged. Once the PI had reviewed all transcripts, a preliminary list of themes and subthemes was created, and a codebook was established. Then, the PI recruited a secondary coder (also a doctoral psychology student), to review each transcript and identify appropriate changes to the codebook. Thematic discrepancies between coders were noted and resolved. Given the limited number of discrepancies between coders, a tertiary coder was deemed unnecessary. Following discrepancy resolution, the PI and the secondary coder finalized the codebook. The PI coded the first five transcripts making notations of utterances or statements that did not clearly align with themes in the codebook. The PI noted when a particular theme was endorsed by each participant. Then, the secondary coder reviewed the first five transcripts with special attention paid to statements highlighted by the PI. The second coder also reported frequency of participant alignment with a pre-determined theme. The coders then met to refine the codebook further with an emphasis on refining coding definition and creating additional sub-themes as necessary (Braun & Clarke, 2006). The PI then re-coded the initial five transcripts utilizing the revised codebook. After revised coding of the first five transcripts, the PI and secondary researcher coded the remaining 16 transcripts using the revised codebook. Following all coding, the researchers met to discuss themes and coding and make additional revisions as necessary. Ten discrepancies were identified. The coders met and resolved the discrepancies. Analysis of coding frequency data revealed commonly used codes across transcripts as well as infrequently used codes. Infrequent codes were then either subsumed under other codes or deleted.

Aim II

Participants and recruitment. In Aim II, 41 postpartum women (6-12 months postpartum) were recruited from the Pediatrics clinic at VCU-HS during their children's appointments with a primary care physician. Chart review conducted by OBGYN/Pediatrics clinic, HCPs, and study staff identified eligible participants prior to family visits with providers. Table 2 outlines participant recruitment and retention. The most frequent reasons that participants were deemed ineligible upon clinic visits included, prenatal care at an outside hospital, BMI < 25, already recruited, non-singleton pregnancy, non-English speaker, maternal age <18, and child brought to clinic by guardian other than mother. In addition, sometimes participants would drop off of the clinic schedule during the clinic day or would not attend the scheduled appointment.

Table 2.

Postpartum Survey Participant Recruitment and Retention.

Recruitment month	Potentially eligible participants	Ineligible	Already recruited	Declined	Enrolled
October	31	25	0	0	6
November	68	55	0	0	12
December	22	20	1	0	3
January	23	20	0	0	3
February	83	65	10	1	7
March	106	80	3	1	9
April	14	11	1	0	1

The majority of participants (63.4%) identified as White (*n*=26), 31.7% as Black (*n*=13), 2.4% multiracial/multiethnic (*n*=1) and 2.4% identified as another race (*n*=1). Most were in partnered relationships (17.1% in a relationship, 65.9% married). Average participant pre-pregnancy BMI was 31.9 (*SD* = 5.6) and current BMI averaged 33.4 (*SD* = 6.1). See Table 3 for the complete demographic characteristics of Aim II participants.

Table 3.

Postpartum Participant Demographics

	All Participants, *n* = 21	
	Frequency	**Percentage**
Race	*n*	%
White/Caucasian	26	63.4
Black/AA	13	31.7
Biracial/multiracial	1	2.4
Other	1	2.4
Prepregnancy BMI		
25-30	17	41.5
30-35	12	29.3
35-40	6	14.6
40-45	6	14.6
Current BMI		
<25	3	7.3
25-30	9	22
30-35	11	26.8
35-40	10	24.4
40-45	7	17.1
45-50	1	2.4
Number of Pregnancies		
1	13	31.7
2	15	36.6
3	7	17.7
4	2	4.9
5	2	4.9
7	2	4.9
Household Income		
Less than 15,000	7	17.1
15,000 – 24,999	3	7.3
25,000 – 34,999	1	2.4
35,000 – 44,999	1	2.4
45,000 – 54,999	2	4.9
55,000 – 64,999	6	14.6
65,000 – 74,999	5	12.2
More than 75,000	14	34.1
Declined to provide	2	4.9
Education		
Less than H.S. diploma	1	2.4
H.S. diploma/GED	8	19.5
Some college	5	12.2
Associates degree	4	9.8
Bachelor's degree	8	19.5
Some graduate school	3	7.3
Master's degree	11	26.8
PhD/MD/JD	1	2.4
Relationship Status		
Single (never married)	7	17.1
In a relationship	7	17.1
Married	27	65.9

Inclusion criteria. Participants were recently postpartum (6-12 months) women who were over 18 years of age at delivery, and sought primary care services for their youngest child at the VCU-HS Pediatrics clinic. Eligible women received prenatal care at VCU-HS and reported having BMIs in the overweight or obese ranges prior to conception (as determined by self-reported height and weight and PI-calculated BMI $\geq$ 25 (CDC, 2015). Prior research has demonstrated the overall accuracy of self-reported height and weight of women of reproductive age (Brunner Huber, 2007)

Exclusion criteria. Women who self-reported a height and weight prior to conception below the BMI threshold for overweight (e.g. normal weight or underweight) were excluded from the current study. Additionally, women who presented with non-singleton pregnancies (most recent for postpartum), clinical history of significant psychiatric disorders (e.g. thought disorder, schizophrenia) as noted by provider, physical disability significantly impacting or curtailing exercise during pregnancy, medical conditions that would significantly impact body weight or diet during pregnancy (e.g., untreated thyroid disease), and problematic pregnancy (as defined above, see section "Phase I Exclusion Criteria") were excluded.

Procedures. Approval by the Virginia Commonwealth University Internal Review Board was obtained for this study. Either the HCP or the PI identified eligible women through medical chart review. Once identified, eligible women were approached by the PI in clinic, informed about the study, and asked about their interest in participation. The project aimed to recruit a diverse sample of women across age, race, and parity. Participants provided informed consent prior to participation. All signed consent forms were kept in a sealed manila envelope and transported back to the researcher's lab and stored in a locked filing cabinet separate from other data. Interested participants then completed a brief screener assessing demographic and

pregnancy information (e.g., age, gestational status, previous pregnancies). Women were asked to report whether their doctor had diagnosed them with a variety of conditions during pregnancy and, if endorsed, at what point during pregnancy they received this diagnosis. The initial survey also assessed for substance use (alcohol, tobacco, illegal narcotics) in the three months prior to pregnancy for expectant mothers and in the past three months for postpartum women. Women who reported past or current substance use were not excluded from the study unless this behavior was a significant concern (as communicated by the doctor) during the course of their most recent pregnancy as noted in the medical record or through in-person communication between provider and PI. Following the results from the Aim I formative interviews, additional screening questions about current employment and postpartum return to work were added to the screening form in Aim II (See Appendix B). Survey completion occurred in a private patient room within the clinic during their appointment or following their appointment to ensure confidentiality and anonymity. Surveys were typically completed in 15-20 minutes. Participants were given $15 for their time and participation.

Measures. Results from Aim I supported the content of the survey used in Aim II. A preliminary draft of the Aim II survey was constructed prior to the initiation of Aim I. A group of psychologists in the field of obesity, healthy lifestyle management and neonatal research were involved in the item generation and survey construction. The proposed collection of measures for the Aim II survey was then provided to professionals in maternal-fetal medicine and women's health research including OBGYNs, psychologists and nurse practitioners to be finalized. Finally, results from Aim I qualitative interviews were used to revise and verify the constructs that were assessed in the Aim II surveys. Several small changes were added to the survey as a result, most notably questions about the employment status of postpartum mothers.

Participants were asked questions regarding demographics, self-report weight throughout pregnancy, pregnancy intention, weight-related self-efficacy, parental mental health (stress, adjustment, and depression), parental sleep, breastfeeding initiation and duration, experiences with HCPs, and patient-provider interactions. Participants were also asked to rank a number of frequent health concerns during the postpartum period to understand the importance of weight management within this sample, relative to other concerns.

Demographic screener. Participants' age, height, current weight, educational status, marital status, household income, current substance use, number of previous pregnancies and live births, the age of their most recent child (in months), diagnoses during pregnancy, and recent substance use were assessed. Results of the screener determined eligibility for the survey and were used to corroborate eligibility as assessed through medical chart review. Unclear responses related to inclusion/exclusion criteria were discussed with the physician or medical staff.

Weight throughout pregnancy. Participants were asked to report their overall weight gain during pregnancy, their prepregnancy weight, and current postpartum weight.

Healthcare provider counseling. Participants were asked several questions about whether or not they received information and guidance regarding GWG from their HCP at various points throughout their pregnancy.

Circumstances of pregnancy. Pregnancy intention and planning was measured using the London Measure of Unplanned Pregnancy (LMUP), a 6-item scale self-report measure addressing questions of pregnancy timing, use of contraception, and pregnancy preparation (Morof et al., 2012). An example question includes "Before you became pregnant, did you do anything to improve your health in preparation for pregnancy?" Total scores range from 0 to 12, with higher scores indicating a higher level of pregnancy intention and planning. Approximate

scoring guidelines suggest the following interpretation of scores: 0-3 unplanned, 4-9 ambivalent, 10-12 planned or highly planned. Research among U.S. samples of expectant and recently postpartum mothers has demonstrated that the LMUP yields reliable scores (Morof et al., 2012). Cronbach's alpha in the current study was .85.

Concerns in the postpartum period. Psychosocial and practical concerns for mothers during the postpartum period were assessed in Aim II based on qualitative results from Aim I (See Appendix E). Participants were asked to indicate which issues (if any) they had been concerned about since the birth of their child. These included finances, housing, transportation, childcare, doctor visits and the health of their child. Next, mothers were asked to order the issues they selected from most to least concerning.

Postpartum sleep quality. Quality of sleep in the postpartum period was measured using the Postpartum Sleep Quality Scale (PSQS). The PSQS is a 14 item self-report measure assessing sleep disturbances among women in the postpartum period over the past two weeks. Items are scored on a 5-point scale (0 = never, 1 = few, 2 = sometimes, 3 = often, 4 = almost always) with total possible scores ranging from 0 to 56; higher scores indicate poorer sleep quality. The PSQS assesses postpartum sleep disturbances across two domains 1) infant night-care related daytime dysfunction (how caring for an infant at night impacts the mother's sleep and ability to manage daytime activities) and 2) physical-symptom related sleep inefficiency (physiological factors affecting sleep) (Chang & Chen, 2016). The PSQS has demonstrated adequate internal consistency, test-retest reliability and construct validity in postpartum samples (Yang, Yu, & Chen, 2013). Cronbach's alpha for the full measure in the current study was .81. PSQS subscale internal consistency was .80 (infant night-care related daytime dysfunction) and .60 (physical-symptom related sleep efficiency) respectively. One possible explanation for this

low Cronbach's alpha is the fact that the majority of women in the study were late in the postpartum period (>6 months) and may have minimal lingering physical complications that were disrupting sleep patterns.

Breastfeeding practices. Breastfeeding initiation, duration and outlook was measured using the Breastfeeding Duration and Attitude Questionnaire (BDAQ). The BDAQ is a 5 item self-report measure that assesses how long a mother breastfed (and by what means, for example, pumping), her attitude towards breastfeeding, and her rationale for ceasing the practice. This scale has been used in prior studies with postpartum women (Sharp, Campbell, Chiffings, Simmer, & French, 2015). However, this scale is not composed of Likert-type questions and respondents can select multiple options or write in their own responses. As such, measures of reliability such as Cronbach's alpha would be inappropriate to use with this measure. Rather, this measure provides descriptive information about women's breastfeeding decisions.

Self-efficacy scale. Participants' overall self-efficacy was assessed using the Generalized Self-Efficacy Scale (GSES), a 10-item self-report measure that assesses an individual's belief in her ability to react to particular situations and events as well as her ability to cope appropriately with setbacks in life (Ralf Schwarzer, Bäßler, Kwiatek, Schröder, & Zhang, 1997). Responses are given on a 4-point scale (1 = Not at all True, to 4 = Exactly true); total scores range from 10 to 40 with higher scores indicating better self-efficacy. A sample item is, "It is easy for me to stick to my aims and accomplish my goals." Prior work has yielded Cronbach's alphas ranging from .76 to .90 and the GSES has yielded adequate convergent and discriminant validity (Schwarzer & Jerusalem, 1995). Cronbach's alpha in the current study was .84.

Weight control self-efficacy. Self-efficacy concerning weight-related issues was measured using the Weight Control Self-Efficacy Questionnaire (WCSEQ) created by Dennis &

Golberg (1996). The WCSEQ is a 20-item self-report measure with responses rated on a 7-point scale ranging from -3 ("most unlike me") to +3 (most like me). Example items include "I am confident in my ability to reach my goal" and "I'm afraid people will criticize me if I do wrong things." The WCSEQ is designed to differentiate between assureds (individuals with high self-efficacy about weight control) and disbelievers (wavering faith in their ability to control weight). This measure has demonstrated adequate reliability and validity (Dennis & Goldberg, 1996).

Social support. The Multidimensional Scale of Perceived Social Support (MSPSS) assessed perceived social support (Zimet, Dahlem, Zimet, & Farley, 1988). The MSPSS is a 12-item self-report measure of the perceived adequacy of the social support in one's environment. The MSPSS evaluates perceived social support adequacy in three domains: friends, family, and significant others. Respondents indicate agreement to each item on a 7-point scale from 1 (very strongly disagree) to 7 (very strongly agree). Higher scores on the MSPSS indicated higher levels of perceived social support. However, total scale scores ranging from 1 to 2.9 could be considered low support; a score of 3 to 5 could be considered moderate support; a score from 5.1 to 7 could be considered high support. Cronbach's alpha in the current study for the full MSPSS was .97. Subscale Cronbach's alphas were: .96 (significant other), .97 (family), and .95 (friends), respectively.

Maternal adjustment and attitudes. Maternal adjustment and attitudes during pregnancy and after delivery were assessed using the 12-item subscale of the Maternal Adjustment and Maternal Attitudes Scale (MAMA) titled "Attitudes towards pregnancy and the baby" (Kumar, Robson, & Smith, 1984), which measures the experiences of women throughout their pregnancy and after the birth of their child as related to the adjustment to motherhood. Sample items on this subscale include, "Have you been worrying you might not be a good mother?" Total subscale

scores range from 12-48, with higher scores reflecting a lower level of adjustment or higher negative attitudes towards pregnancy and the baby. This subscale has been used in isolation in previous work with obstetric populations (Koubaa, Hällström, & Hirschberg, 2008), and yields reliable and valid scores (Kumar et al., 1984). Cronbach's alpha in the current study was .61. One possible explanation for this low value is that frequently this scale is used in populations that are twelve months postpartum or less. In the current study, participants were between six and twelve months postpartum and may approach these questions differently than mothers early in the postpartum period.

Parental stress. The Parental Stress Scale (PSS) was used to evaluate postpartum parental stress (Berry & Jones, 1995). The PSS is an 18 item self-report measure assessing parental stress levels during childhood and the parent-child relationship. Scores on this measure range from 18 to 90. Higher scores indicate greater parental stress. The PSS has demonstrated high internal consistency ($\alpha = 0.84$) for postpartum mothers. The PSS has also demonstrated adequate test retest reliability (0.81) over a six-week period as well as adequate convergent and divergent validity when compared to similar measures of parental stress (Berry & Jones, 1995). Cronbach's alpha in the current study was .93.

Postnatal depression scale. Postpartum depression and mood symptoms were assessed using the Edinburgh Postnatal Depression Scale (EPDS), a 10 item self-report measure assessing depression risk in postpartum women over a 7-day period (Cox, Holden, & Sagovsky, 1987). This measure has yielded reliable and valid scores in prior studies ($\alpha = .87$) (Cox et al., 1987). The EPDS has also demonstrated appropriate sensitivity to change in depression symptoms over time. Cronbach's alpha in the current study was .78.

Patient-provider relationship satisfaction. Participants' appraisal of their relationship with their prenatal care provider was assessed using the Patient Satisfaction with Provider-Patient Relationship Questionnaire (PSPPRQ), a 25 item self-report measure designed to assess patient satisfaction with patient-centered care in medical and hospital settings (Laird-Fick et al., 2011). The last item on this scale, "Overall, I am satisfied with my nurse/doctor" was unintentionally omitted from the current study. The Cronbach's alpha of the scale after the omission of the final item was .98.

Data analysis. Survey data were double entered into REDcap. Any data discrepancies were identified by the secondary researcher and resolved by the PI. Once data entry was completed, verified, and finalized, data were exported to SPSS 24.0, which was used for all analyses. The level of significance was $\alpha = .05$ for all statistical tests. Given the small sample size of the current study ($n < 50$), scale variables were said to have met the assumption of univariate normality if skewness and kurtosis were < 1.96 (Kim, 2013).

As very little quantitative data have been gathered with pregnant and postpartum women addressing GWG, analyses were mainly descriptive in nature, and examined the prevalence of overweight and obesity, pregnancy intentions, excessive GWG, postpartum weight retention, parental stress, mood, self-efficacy, social support, maternal adjustment, sleep quality, and satisfaction with patient-provider communication. Descriptive statistics also examined the frequency with which women endorsed both expecting, and actually receiving, counseling regarding weight gain from their HCP. Cronbach's alpha was computed to assess internal consistency of all measures. Correlations between measures examined associations among the constructs.

Aim III

Participants and recruitment. HCPs were recruited through flyers, advertisements through contacts in the obstetrics clinics (e.g. flyers placed in women's health program rooms), recruiting at provider meetings (e.g. rounds, case conferences), and word of mouth. The potential participant pool for the current study included all HCPs working with expectant mothers in the VCU-HS OB-GYN and Maternal-Fetal Medicine departments. At the initiation of data collection there were approximately 18 physician faculty, 5 women's health nurse practitioners, 6 certified nurse-midwives, 6 chief residents, 6 assistant residents, 6 junior assistant residents, and 6 interns who qualified for the study. Given the nature of VCU-HS as a training hospital, the total number of physicians and trainees available varied across the data collection period as determined by resident training schedules, promotions, retirements, etc. A total of 30 providers were recruited in Aim III.

Inclusion criteria: HCPs were required to have one-on-one interaction with pregnant women at the time of data collection and included residents, fellows, physicians, faculty, nurses, midwives, and nurse practitioners.

Exclusion criteria: HCPs who did not current have one-on-one interaction with expectant mothers were ineligible. Additionally, medical students who did not currently have independent patient interaction were excluded.

Procedures. The PI explained the purpose, procedure, and voluntary nature of the study to participants. Participants provided written (or verbal) informed consent. Pencil and paper surveys were completed within the clinic to ensure confidentiality and anonymity. All consent forms and completed surveys were kept in a sealed manila envelope, transported back to the researcher's lab and stored in a locked filing cabinet. Providers were asked about their

experience and comfort with communication about GWG with patients (See Appendix D). The survey required approximately 5-10 minutes to complete. Participating providers were entered into a raffle for a $25 gift card to a local restaurant.

Measures. Survey questions assessed HCPs' opinions about their knowledge and competency regarding the dissemination of weight related information to patients. HCPs were asked to provide information about their primary patient population. They also answered questions about their confidence and comfort discussing issues such as weight gain, substance use, nutrition, and physical activity with their patients. In addition, providers were asked about their familiarity and comfort with GWG guidelines, as well as their perceptions of patients' receptivity and adherence to weight gain counseling. Lastly, providers were asked to identify common barriers to weight maintenance for their patient population (see Appendix D).

Data analysis. SPSS 24.0 was used for all data entry and analyses. Data collected on paper was double entered electronically into REDcap, verified by the PI, and directly exported to SPSS. The level of significance was $\alpha = .05$ for all statistical tests. Because of the small sample size ($n < 50$), in the current study, variables were considered to have met the assumption of univariate normality if skewness and kurtosis were < 1.96 (Kim, 2013). Analyses included examination of basic descriptive statistics (e.g. mean and standard deviation) to determine the frequency with which providers endorsed communicating GWG information to their patients as well as their average comfort level with discussing this information.

Aim IV

Data analysis. Qualitative data from Aim I were analyzed (as described above in Aim I Analyses) and these findings were presented in conjunction with the quantitative data derived from HCPs' survey responses from Aim III. The goal of this aim was to understand whether the

overall opinions of expectant and recent mothers (Aim I) regarding provider dissemination of GWG information aligned with the self-reported dissemination techniques of providers (in Aim III). For example, patients' experience with the frequency and content of nutrition and weight-related health information provided by health professionals during routine pregnancy well-visits was contrasted with the frequency with which providers endorsed communicating this information. This aim is derived from past research that indicates discrepancies between provider-endorsed behavior in clinic visits with the experiences of expectant and postpartum mothers. Given study methodology, no dyadic comparisons could be made. As such, this study aim seeks to generate information for future research rather than directly compare dyadic data.

Results

Aim I: Qualitative Results

Demographic screening questionnaires. Women (n = 21) in this portion of the study ranged in age from 20 to 36 (M = 28.1, SD = 5.3). Participants identified as: 52.4% White, 33.3% Black/African-American, 9.5% Biracial/Multiracial and 4.8% identified as another racial category. The average number of pregnancies was two (SD = 1.18). Women reported a range of pregnancies including one (n = 8, 38.1%), two (n =8, 38.1%), three (n =4, 19%) and six (n = 1, 4.8%). Most (n = 16) denied significant medical complications during their most recent pregnancy. Five women reported some medical complications, specifically, anemia (n=2), depression (n=1), high blood pressure (n=2), preeclampsia (n=1) and preterm labor (n=1).

Most (90%) women reported some caffeine use at the time of interview. Frequency of caffeine use varied among participants with 33.3% reporting daily use, 14.3% reporting use 5-6 days per week, 14.3% reporting use 3-4 days per week, 19% reporting use 1-2 days per week and 9.5% indicating use less than 1 day per week. Two participants denied caffeine use. Of those

who endorsed caffeine use, most drank coffee (52.4%) and soda (52.4%), followed by tea (38.1%), and energy drinks (9.5%). Thirteen participants denied alcohol use (of note, 10 out of 11 pregnant women denied alcohol use and the remaining participants endorsed use <1 day per week). Women who endorsed alcohol use indicated the following frequency patterns, 14.3% <1 day per week, 19% 1-2 days per week, and 4.8% 5-6 days weekly. Five participants (23.8%) endorsed tobacco use prior to pregnancy. Of these participants, three indicated discontinuing use when pregnancy was confirmed, one postpartum participant was currently using tobacco and one participant declined to provide frequency of tobacco use. No participants endorsed use of illicit substances (e.g. marijuana, cocaine, methamphetamine, or prescription medication abuse) during pregnancy or postpartum.

The enrollment rate in Aim I was high. Less than five women approached for participation in the qualitative interviews declined. The primary reasons for declining included disinterest in research participation, scheduling conflicts, or the need to participate in perinatal testing immediately following their visit with their provider.

Qualitative interviews. A total of 21 interviews were conducted. Interviews began by gathering general information regarding the participant's pregnancy, and her experiences with prenatal care providers. Interviews then became increasingly more focused on the participant's personal experiences with GWG, provider guidance regarding healthy lifestyle management during pregnancy, and satisfaction with prenatal care. Discussion of themes is qualified by quotations from the participants. To protect confidentiality, a number identified participants.

Prenatal care and patient/provider relationships. Most participants readily discussed positive interactions with their prenatal care providers and OBGYN clinic staff. When discussing overall prenatal care, most participants reported positive experiences at the clinic with comments

such as, “Loved my prenatal care so much it was hard to terminate” (P22) and, “They paid attention to everything” (P10). Similarly, the majority of participants indicated high satisfaction with their prenatal care. All individuals were asked to rate their approximate prenatal care satisfaction on a scale from 1 (not at all satisfied) to 10 (very satisfied). Only 23% (*n*=5) gave a number below nine; 66% (*n*=14) gave a perfect “10” rating. The average prenatal care satisfaction rating was 9.4.

Over half of the interviews (*n* = 11) yielded no major patient complaints about the patient-provider relationship. However, 61.9% (*n* = 13) expressed the desire for at least one change to their prenatal care experience. Some participants (*n* = 3) voiced complaints or frustrations with the prenatal care system as a whole. Examples include, “I would say the only, like, not perfect thing is, when I come for appointments it’s just a long waiting time” (P8). A few participants (*n* = 6) gave other criticisms specifically related to their own personal experience such as, “The biggest complaint I would have, I had fast deliveries and no one took me seriously” (P20). Participants were also asked to reflect more specifically about their individual healthcare providers. The majority of patients reported having a positive relationship with their providers as evidenced by high prenatal care satisfaction ratings. Women frequently used positive adjectives when describing their interactions with HCPs. Providers were described as, “Really chill, very reassuring, very realistic, down to earth” (P20), “Super helpful,” (P16), and, “Very thorough” (P13). Others describe their provider’s approach as “relaxed and comfortable” (P19). Some women indicated that they felt a strong personal connection with their provider, offering comments such as, “I felt like my OB truly cared about me and the health of my baby” (P18) and that the provider, “Listened to what I wanted and my opinions” (P13).

Although complaints were not common, one theme that emerged among women who expressed criticism was the perception that prenatal care process was rushed, or that patients were not given enough time with their provider. One woman recalled:

> All my visits were quick and really just every time I go to my doctor, it's always 10 minutes or less. So we didn't really do anything. They'd come, they check the heartbeat, and that is it. When she asks me questions, if I am having any problems, but I never have any problems, so I guess that is why it's so quick (P6).

Meanwhile, another participant stated provider-specific concerns including, "She seemed like she was in a rush" (P17). Others indicated that they did not feel like all of their questions were sufficiently answered, or they had difficulty obtaining additional details from their provider. One woman recounted her experience stating:

> I would say it could have been a little bit more detailed with what to like, expect. I guess when I came in, I didn't have somebody really sit down with me and say, spell it out in terms of detail. I don't think that's necessarily what is supposed to happen, I don't know. I think it is kind of, I was just there, got checked on, and left. So it's like, I mean obviously if you ask a bunch of questions you are going to get the answers to them, but if you don't ask the specific questions, you don't necessarily really get much detail at all (P16).

Weight history and GWG. Some women voiced a history of weight-related concerns outside of the perinatal period. One pregnant woman stated, "I've always been a little on the overweight side" (P2) and another shared, "Because I've been plus size all my life, I didn't like the fact, the thought of gaining more weight" (P11). Similarly, several women indicated awareness of their pre-pregnancy BMI and discussed how this impacted their views about GWG. For example, one pregnant participant acknowledged, "With both of my pregnancies I know that I have been technically overweight, like before getting pregnant, not significantly, but still overweight, so that has always been in the back of my mind" (P1). More frequently, participants voiced that weight gain was a specific concern for them during their pregnancy. When asked about weight-related concerns during pregnancy, examples of common responses included "Yes,

I worry about me gaining too much" (P11), and "Weight gain, I didn't want to be a high risk pregnancy being that I was overweight" (P9).

Some women had concerns about projected weight gain across pregnancy, as one postpartum woman reflected, "I would say my first three months I was really concerned about gaining too much weight. That was my biggest thought. I was like, 'Oh my god, I'm gonna gain like 15 pounds immediately'" (P17). Some women were concerned about general weight gain associated with their initial prepregnancy weight. One mother commented:

> I got pregnant at 170 but I usually am at like 145 so I had gained a lot of weight before I had gotten pregnant. So I was already unhappy with my weight gain and then I was like, 'oh no'… (P14).

Few women spoke about body image during pregnancy, although one participant commented:

> I mean I already suffered a little bit; ever since adolescence you know [with] body image. So being pregnant, and then weight gain, I mean that exacerbates the body image distortion, and I'll be honest, I was affected by it (P20).

Among multiparous women, there was a significant concern about weight gain during the most recent pregnancy due to past GWG or postpartum weight retention. Two multiparous women noted that concerns about weight shifted between their pregnancies recalling:

> I still have the weight from my previous pregnancy. Because, it's just like, when I first had my child, it's like, okay I already had the baby so what's the issue with losing the weight, and then I got pregnant again. And then it added on to my weight and stuff like that I used to weigh 150 and now I'm like 200 and something. So…(P5).

> The only concern I had was that I didn't want to gain the weight again. Like I gained a boatload of weight with my first one. I think I gained almost 60 pounds the first time around so… and even when I got pregnant the second time I still had some of that weight on just because I just couldn't get it off (P12).

Several multiparous pregnant women projected concerns regarding postnatal weight outcomes based on prior experiences. One example was a participant who stated:

> I know I when I was pregnant before I gained a lot of weight…and it's hard to come off, and I mean, like I said, I have a 4 year old and I still try to get the weight off from her...and I got pregnant again *laughs*...Now I got *this* weight to get off (P7).

This issue seemed particularly salient for women with short spacing between pregnancies. For example, a pregnant participant stated, "I told you, my pregnancies were pretty close together and so I didn't get back down to my pre-pregnancy weight. I like, started with a deficit *laughs*" (P2).

Although inclusion criteria required participants BMI >25, signifying overweight or obesity prior to pregnancy, a number of participants (n = 8) did not express direct concerns about weight gain during pregnancy. For many women, weight gain was an expected part of the process associated with little distress. As one woman stated, "It wasn't a concern for me, honestly speaking" (P3). Others reported having other priorities such as their child's health. One woman recalled, "Baby's my important thing and if I have to gain weight I'm gonna gain weight, and if I don't gain weight, I don't gain weight. Either way, I'm happy" (P5). Some women used previous pregnancy experiences as an indicator of their expected postpartum weight trajectory. One multiparous woman noted, "With the boys I gained 45 to 50, and around the same with her [most recent pregnancy]. So I kind of knew that I was probably gonna gain a decent amount of weight but I didn't really have any issues getting it off the first couple times so I wasn't as concerned the third time" (P18).

Source of healthy lifestyle information. Women noted that they relied on multiple sources of information regarding health management and weight during pregnancy including family and friends, prenatal care providers, pregnancy books, internet/search engines, phone applications, and other sources. Many women mentioned that family members or close friends provided pregnancy-related information. One postpartum participant recalled, "A lot of that

information did come from my sister and my mom. My mom and my sister would also tell me something and I would go and double check with the provider" (P15). Other women noted that they received feedback from a mix of family and friends who had children, or who were currently pregnant. For example, one woman stated she got information from, "A few friends. I actually had a coworker, we were pregnant at the same time; my sister was pregnant at the same time. So, you know, just kind of grab things from them" (P13). Another pregnant woman stated, "A lot of information I've gotten has been from my sister-in-law. Yeah primarily it's been family and friends" (P8) who provided her with healthy lifestyle information.

Other women discussed that they got information from the OBGYN clinic either directly during a visit, or from handouts provided by their prenatal care provider. For example, 59% of women reported they received healthy lifestyle information, "from the doctor" (P5). One woman discussed comparing information from her provider with that received from other sources stating, "It depends on who you're talking to. Like I put a lot of stock in what medical professionals have to say" (P2). Other participants mentioned that the OBGYN clinic provided an expectant mother information booklet. Some women reported using this information, and others stated they received it but could not readily recall elements of the packet. One woman expressed, "They did give us like the manual for the prepartum, like the expecting mother booklet, the one from [hospital name] health...So it had all of that type of stuff in there" (P13). Although several women mentioned the booklet, participants varied in their knowledge and opinions about the materials. For example, one mother said, "I don't remember exactly if it had anything in there that said, you know, go to this page for nutrition. But we had a handbook so I'm not a hundred percent sure if there was exactly something in there" (P12).

Another traditional source of information shared by participants was pregnancy books. For example, one woman stated, “I have The Pregnancy Bible” (P1) and another voiced, “I had a couple of books I relied on. There was the Mayo Clinic book” (P14). When reflecting on information gathering one postpartum woman reported, “I would say most of it came from reading, I bought all the pregnancy books and I read, I felt like, a lot. If anything, I read way too much about pregnancy and not enough about babies *laughs*” (P17).

More commonly however, women discussed digital sources of information such as websites (phone application use is discussed separately below). A few mothers commented on the ubiquitous nature of the internet with comments such as, “I think it’s everybody’s source of information, just Google” (P3) and, “Most of the time probably online because it’s easily able to Google something and you’ll get a vast array of information, whether it’s reliable or not....” (P13). Others stated use of general internet searches while also naming specific websites, for example, “I looked on the internet a lot. I knew that there was a website KellyMom” (P16) and “I got most of it from a site called babysitter” (P11)” and “BabyCenter. That website usually has a lot of answers to my questions” (P9). Another reported, “I’m in a lot of, like mommy groups on Facebook, and I do my own research on you know online and stuff” (P14). A few women acknowledged some problems with relying too heavily on search engines or internet-based information. Some mothers reported deference to providers over internet data. When asked about use of the internet one mother said:

> No, I avoid, you know, internet sources like BabyCenter, or whattoexpect.com. I avoid all of that...I consider it less reliable. You know, you can get an opinion from anybody on any subject, But I need mine to have you know the stamp of MD on it or (laughs) a reliable source (P1).

Similarly, another participant commented:

> I mean, I talk to my doctor of course, and internet but I'm iffy on the internet. Everything I read on the internet I do ask her about it before I do it. I'm really not a computer person so I don't know which ones to trust and which ones not to trust (P7).

Another relayed an anecdote, "I have a girl who's pregnant at work now and she thought something was wrong and like immediately went to *Web M.D.* I learned with me I can't do that, because I will think I'm dying" (P18). Others indicated awareness of the limitations of internet-based research, as one mom explained:

> I feel like when I start to Google things or look things up I see a lot of like blogs or discussion posts. So, it's like, you know, maybe just other moms giving experience or I am part of like a Facebook group too so, it's a lot of just like, you know, personal anecdotes and personal experiences and stuff, and so I use that to kind of gauge things but I try not to use it for like, actual advice (P14).

One source of information that appears to be changing the landscape of healthy lifestyle knowledge dissemination is phone applications or "apps." Several women voiced that they utilized health information from apps during their pregnancy. One pregnant mom commented on the ubiquitous nature of apps stating "I really feel like everybody and their mother uses these stupid apps *laughs* because everybody has access to a phone or a smartphone for that matter, no matter like, what your economic standing is" (P2). The use of apps was common among women interviewed. Among the 21 participants in the current study, seven apps were named (What to Expect, Babysitter, Pregnancy Plus, OVIA, The Bump, Glow Nurture, Pregnancy First). However, some participants endorsed app use but could not recall the exact one used. For example, one participant stated, "I used one of the apps... I *think* it's What to Expect…" (P19). In other instances, women endorsed the use of multiple apps, as one participant said, "Well, I have a lot of apps on my phone. Yeah, I have like four different ones" (P6). Women expressed different levels of confidence in the information presented in these applications. For example, one expectant mother recalled:

> I had a really, like caveman phone for the first time in the pregnancy so there was an app on there that was like, I don't think it was original. I think it was translated into English...So it wasn't like the best like source of information but I did like, you know, the pictures (P14).

A minority of women indicated other information sources beyond those described above. A few noted having personal connections to health professionals that were independent from their prenatal care providers. For example, one woman indicated receipt of information from public assistance sharing, "Some of it I did get from the WIC office when we had to do like, orientation" (P11). Other women indicated having connections through work stating, "I work with nurses. Some nurses that I work with, they practice natural medicine and all that stuff so I try to ask them questions about birth and all that stuff" (P9) and "My best friend is an RN" (P22).

Barriers and facilitators to healthy lifestyle management in pregnancy. Both pregnant and postpartum women noted that they encountered obstacles to engagement in healthy physical activity and nutrition behaviors.

Physical activity barriers. Participants were asked to report on issues they felt made it difficult to engage in appropriate or desired physical activity both during pregnancy and postpartum. Commonly identified barriers can be grouped into issues related to time, fatigue, and physical limitations.

Time. One clearly identified barrier was time. One woman summarized the issue stating, "Mainly, the main problem is that scheduling" (P13). Another shared that although more formal exercise was a goal, this could be a challenge:

> It's been crazy so far and I couldn't have any time to go and do this exercise and I just cancelled my membership. So right now, I'm just trying to find different solutions to do some exercise, especially at home (P19).

Related to scheduling, women who worked outside of the home before and/or after their pregnancy voiced specific work-related time constraints. For example, one postpartum woman shared:

> I think being a working mom, it made it harder for me to work out because when I got back to work I was grabbing and going. And the exercising after work because I get to work at seven to pump before my day starts at eight... Me working out after work, it's just, I'm too tired…(P15).

Fatigue. Another clear barrier for women was fatigue. One postpartum mother recalled, "After pregnancy I was exhausted... like 'ugh'. I was exhausted, like, mentally I'm drained, physically I'm drained. So it's like I don't even feel like working out right now" (P15). Another pregnant women reflected on energy fluctuations across pregnancy stating:

> Early on first trimester you are just absolutely wiped because that's what happens, first trimester. And then, I mean this time I have a toddler, and by the time I am done with him at the end of the day I am just done and then third trimester you have that and you feel like a walking watermelon and you, you're just done (P1).

Similarly, other women voiced a lack of motivation. One pregnant woman reported, "So, I guess I was getting some type of exercise but not the exercise I should be getting...And then, it's just me not having the motivation; I know I should, and there's no excuse for me not to…"(P7).

Physical limitations. Lastly, some women discussed specific physical limitations (often related to pregnancy) to engaging in activity. For some women, pregnancy-complications hindered their ability to modify their activity during pregnancy. For example, one mother shared, "When we first found out I went out and got some brand new running shoes and I was like, 'I am going to at least go like fast paced walking like all the time'... and that lasted maybe a few weeks because I got really bad morning sickness" (P14). Another mother cited pain reflecting:

> My first two pregnancies were definitely breezy, like I didn't feel like I was pregnant. With her, [most recent pregnancy] I felt every bit of it. Like if I sat for too long I would

> hurt, and so... I will say actually getting up to do the walking, it was painful, but once I did it I felt better. So, it's kind of like I have to think ahead. Say, 'Okay you're going to appreciate this; it's gonna be good for you' (P18).

Others reported an inability to engage in their typical form of physical activity. As one woman recalled, "That was the hardest part because I ended up having... I wasn't able to do like the elliptical ... and the Braxton Hicks, that's what made me stop cycling" (P20). Lastly, one mother reported external barriers to physical activity citing the way she was treated by others sharing, "I think honestly other people make it the most difficult because everybody has an opinion of what you should do, and what you should lift, and, 'Don't reach above your head because the umbilical cord will strangle the baby.' Like, just insane ridiculousness" (P2).

Diet and nutrition barriers. Barriers to healthy eating were also discussed during interviews. A few major themes emerged including nutrition knowledge, cost/access to healthy foods, employment, time, and eating behaviors during pregnancy.

Knowledge. Some mothers reflected that a lack of knowledge made healthy dietary choices more difficult. As one stated, "That has been hard for me. I mean, like, servings and stuff, I don't know how to calculate and do all that stuff but, and it all depends on your like eating habits. That's what's been kind of hard for me…"(P7). Another mother linked knowledge and access to healthy foods saying she:

> Would imagine access to nutritional information and availability of foods [are barriers to health eating]. Like I know I live in Northside which pretty much has no grocery stores, there's not really access to healthy organic food...So I can get in my car and drive to a store that I wanna go to, but not everyone has that opportunity (P8).

Access/cost. Other cited access to healthy foods in terms of costs associated with buying particular foods over others, namely produce. For example, one pregnant mom stated:

> Produce and healthy foods are really, insanely expensive…Like we shop the outskirts of the supermarket and we can fill our cart with produce and meat and dairy all of the

> healthy, organic, whatever, stuff for 300 dollars or, we could shop the boxed items in the middle that will last just a month and spend 100 dollars, you know what I mean? (P2)

One woman receiving public assistance echoed this struggle reporting:

> Even with, you know, having the WIC its like you can purchase enough vegetables, and stuff to last you for a couple weeks and it's like man... I wish I had WIC more because it is, it can be really expensive too and goodness forbid prices hike up, 'cause they only cover a certain amount. So I think for lower income women it's just buying the stuff you need to stay healthy. Cause the bad stuff is always cheaper (P11).

Another shared how personal finances impact food choices. "It is also is everybody's individual abilities. Like, if somebody can afford just to go to fast food restaurants and order off of the dollar menu, then I guess that is all that they are going to be able to do" (P16).

Employment. Employment also emerged as a significant limitation for women enacting healthy lifestyle goals. One woman reflected the way in which her employment impacted her healthy lifestyle management options sharing, "I went back to work when he was two months. I didn't start cooking dinner for my family until he was like four months just because I was so tired, I would literally come home and I would have to go to sleep cause I was that tired…"(P15).

Time and convenience. Time and convenience were also voiced as a barriers to healthy dietary choices during pregnancy. One woman reported, "Yeah, it doesn't help when you have five minutes to get out the house…definitely easier to grab a brownie than an apple" (P3). Another indicated competing demands related to work and scheduling, citing the primary barrier of, "convenience, especially if you're a single mom and you are working a full 40 hour week, sometimes more, it's hard to sit there, and come home, and have to cook a dinner, and then pack a lunch for work the next day you know?" (P7)

Eating behaviors in pregnancy. Finally, during the discussion about nutrition in pregnancy, a sub-theme emerged that centered on eating behaviors during pregnancy. Indeed, a

number of women (n = 6) discussed the ways in which they noted distinct eating patterns that emerged during their pregnancy that presented unique challenges with regards to healthy lifestyle management. Some women used colloquial phrases to summarize these altered eating patterns, as one woman reported her major barrier was "just pregnancy cravings" (P4) while another stated, "I totally had the mindset of eating for two" (P12). Several women discussed changes in hunger during pregnancy which led to modified eating patterns as one mother stated, "I think that part of my weight gain was like, just constant snacking made me feel a lot better, like to battle the nausea, like, I needed to be having crackers or sometimes I craved like red peppers, so sometimes it was vegetables *laughs*" (P14). One woman shared how she rejected the idea of having GWG guidelines at all based on the implied changes to eating patterns reporting, "You can't do that, especially when you pregnant; you got to eat. Me, in my pregnancy, I eat whatever I want" (P5).

Facilitators. In contrast, participants were also asked about possible facilitators to healthy lifestyle management during their pregnancy. Women discussed a variety of different life factors that aided in their healthy lifestyle activities, if any. Three healthy lifestyle facilitator themes emerged and were categorized as facilitators for activity, facilitators for nutrition, and social support.

Activity facilitators. With respect to physical activity, some women indicated being active prior to pregnancy was beneficial because it encouraged the continuation of these behaviors throughout pregnancy. For example, one participant recalled, "We're pretty active people anyway, so we just kind of maintained an active lifestyle. You know, I'm mowing the lawn at nine months pregnant *laughs* and gardening and getting outside a lot" (P2). Another mother reported, "I continued all my exercise as long as I could like almost to the point of giving birth...I

went to the gym three times a week and I walked a lot" (P12). One woman expressed surprise at her level of activity stating, "I thought it was gonna be harder. Like people were always like, 'Oh I can't get out of bed; I can't do this or' and I didn't ever feel like challenged, like disabled" (P17). Other women expressed that aspects of their lifestyle were conducive to getting exercise for example, one mother discussed how limited transportation options facilitated physical activity sharing:

> For me it wasn't too hard to, to get exercise, I have to catch the bus and walk to most places. My mom has a car and she'll help drive around and what not, but for the most part, during my first to second trimester of pregnancy, I was still in college and so I had to walk around campus. I walked to campus off the bus so, for me, getting in walking and stuff has kinda helped me keep that, keep getting some exercise in (P11).

Lastly, multiparous women shared opportunities for structured physical activity overlapped with childcare as one woman shared, "I do a walk around the track at the park. I have a little girl so it's easy to just take her out" (P7).

Nutrition facilitators. Participants also mentioned factors that facilitated healthy nutrition efforts during pregnancy. Some women expressed that shifting the focus from eating healthy for oneself to eating healthy for one's child, aided in making healthy nutritional choices. One woman stated, "Basically, I think, you know, just trying to eat more healthier, I mean, I have a human being eating what I'm eating basically" (P13). Several women shared that making changes to their food environment aided in healthy choices, though strategies differed. One mother shared that meal-preparation was the most helpful change stating, "One thing that did make it easier, once I hit that four month mark for me, was making my food. I got to the point of packing my breakfast and lunch because I know I need a snack. Instead of getting brownies or something I'd grab some crackers or some fruit or I'd just keep stuff in my desk (P15)." Another mother stated that making healthy choices convenient helped her, suggesting, "Take care of

yourself by splurging on, saying 'I'm going to Sam's club to buy the damn fruit tray' instead of buying the watermelon and then never cutting the stupid thing. Simple things like that make life a whole lot easier" (P12).

Support. Lastly, several women indicated a belief that interpersonal support was an influential factor in healthy lifestyle attempts. Women shared the importance of support from a variety of sources captured in statements such as, "family helps out a lot, spousal support" (P9) and, "when you have somebody to help you because, without that help, it's hard. I don't see how single parents do it" (P7). One woman shared how her romantic partner helped her maintain her desired activity level stating, "I think that even if you change what you do, everyone's dynamics are different. So at my house, I have a husband who's super supportive and would, if I needed, you know, 'hey, honey, I didn't get a chance to do my walk'... 'No problem. I got the kids. You go ahead and take a walk.' You know, everyone doesn't have that" (P18).

Patient perceptions of GWG guidance and provider counseling. Descriptions of GWG guidance from prenatal care providers among participants varied widely. Some women indicated that their providers spoke with them explicitly about pound ranges with regards to ideal GWG. For example one woman noted her provider, "told me I should, before, I should gain about 20, 25 pounds" (P3) whereas another woman stated her provider, "said try not to exceed that half a pound a week" (P2). Other women indicated that their provider discussed weight gain in pounds but were less clear in their recollection. Two postpartum participants recalled "I think...between 20... and 30 pounds... 35 pounds, was the average... and mine was 40 so…"(P19) and "well she did – probably like 15, 30 pounds... or something like that" (P13).

Other patients indicated receiving little or no concrete information about weight gain from their providers. Many of these women stated that this was not a concern of theirs and they

felt comfortable deferring to their provider regarding their weight gain trajectory. A number of women indicated a high level of trust in their doctor and appeared comfortable with less feedback regarding weight gain during pregnancy. One participant stated "I mean she hadn't had a problem with the weight I gained so far, so I guess it's okay, but no I don't know the proper, you know, weight to gain, I guess, obviously everybody's different, so I don't know" (P7). Another participant expressed that "They just wanted to make sure I was healthy and baby was healthy so they didn't bring up any guidelines or you have to stick between this and make sure you're not doing x, y, and z" (P15). One woman even indicated that she did not believe communicating GWG guidelines (in lbs.) was common practice in prenatal care stating, "I don't think they do that period...unless they feel like it's a concern in the pregnancy" (P10).

Among women who did not recall receiving information, some multiparous women made assumptions that this was due to the fact that they had already had a prior pregnancy. One pregnant participant stated, "I am trying to remember... no, I don't think we have had any conversations during this pregnancy. All it's been is, 'you're on track'" (P1). Some patients indicated that while they did not get information from their providers about weight ranges, they obtained this information from other sources. An expectant other noted, "They didn't mention how much weight I should be gaining here. But when I did look up on babysitter [phone app] and stuff they say about 11 to 20" (P11). Other patients indicated that while they trusted their providers with regards to weight gain they would have like more information about weight gain guidelines, as well as the rationale for these numbers, to better interpret their weight at appointments. One woman indicated that she:

> Would of liked it to have been, kind of explained, or more pointed out probably each time that I went there, I had my weight taken, that it was explained if it was increasing or decreasing or anything like that (P16).

With regards to provider reassurance regarding weight gain, another participant stated that "nobody ever did, so I was kind of like 'am I in a good spot?' or I guess, so nobody said anything good or bad really so, I guess I felt kind of uncertain about that, and I didn't get a whole lot of specifics, so I think one time I did ask and they were like, 'no you're fine'" (P14).

Patient reactions to ACOG guidelines. During the interviews, facilitators explained the ACOG GWG guidelines for all groups based on BMI. Women were asked about their familiarity with these guidelines as well as their reactions and opinions about them.

ACOG guideline knowledge. First, women were asked about their knowledge of GWG guidelines. A number of women expressed they were aware that weight gain guidelines existed or recognized the weight ranges upon hearing them from the interviewer. Some women expressed that the guidelines seemed similar to their prior knowledge as one woman put it, "Yeah, I think I remember something like that" (P18). Others reported that, although, the guidelines sounded familiar, they were unsure which source they had used to access this information. One participant shared this information was reflective of her interaction with her provider, "Yeah, I think that is what she told me" (P5) while another woman stated, "I'm trying to remember if it was the doctors themselves or the midwives themselves that did, or if it was something I had read" (P14). Others felt that the IOM guidelines were a bit discrepant from prior information sources. Two women explained this stating, "I feel like that does look higher than what I saw. I don't know if that was the book, whatever book I was reading" (P17) and, "It sounds about right for the certain people I've seen. You definitely want to be around a healthy weight when you give birth so you make sure baby is healthy" (P3).

ACOG guideline feasibility. Secondly, participants were asked to reflect on the perceived feasibility of, and personal reactions to, these weight gain guidelines. Women's responses were

split with regards to expressed opinions on the proposed guidelines. A few (*n* = 2) communicated general agreement with the guidelines, as reflected in statements such as, “It feels do-able to me” (P9), and, “I think physically they are reasonable, it’s just practicality day-to-day”(P1).

A smaller proportion of women (*n* = 8) shared relatively neutral statements about the guidelines. For example, ambivalence about the need for guidelines was evident in the following comment, “I mean, I couldn’t really say if it was realistic or unrealistic cause, it’s, you can’t really control sometimes...You know, the weight gain and what not. Cause it’s, your body’s changing for the baby” (P11). Other women expressed that guidelines might not be applicable to all pregnancies with statements such as, “It all depends on the body type, you know, the person, um, as for body processes, in addition to their lifestyle” (P13) and, “It’s a good guideline I think, but like I said, when you’re underweight I’m pretty sure it’s really hard... yeah, and if you’re really overweight I’m pretty sure it’s really hard too…”(P12).

A larger group of women (*n* = 11) expressed disagreement with the IOM guidelines for GWG. Some women reflected that the guidelines for women with overweight or obesity women seemed particularly infeasible. One woman shared that the lower end of the range for obese women seemed exceptionally difficult commenting:

> The 11 pounds for obese people I think would be difficult because especially if you’re obese you have probably a higher risk, and I don’t I’m obviously not a doctor, but like high risk for gestational diabetes, so your baby could be close to 11 pounds itself, you know? Especially you’re thinking about like amniotic fluids and all of that (P14).

Another reported that the focus of the guidelines should be on health of the offspring rather than weight gain, expressing distaste for the existence of the IOM guidelines stating:

> I think that’s kind of a ridiculous number, only because you want to make sure that you’re keeping your child healthy. As long as you don’t have high blood pressure or they’re saying you have gestational diabetes then I don’t see an issue with it. I think that honestly those numbers are ridiculous to me. I think that especially since I fall into that

> last one, the obese one, like you can't tell me that, that's ridiculous to tell me that you can only gain between like 11 and 20 pounds, come on now (P15).

Participants communicated a sentiment that guidelines might make women who cannot adhere to the recommendations experience a sense of defeat. One woman shared, "I just knew I wasn't gonna make that and it also made me feel kind of bad about myself because I was like, 'oh, I'm overweight I should've not been, I should've been less when I started pregnancy'"(P17). A few women indicated their disagreement stemmed from criticism of a sole reliance on BMI to determine weight categories. For example one woman indicated that:

> I don't really like the whole BMI thing in general, it's kind of bogus (laughs). I mean, it doesn't account for muscle. Like I think for your pregnancy, I think that they should try to personalize your weight gain goal better. Instead of just going off the BMI (P4).

In addition to concerns about BMI, other women expressed a distaste for a "catch-all" weight range that did not personalize pregnancy weight goals making comments such as, "I don't know that all those factors were necessarily accounted for...I don't know, I think genetics plays a role... (P20)" and, "There is a lot of pressure from either side. Like if you're not in the middle, then like, either way it is still putting you in the category, that it's one size fits all" (P16).

Other women took umbrage with the mere existence of GWG guidelines. Some comments from women included, "I mean you can't tell people how much weight to gain. It's like if they gain it, they gain it. If they don't, they don't. Cause it's like, you can't predict nobody's body" (P10) and "I don't think that that's fair. We all carry our weight differently but I think it just, it puts pressure, I mean it's a highly emotional state you're in when you're pregnant and then, if you're an emotional eater, you are done" (P18). Others felt like the guidelines are only useful for individuals monitoring weight as one woman indicated, "I don't think they are realistic because when you are pregnant you can eat as much as you want. You can gain...I think

those [guidelines] are just for people who actually watch what they eat. What they eat, or have diet stuff, I don't know, I just eat anything" (P6).

Concerns in the Postpartum Period. Women were also asked to reflect on concerns specific to the postpartum period. Three major themes emerged: postpartum weight retention and body image, postpartum maternal isolation, and concerns about being a "perfect mother."

Weight loss and retention. Several women indicated concerns about how GWG would impact postpartum weight loss. Women with children noted how difficult losing weight postpartum had been previously. For example, one multiparous pregnant woman indicated, "I had no idea how difficult it would be to lose the baby weight. Everyone talks about bouncing back after the baby is born, that is bull crap. I mean there is plenty of bouncing, but it is just flab" (P1). A first time expectant mother reflected on her GWG sharing, "I know some of its gonna come out as soon as she comes out but I am a little nervous about, you know, the rest of it, because I've just about always been a bigger girl. And [I'm] the heaviest now I've ever been, so I'm just worried about making sure I do enough to you know, burn whatever I need to burn off" (P11). Others expressed frustration with their postpartum weight trajectory as one woman lamented:

> That's been a challenge for me, I think I've just recently gotten to I've gotten under my prepregnancy weight just like since a month or two ago, which was bothering me cause I'm like 'why am I still this heavy, I'm breastfeeding and I'm not eating as much' but I think that's because I was eating more and eating more desserts than I've ever, than I typically did before pregnancy so it's hard to break those habits *laughs*.. (P17).

Another woman shared a similar reaction stating, "After I had my son, I, literally earlier this week, almost had a meltdown just about the stress that I've gained too much weight, I can't get this off" (P15). Lastly, fewer women expressed concern about postpartum body image and social comparison as one woman commented, "You know there will be loose skin. You know there is

people that have perfect bodies afterwards, and before, but there is other people where you know genetics are just not as nice and, you will have loose skin it doesn't matter if you're crazy sporty active or not; it's just how it is" (P12).

Isolation. Other women spoke about social disconnection and having difficulty adjusting to the lack of ongoing care following their birth. Several women used the term "isolation" to describe the postpartum period. One woman in particular stated, "A word that just popped into my head was like I did feel like a little isolated, by not having a network. I think that like leaving the house with him sometimes seems like way too much of a challenge so I just wasn't gonna do that" (P14). Another mother shared, "I underestimated the isolation" (P15). Two mothers reflected on the way in which pre- and post-natal care structure does not aid feelings of isolation with comments like, "It does it does feel like when you go in for your six week that that's the end of it, and you back to being a regular person now" (P22) and, "I only had one follow up after postpartum. Like, I haven't gone back to like see anyone since then. So it was like, there is no one to ask anymore" (P16).

Perfect mother. Lastly, a number of participants related to the concept of experiencing societal pressure to perform motherhood in a particular way that was best characterized by one participant's comment that, "Society is definitely like, there's so much expectation that you've gotta do this and you're always having the feeling that you've gotta be the perfect mom... you know?" (P12). Many other women related to the notion of trying to be a "perfect mother" reporting a sense of judgment regarding their decisions in motherhood from others and, more specifically, from other mothers. A postpartum mother explained the concept stating, "I feel much more pressure to look like I have it all together now" (P22). One woman endorsed a sense of rivalry or showmanship between mothers stating, "There's always this competition where

when moms even get together they talk about, 'Oh I did this and I was able to do that and I was able to do this'" (P20). One mother reflected that this pressure to conform to the actions of other parents permeates all aspects of childcare sharing:

> Like when you get to daycare even making decisions based off the type of wipes you use for your kid, like there's one kid that comes with these things called boogie wipes, (Laughter), so it's like literally to wipe your kid's nose and I'm like, damn, we gotta get (child's name) boogie wipes cause I'm like, I don't want him to be the only kid without the boogie wipes…(P15).

In other situations, mothers shared that familial expectations about motherhood and childrearing were more difficult to navigate. As one mother recalled, " So like my mom definitely has opinions about everything, and so I feel like I have to prove myself to her. I have to like say why I'm doing things or just like tune her out…"(P14). However, other mothers noted that self-blame or criticism was something with which they struggled. As one participant recalled, "I remember there was another time I was having a really hard time breastfeeding, like the first day we came home, and so I pumped and I gave her a bottle and then I felt like the worst mom in the world. I was like, "Oh my god I've ruined her; she'll never breastfeed'" (P17). Some multiparous mothers endorsed that the "perfect mother" pressure was most intense with the first child and was subsequently less salient for them, as one mom recalled

> You know, I do, I feel like my first one it was like, 'Oh well he can't do this and I need to make sure I do this' and it's like you know what? You aren't perfect, there's no such thing. You will drive yourself nuts... Like comparing yourself to this mom. I am not a Pinterest mom, I don't have the ability to be that mom, I don't. I work forty hours a week…(P18).

This same mother noted a change in her appraisal of her mothering skills over time reflecting:

> So I don't beat myself up about it anymore... occasionally I can volunteer at my kid's school for a field trip or something like that, then awesome, and I will, but if I can't...my kids know I love them, you know? They don't measure the amount of love by the amount of times I come to their school or how many, you know, butterfly shaped snack packs I send there…(P18).

Proposed changes to prenatal care. Despite the majority of participants indicating a positive prenatal care experience, several voiced concerns about the current system or proposed changes to improve it. Some changes were patient-initiated while others were given as a response to an item in the interview guide about improvements or changes. Themes regarding proposed changes included general pregnancy information, weight management, nutrition information, and prolonging provider contact.

Pregnancy information. One theme that emerged was a lack of consistent delivery of detailed information from providers. Several women indicated that, although, resources were available, they frequently felt they could have benefitted from additional information about pregnancy as a whole. One expectant mother shared, "I know for me, as an about to be first time mom, it can be a little nerve-wracking trying to talk to other people because you don't want to seem like an idiot" (P11). One mother gave a suggestion for a screening tool at the start of prenatal care to inform provider guidance proposing, "an initial assessment of the person's knowledge, education, and prior experience" (P1).

Weight management. More specifically, throughout interviews, despite their overall reported comfort discussing weight with providers, many participants indicated that changes could be made to improve communication about GWG between patients and providers. One woman shared that she would have liked more frequent reminders of GWG guidelines suggesting, "I mean, if they can remind the moms and the patients like in every visit, 'This is the range. Just keep it in mind. You know, this is the weight range that you, can be normal for you and', you know, during your pregnancy might be helpful?" (P19). Another shared that a more personalized approach to GWG counseling would have been preferable commenting, "I think for your pregnancy, I think that they should try to personalize your weight gain goal better, instead

of just going off the BMI" (P4). Lastly, one woman indicated she would have liked information from her prenatal care provider about the postpartum period regarding weight loss sharing, "how long it takes you to lose weight. Like, if it's expected at all that you go back to the weight that you were before. I wasn't really told that" (P16).

Nutrition information. Similarly, participants indicated that, although, some pregnancy information given by providers was helpful, there was a dearth of nutritional guidance. One woman in particular indicated that her paperwork lacked this information reflecting, "Here at [hospital] they give you a book that like talks about classes and different things to expect, but there is no nutritional kind of tab in that binder. So that would've been a cool thing to have" (P2). Another woman shared that she experienced an expectation that she had more nutritional knowledge than she did stating, "I just hear some women say, 'I get told to eat good.' I don't have a degree in nutrition; I don't know exactly what that means" (P4). Two mothers gave concrete suggestions for particular types of nutritional information such as, "correct servings, how to calculate servings, calories and portions and stuff like that, healthy ways to lose weight, and just some more information on eating right" (P7) and, "a list of food we supposed to have in the house, if they had like a chart" (P5). Other women, particularly those in healthcare or health-affiliated fields indicated that their providers assumed they had all the relevant knowledge. As one woman recalled, "There was the assumption that I knew what I was doing" (P20).

Postnatal care. Lastly, many women indicated disconnection between the frequency of prenatal visits prior to birth and the relative lack of postpartum care, despite identified need. Several women lamented that prenatal care frequently only include one postnatal visit several weeks after birth. As one woman commented, "It was an adjustment with no follow-up. I only had one follow up after postpartum. Like, I haven't gone back to like see anyone since then. So it

was like, there is no one to ask anymore" (P16). Another women who had been involved in a Centering Pregnancy program reflected the utility of an extension of this program into the postpartum period suggesting, "They should actually have it [centering pregnancy program] maybe 4 months afterwards because that's the time when a lot of new moms have nobody...maybe they should extend care" (P12).

Aim II: Quantitative Results

Postpartum Participant Data. Participants in Aim II completed two surveys, a brief demographic survey and a longer postpartum questionnaire that included items about pregnancy, patient-provider relationships, weight trajectories and postpartum adjustment.

Demographic Screening Questionnaires. Demographic information from participants in Aim II of this study is presented in Table 2. Women ranged in age from 20 to 42 years (M = 32.1, SD = 4.9). Participants identified as 63.4% White, 31.7% African American, 2.4% biracial/multiracial and 2.4% identified as another racial category. Their average number of pregnancies ranged from 1 to 7 (M = 2.3, SD = 1.5). The number of live births ranged from 1 to 5 with an average of 1.74 (SD = .91). Participants were also asked about their pregnancy history and substance use history. Over half (n = 26) indicated medical complications during their most recent pregnancy. The most commonly reported was gestational hypertension (11 participants, 26.8%), followed by four women reporting anemia (9.8%), four women reporting gestational diabetes (9.8%), four reporting preeclampsia late in pregnancy (9.8%), three reporting depression (7.3%), three reporting vitamin deficiency (7.3%) two women indicating abdominal pain (4.9%), two with a placenta previa diagnosis (4.9%, early pregnancy diagnosis and self-resolution) and one woman reporting vaginal bleeding (2.4%).

Most (90.2%) women reported some caffeine use. Frequency of caffeine use varied among participants with 43.9% reporting daily use, 7.3% reporting use 5-6 days per week, 9.8% reporting use 3-4 days per week, 14.6% reporting use 1-2 days per week and 14.6% indicating use less than 1 day per week. Four participants denied current caffeine use. Of those who endorsed caffeine use, most drank coffee (58.5%), followed by tea (48.8%), soda (29.3%) and energy drinks (7.3%). Nineteen participants denied alcohol use. Women who endorsed alcohol use indicated the following frequency patterns: 17.1% <1 day per week, 26.8% 1-2 days per week, 7.3% 3-4 days per week and 2.4% 5-6 days weekly. Among individuals indicating current alcohol use, 29.3% reported one drink per day on the days they consumed alcohol, 14.6% reported 2 drinks, 9.8% reported 3 drinks, and 2.4% reported 5 or more drinks. Six participants (14.6%) endorsed tobacco use prior to pregnancy. Of these participants 3 (7.3%) indicated quitting when pregnancy was confirmed, 4 indicated quitting tobacco products during pregnancy but resuming postpartum, one participant endorsed current tobacco use and 3 declined to provide frequency of tobacco use. Only one participant endorsed use of illicit substances (marijuana, 1-2 days per week). All participants denied other illicit substance use (e.g. cocaine, methamphetamine, or prescription medication abuse).

Postpartum Survey. One participant was excluded from analyses due to ineligibility per self-reported pre-pregnancy BMI, resulting in a final sample of 41 participants. The majority of participants (73.2%; *n*= 30) indicated receiving prenatal care from a medical doctor; 22% (*n*=9) indicated their primary provider was a midwife or nurse midwife, and 4.9% (*n*=2) indicated their primary prenatal health care provider was a nurse practitioner.

The enrollment rate in Aim II was high. Approximately five of the eligible women approached in the pediatrics clinic to participate in the research study declined to complete the

questionnaire. One patient initially agreed to complete the survey but later in the visit declined participation. One patient declined due to timing concerns related to multiple medical appointments on the same day. Two patients were ineligible due to gestational diabetes prior to approval of these mothers as participants by the VCU IRB. Finally, one mother declined participation without providing a reason. In several instances, age-eligible children attended clinic with a caregiver that was not their mother. In these instances the caregiver was given a survey flyer and asked to share the information with the mother should she be interested.

Participant weight status. Participants were asked to reflect on their own perceived weight category as well as the weight category (if any) their provider assigned them. The most frequently endorsed self-identification was as "overweight." However, about one-quarter of participants indicated that their provider did not use any specific words to describe their weight status prior to pregnancy, another quarter of participants believed their provider described their pre-pregnancy weight as "underweight." A little over half of participants assumed that weight-related conversations with their provider would be standard during clinic visits. See Table 4 for complete breakdown of item responses.

Table 4.

Participant Weight Status and Expectations about Weight-Related Communication.

Item	Total Endorsed *n* (%)	White *n*	AA/Black *n*	Other *n*
At the beginning of this pregnancy I believe my weight fell into the category of				
Underweight	1(2.4)	1	0	0
Normal weight	8 (19.5)	3	4	1
Overweight	24 (58.5)	17	6	1
Obese	8 (19.5)	5	3	0
At the beginning of this pregnancy my healthcare provider told me that I was….				
Underweight	2 (4.9)	1	1	0
Normal weight	6 (14.6)	1	4	1
Overweight	10 (24.4)	7	3	0
Obese	4 (9.8)	2	2	0

My healthcare provider did not use any specific words to describe my weight	19 (46.3)	15	3	1
When I found out I was pregnant I assumed that my healthcare provider would talk to me about my weight				
Yes	22 (53.7)	16	6	0
No	9 (22.0)	6	2	1
Unsure	9 (22.0)	3	5	1

Provider experiences and weight gain guidance. Next, participants were asked to reflect on the specific nature of any GWG guidance they received from their primary prenatal healthcare provider. Results are displayed in Table 5. In general, participants indicated that providers discussed weight gain, but the specific recommendations differed greatly among expectant mothers. Similarly, patients noted that most providers discussed nutrition and physical activity at some point across a woman's pregnancy.

Table 5.

Postpartum Participants' Report of Weight Gain Guidance and Provider Interaction.

Item	Percentage Endorsed
During my pregnancy my healthcare provider talked to me about weight gain.	
Yes every visit	34.1
Yes more than once during my care	29.3
Yes once during my care	7.3
Not that I recall	14.6
No, never	14.6
During my pregnancy my healthcare provider spoke to me about a specific weight range (number of pounds) that would be appropriate to gain during my pregnancy	
Yes	68.3
No	19.5
Unsure	12.2
How much weight did your provider tell you to gain during pregnancy?	
No specific amount	31.7
5-10 lbs.	24.4
10-20 lbs.	14.6
15-25 lbs.	9.8
25-35 lbs.	12.2
30-40 lbs.	2.4
More than 40 lbs.	2.4
I don't recall	2.4
If your healthcare provider spoke with you about a weight range, how practical did this range seem for you?	
Practical or very practical	39.1
Neither practical nor impractical	24.4
Impractical or very impractical	4.8

During my pregnancy, my weight gain was…	
Much less than I expected	17.1
A little less than I expected	12.2
About what I expected	26.8
A little more than I expected	19.5
Much more than I expected	19.5
During my pregnancy my healthcare provider talked to me about nutrition	
Yes	87.8
No	9.8
Unsure	2.4
During my pregnancy my healthcare provider talked to me about physical activity	
Yes	82.9
No	17.1
During my pregnancy my healthcare provider talked to me about weight loss after the baby is born	
Yes	43.9
No	51.2
Unsure	4.9
I believe I will be able to lose the weight I gained during pregnancy	
Yes	74.4
No	7.7
Unsure	17.9

Postpartum participants were asked to report their ideal weight gain versus expected/actual weight gain during their most recent pregnancy. When asked about the amount of weight participants thought was ideal to gain, the average response was 19.8 pounds, and the median and modal responses was 20. In comparison, the average response for actual weight gain projection was 25 pounds with a median score of 25 pounds and a modal score of 20 pounds.

When asked how much time participants thought it would take to lose pregnancy weight in the postpartum period, responses ranged between 1 month and 24 months with an average of 8.8 months, a median of 9 months, and a mode of 12 months.

Pregnancy Intendedness. The London Measure of Unplanned Pregnancy (LMUP) was used in the current study to assess pregnancy intendedness. Past research has suggested that scores on this measure can be interpreted by individual item or by aggregate total score (Hall, Barrett, Copas, & Stephenson, 2017). Aggregated scores on this measure fall into three categories of pregnancy intendedness: a score of 0–3 is classed as “unplanned”, 4–9 as “ambivalent”, and ≥ 10 as “planned”. In the current study, the average LMUP score was 10.1

(*SD* = 2.7). Using the aforementioned categories, in the current sample the majority of Aim II participants (69.4%, *n* = 25) can be categorized as having planned pregnancies and 10 participants (27.8%) could be categorized as ambivalent. Of note, five participants did not have total scores calculated due to incomplete responses to LMUP items.

Concerns in the postpartum period. This measure was developed by the PI to capture postpartum women's most pressing concerns across a variety of domains. Among all instruments delivered, this scale appeared to cause the most confusion and misunderstanding among participants as several participants failed to complete the measure in alignment with given instructions regarding ranking. As such, the following results should be interpreted with caution. Table 6 presents the average level of concern for each item. The items with the largest average concern among postpartum mothers were health of the baby (*M* = 3.09), maternal weight (*M* = 3.08), and return to work (*M* = 2.95).

Next, women were asked to rank their top 10 most pressing concerns among the items they previously indicated as a concern. As mentioned above, not all participants appeared to understand the intend nature of the item ranking section of the measure. As such results could only be derived from women whose responses aligned with instructions. Among these participants, health of the baby, breastfeeding/formula feeding, finances/money, and being a "good mother" were most frequently ranked in the top 3 concerns. Conversely, maternal physical health, childcare, and family relationships were most frequently cited as the least concerning.

Table 6.

Significance of Participant Concerns in the Postpartum Period.

Concern	Average Concern Level (*M*)	Frequency of Ranking in Top 3 concerns (*n*)	Frequency of Ranking in Bottom 3 concerns (*n*)
The health of your baby	3.09	13	7
Your weight	3.08	6	9
Return to work	2.95	8	8
Romantic relationships	2.80	5	11
Breastfeeding/Formula feeding	2.79	9	10
Finances/Money	2.73	9	11
How much your baby is sleeping	2.65	4	10
Your sleep	2.63	5	7
Your physical health	2.53	4	12
Your mental health	2.53	6	9
Childcare	2.50	7	12
Being a "good mother"	2.41	9	8
How much your baby is eating	2.21	5	10
Family relationships	2.07	2	12
Housing	1.67	2	7
Items for your baby	1.44	1	8
Doctor visits	1.41	1	10

Postpartum sleep quality. The Postpartum sleep quality scale (PSQS) was used to assess sleep quality among postpartum participants. Higher scores on this measure indicate higher levels of postpartum sleep disturbances. Assumptions of normality for sleep were met, with a skewness of .64 (*SE* = .40) and a kurtosis of .20 (*SE* = .78). The mean score on this measure was 23.2 (*SD* = 8.8), which indicates mild sleep disturbance. The average score on the infant night-care related daytime dysfunction subscale was 11.1 (*SD* = 5.8) while the average score on the physical symptom related sleep inefficacy subscale was 12.1 (*SD* = 4.2).

Breastfeeding attitudes and duration. Fourteen (34.1%) of participants were currently breastfeeding at the time of the study. Among these 14 individuals, their youngest children ranged in age from 3 months to 14 (*M* = 7.4 months, *SD* = 2.4). Following discharge from the hospital, 21 mothers (51.2%) indicated they solely breastfed, 12 (29.3%) reported using a mix of breastfeeding and formula feeding, and seven mothers (17.1%) indicated solely formula feeding.

Of those who indicated that they breastfed their most recent child, 8.6% breastfed for less than one month, 14.6% breastfed for 1-2 months, 14.6% breastfed for 3-6 months and 41.5% breastfed for more than 6 months (which includes the 14 mothers who indicated current breastfeeding). The BDAQ asks respondents to indicate their reason(s) for stopping breastfeeding and allows up to three responses. The most frequent breastfeeding discontinuation reasons in the current sample were inadequate milk supply (34.1%; *n* = 12), return to work (14.6%; *n* = 6), baby refused to breastfeed (7.3%; *n* = 3), breastfeeding too tiring (4.9%; *n* = 2), too time consuming (4.9%; *n* = 2), painful nipples (4.9%; *n* = 2), natural weaning (4.9%; *n* = 2), disliked breastfeeding (2.4%; *n* = 1) and 'other' (7.3%; *n* = 3). Lastly, women were asked about their attitudes towards breastfeeding their most recent child; respondents could choose all applicable options. The most commonly cited attitudes were 'enjoyed, would breastfeed other babies' (36.6%; n=15), 'breastfed as thought better for the baby' (29.3%; *n* =12), 'enjoyed, would have breastfed longer if possible' (19.5%; *n* = 8), 'enjoyed, but would not do again' (7.3%; *n* = 3), 'family pressure to breastfeed' (4.9%; *n* = 2), and 'disliked' (4.9%; *n* = 2).

Generalized self-efficacy. The Generalized Self-Efficacy Scale was used to measure overall personal sense of control among participants. Assumptions of normality were met with a skewness of -.50 (*SE* = .38) and a kurtosis of -.54 (*SE* = .74). Results indicate high levels of overall self-efficacy with a mean score of 33.5 (SD = 4.2).

Weight-control self-efficacy. Self-efficacy concerning weight-related issues was measured using the Weight Control Self-Efficacy Questionnaire (WCSEQ). Given that this scale uses negative scale anchors (which is the opposite direction of all other measures in this questionnaire packet), responses were transposed to reflect positive integer anchors. Following transposition, responses ranged from 0 (most unlike me) to 6 (most like me) such that higher

scores indicated greater weight-control self-efficacy with total scores ranging from 0 to 78. Assumptions of normality were met with a skewness of -.02 (*SE* = .39 and a kurtosis of -.90 (*SE* = .76). Scores on this scale ranged from 17 to 70; *M* = 44.9 (*SD* = 14.9).

Social support. The Multidimensional Scale of Perceived Social Support (MSPSS) was used to measure participants' current social support generally, as well as across three domains: significant other, family, and friends. Firstly, results of overall social support in the current sample demonstrate non-normal distribution with a skewness of -2.02 (*SE* = .38) and a kurtosis of .3.8 (*SE* = .74) making the scale leptokurtic with a negative skew in the current sample.

Indeed, many participants indicated a high degree of perceived social support across support types. The mean for overall social support in the current sample was 5.9 (*SD* = 1.5). The highest average social support response was found on the significant other subscale at 6.2 (*SD* = 1.5), which is consistent with the partnership demographics of the sample. Average friend and family support were also high at 5.9 (*SD* = 1.8) and 5.7 (*SD* = 1.7) respectively.

Maternal adjustment and maternal attitudes. Maternal adjustment and attitudes during pregnancy and after delivery were assessed using the 12-item Attitudes towards pregnancy and the baby subscale of the MAMA (Kumar, Robson, & Smith, 1984), which measures the experiences of women throughout their pregnancy and after the birth of their child as related to the adjustment to motherhood. As noted above, Cronbach's alpha for this subscale in the current sample was lower than expected (alpha = .61) given results of prior studies (Koubaa, Hällström, & Hirschberg, 2008; Rouhe et al., 2015). However, assumptions of normality were met in the current study with a skewness of .63 (*SE* = .39) and a kurtosis of -.02 (*SE* = .76). Scores on this subscale range from 12-48, with higher values reflecting a lower level of adjustment and higher negative attitudes towards pregnancy and the baby. In the current sample, total scores on the

MAMA Attitudes towards pregnancy and the baby subscale ranged from 14 to 30 with an average score of 20.8 (SD=3.56), indicating an adequate positive maternal adjustment in the sample.

Parental stress. Positive and negative themes of parenthood were captured using the Parental Stress Scale. Skewness of the PSS was within normal limits given the sample size (n = 41). This scale demonstrated a skewness of .1.8 (SE = .38) and a kurtosis of 5.5 (SE = .74) indicating a negative skew and a leptokurtic distribution as the majority of scores clustered between 20 and 50. Scores on this measure range from 18 to 90 with higher total scores indicating greater parental stress. Responses on this scale ranged broadly, from low stress (19.0) to high stress (86.0). On average, mothers indicated a total score of 34.99 (SD = 12.8) reflecting relatively low levels of stress for new parents.

Postpartum depression. The Edinburgh Postnatal Depression Scale (EPDS) was used to assess mood concerns in the postpartum period. Assumptions of normality were met in the current study with a skewness of .92 (SE = .38) and a kurtosis of .99 (SE = .74). Possible scores on this measure range from 0 to 30, with scores greater than 10 indicating possible depression. In the current sample, the average total score on the EDPS was 5.6 (SD = 4.4). The majority of participants (n = 32) scored beneath the "possible depression" cut off score. Seven participants scored above the possible depression threshold of 10 with several women indicating a previous (or current) diagnosis of depression on the demographic questionnaire. Of note, no participant scored high (i.e. above 1) on the question addressing suicidality.

Patient-provider satisfaction. Participants indicated overall high satisfaction with providers as indicated by results from the Patient Satisfaction with Patient-Provider Relationship Questionnaire (PSPPRS). The last question from this scale, which states, "Overall, I am satisfied

with my nurse/doctor" was unintentionally omitted from the current study. As such, scores in the current sample range from 24 to 120 (instead of 25 to 125). The average score on this measure in the current sample was 109.3 (SD = 19.1) indicating a high level of patient-provider satisfaction. As such, assumptions of normality were not met in the current sample. In this study the PSPPRS had a skewness of -2.65 (*SE* = .37) and kurtosis of 8.50 (*SE* = .73) demonstrating a leptokurtic distribution with a negative skew. This information is broadly consistent with data obtained in the qualitative portion.

Aim III: Healthcare Provider Data.

Healthcare providers were asked to reflect on their patient populations, factors that influence topics covered in routine OB visits, and their overall comfort and typical practice with regards to GWG counseling.

Topics in routine visits. First, Healthcare providers were asked to rank order 10 concerns that might be covered in a routine OB visit from 1 (most important) to 10 (least important). The most frequently cited top concern for providers was the presence of medical complications, with 96.7% of providers rank ordering this concern as their number one priority. Gestational weight was never ranked as the top concern among providers, although seven (23.3%) ranked weight in the top three most pressing concerns to address during a routine OB visit. Frequently, providers ranked weight between 5 and 10 with regards to importance, generating two modal rankings, a rank of 6 (*n* = 6) and the rank of 7 (*n* = 6). Full rankings are presented in Table 7.

Table 7.

Rank Ordering of Provider Topics of Concern During Prenatal Patient Visits.

Topic	Top Concern *n* (%)	In top 3 concerns *n* (%)	Mode	Median	Mean
Medical Complications	29 (96.7)	29 (96.7)	1	1	1.13
Mood	0	13 (43.3)	2	4	4.37
Weight	0	7 (23.3)	6	6	5.33
Sleep	0	1 (3.3)	10	9	8.5
Smoking	0	12 (40)	2	4	4.27
Alcohol	0	9 (30)	3	5	5.13
Substance Use/Abuse	0	9 (30)	2	4	4.6
Home life	1 (3.3)	5 (16.6)	9	8	7.13
Intimate relationships	0	4 (13.3)	9	8	7.43
Postpartum contraception	0	8 (26.7)	3	7	5.97

Patient population characteristics. Providers were then asked to indicate their primary patient population on a scale ranking from 1 (all privately insured) to 5 (all indigent/Medicaid). Ten providers (33.3%) indicated they saw primarily indigent care/Medicaid patients; nine (30%) indicated seeing an even mix of privately insured and indigent care patients; eight (26.7%) indicated they only saw indigent care/Medicaid patients, two (6.7%) indicated they saw primarily privately insured patients, and one (3.3%) indicated s/he saw entirely privately insured patients.

Providers who care for primarily indigent care/Medicaid patients were asked to reflect on which patient characteristics might influence topics covered during an OB visit. Among these providers 93.3% (*n* =28) indicated medical risk, 83.3% (*n* =25), indicated substance abuse history, 80% (*n*=24) indicated weight, 70% (*n* = 21) indicated parity status, 60% (*n*=18) indicated age, and 26.7% (*n*=8) indicate race. Alternately, providers who primarily treat privately insured patients were also asked to identify which patient characteristics might influence topics covered during routine OB visits. In this group of HCPs, 63.3% (*n*=19) indicated medical risk, 60% (*n*=18) indicated substance abuse history, 60% (*n*=18) indicated weight, 53.3% (*n*=16) indicated parity status, 46.7% (*n*=14) indicated age, and 26.7% (*n*=8) indicate race.

Substance use. HCPs were asked to indicate how often (if at all) substance use is discussed with patients. One-third (33.3%, *n*=10) indicated substance use was discussed at intake only, one-third (33.3%, *n*=10) indicated a discussion at intake and at a predetermined follow up visit, and one-third (33.3%, *n*=10) indicated that substance use was discussed every visit. One provider indicated a nurse or other staff member discussed this topic with their patients. HCPs were then asked to rate how confident they felt in their knowledge of appropriate management of substance abuse in pregnant women using a scale ranging from 1 (not at all confident) to 7 (extremely confident). Providers indicated an average confidence rating of 5.3 (SD = .877). Lastly, HCPs were asked to rate their confidence in their knowledge of appropriate treatment resources for women abusing substances during pregnancy on a scale from 1 (not at all confident) to 7 (extremely confident). Providers indicated an average confidence rating of 5.2 (*SD* = 1.0).

Nutrition and physical activity. Similarly, providers were asked to rate their level of personal confidence regarding their knowledge of nutrition and physical activity recommendations and needs of pregnant women on the same scale ranging from 1 (not at all confident) to 7 (extremely confident). The average provider rating was 5.6 (*SD* = .93). Average confidence in provider knowledge of physical activity needs for pregnant women was slightly higher at 6.2.

Source of information. Providers were asked to indicate their perception of patients' primary source of information with regards to healthy lifestyle choices during pregnancy. The largest proportion of HCPs (43.3%) indicated that provider guidance was a primary source of information for patients; 33.3% indicated family; 10% indicated internet sources; 6.7% indicated

friends, and 3.3% indicated pregnancy/parenting books or magazines. One provider did not provide a response.

Weight and GWG. Providers were also asked about the frequency and content of weight gain counseling, their comfort with this topic, perceived patient receptivity to counseling, and overall satisfaction with weight-related patient communication.

Importance. HCPs were asked to indicate how important they believed it was to discuss weight gain with patients on a scale ranging from 1 (not at all important) to 7 (extremely important). Providers' mean rating was 5.7 (*SD* = .76)

Comfort discussing. When asked to indicate comfort discussing weight gain with patients on a scale from 1 (very uncomfortable) to 5 (very comfortable), on average, HCPs gave a rating of 4.4 (*SD* = .85).

Frequency of weight discussion. Providers were asked to indicate how often they discussed weight and weight gain with their expectant patients. For this item, HCPs were allowed to select more than one response, if applicable. Despite broad agreement among providers that discussion of weight gain was important, and their general reported comfort with weight-related conversations, responses regarding frequency of these conversations were mixed See Table 8.

Table 8.

Provider Report of Frequency of Discussion of GWG.

When is GWG discussed with patients (select all that apply)?	Frequency of provider report
At intake Only	30%
At intake and predetermined follow up visit	26.7%
Every other visit	10%
Every visit	26.7%
At a predetermined follow-up visit	6.7%
Only when maternal pre-pregnancy BMI >30	33.3%
Only when mother requested GWG information	3.3%

Providers were asked about the frequency with which they discussed GWG with patients and providers were able to select more than one response, if applicable. Specifically, 33.3% of providers indicated weight was only discussed when the mother had overweight or obese prior to pregnancy; 30% indicated this topic was covered at intake only; 26.7% indicated weight was discussed at intake and predetermined follow-up visits; 26.7% indicated weight was discussed at every visit; 10% reported having a discussion every other visit, 6.7% indicated discussing weight at predetermined follow up visits, and 3.3% indicated weight was only discussed when the mother requested information about this topic.

Weight ranges discussed. When providers were asked directly whether or not they discuss explicit weight ranges (in pounds) with patients an overwhelming 93.3% (28) indicated that they do; only 6.7% indicated not doing so.

Patient responsivity. HCPs were asked to indicate their perception of patients' responsivity to information they provide on a scale from 1 (very unresponsive) to 5 (very responsive). Despite a general agreement among providers that their guidance is patients' primary source of information, results indicate that providers feel patients are not highly responsive to their weight-related counseling. The average rating from providers was 3.3 (*SD* = .92). Indeed, 46.7% of providers indicated a neutral ranking that implied that they felt patients were neither responsive nor unresponsive to their guidance. Only four providers (13.3%) endorsed a ranking of "5," signifying a high level of perceived patient responsivity to weight-related guidance.

Perceived patient adherence. Similarly, providers in the study were asked to reflect on their impression of patients' adherence to weight-related counseling. Given that weight is a highly stigmatized characteristic that has been associated with suboptimal care across domains,

including healthcare (Phelan et al., 2015), providers were asked to reflect both on their general patient pool, as well as on patients with overweight or obesity. First, providers were asked to indicate how well they felt their general patient population adhered to provider GWG advice. This information is provided in Table 9.

Table 9.

Provider Belief in Patient Adherence to HCP GWG Advice in Patient Population.

For the overall patient population: What percentage of patients do you think will adhere to your GWG advice?	**% of providers that believe this**
Less than 20%	10%
20-40%	40%
40-60%	40%
60—80%	3.3%
80-100%	3.3%

In comparison, when asked to indicate what percentage of patients with overweight or obesity will adhere to guidelines, provider indicated slightly discrepant responses that are presented in Table 10.

Table 10.

Provider Belief in Patient Adherence to HCP GWG Advice in Patients with Overweight or Obesity.

For patients with overweight or obesity: What percentage of patients do you think will adhere to your GWG advice?	**% of providers that believe this**
Less than 20%	23.3%
20-40%	46.7%
40-60%	20%
60—80%	3.3%
80-100%	3.3%

Satisfaction with conversations. Providers were also asked to rate their overall satisfaction with patient-provider conversations about GWG on a scale from 1 (very unsatisfied) to 5 (very satisfied). The average rating was 3.55 (SD = .95). The highest percentage of providers (43.3%) indicated they were neither very satisfied nor very dissatisfied with these conversations. Only 20% indicated they were "very satisfied" with conversations with patients on this topic.

ACOG GWG guidelines. HCPs in the current study were asked to respond to items about their familiarity with, discussion of, and perceived practicality of the ACOG GWG guidelines.

Familiarity. On a scale from 1 (not familiar) to 5 (very familiar), providers indicated a high degree of familiarity with ACOG GWG guidelines, with an average ranking of 4.3 (*SD* = .87) with the majority of providers (86.7%) reporting a "4" or "5".

Perceived patient practicality. Providers appeared to view the guidelines as practical, with 23.3% reporting they were "very practical;" 40% rated this item a "4" suggesting some level of practicality, 23.3% feeling neutral with regards to practicality and only 6.7% indicating some impracticality. In the current sample, no providers rated the guidelines as "very impractical." However, two providers chose the option "I am not familiar enough with the guidelines to answer."

Discussion with patients. Lastly, HCPs were asked to report the proportion of patients with whom they shared the ACOG guidelines; 53.3% indicated this information was shared with all patients, 40% indicated only patients who have overweight or obesity, and 6.7% indicated this topic is discussed only with patients who voice weight as a concern. Finally, providers were asked about ACOG guideline adherence specifically among patients with overweight or obesity prior to pregnancy. See Table 11.

Table 11.

Provider Belief in Adherence to ACOG GWG Among Patients with Overweight or Obesity.

For patients with overweight or obesity: What percentage of patients with overweight do you think will adhere to ACOG GWG guidelines?	**% of providers that believe this**
Less than 20%	13.3%
20-40%	43.3%
40-60%	20-40%
60—80%	30.0%
80-100%	6.6%

Barriers to GWG guideline adherence. HCPs were also asked to reflect on potential barriers to adherence to ACOG guidelines.

Characteristics influencing non-adherence. HCPs were asked to think about patients they felt do not adhere to their guidance and asked to indicate possible reasons for this non-adherence. Providers could choose multiple responses for this item; 90% of providers endorsed psychosocial issues; 76.7% endorsed education; 66.7% endorsed weight; 66.7% endorsed socioeconomic status; 50% endorsed family issues, and 30% endorsed maternal age.

Provider-identified barriers. Finally, HCPs were asked to identify patients' reported barriers to healthy lifestyle management, using a list (See Appendix D). Providers were also given the opportunity to indicate barriers that were not included in the list. Most HCPs (96.7%) indicated finances/money; 86.7% indicated no time/too busy; 66.7% indicated childcare; 46.7% indicated family issues/relationship issues; 46.7% indicated maternal mental health; 46.7% indicated maternal physical health; 36.7% indicated caring for other family members, and 33.3% indicated housing. Only three (10%) providers provided "other" barriers and these included "denial," "employment," and "lack of interest/too tired."

Providers were next asked to indicate which barrier appeared to have the greatest impact on their patients. The biggest patient healthy lifestyle barrier cited most frequently by providers was no time/too busy (30%), followed by finances/money (26.7%), mother's mental health (13.3%), caring for other family members (10%), childcare (3.3%), mother's physical health (3.3%), and family/relationship issues (3.3%). All providers that wrote in "other" barriers (see above) ranked these barriers as the most significant.

Aim IV: Patient-Provider Discrepancies.

One key finding throughout this study was the relative mismatch between providers' reported behavior and patients' reported receipt of information regarding GWG guidelines. Key discrepancies are detailed below.

Discussion of weight. Participants were asked if, and when, their healthcare provider discussed weight gain. Qualitative results indicate a gap in communication with regarding weight gain, while quantitative surveys indicate the majority (70.7%) of patients noted their provider discussed weight at some point during the prenatal care. Despite providers citing weight gain as a relatively important topic for patients, 33.3% of them indicated weight was only discussed when the mother was overweight or obese prior to pregnancy (See Tables 5 and 8 for more detail).

Discussion of GWG ranges. Most (93.3%) providers indicated that they spoke to women about GWG using a specific range in pounds. However, only 68.3% of women recalled their provider speaking to them about a specific weight range (in lbs.); 19.5% stated their provider did not speak about a weight range, and 12.2% were unsure whether this conversation occurred.

Frequency of weight-related conversations. Of those that indicated their provider did speak with them about weight gain, 34.1% indicated a discussion at every visit; 29.3% indicated

weight-related conversations happened more than once during care, and 7.3% indicated weight was discussed once during the course of prenatal care. Providers' reports of weight-related counseling were discrepant from those of participants (see Table 5).

Information about nutrition. Surveyed providers reported high confidence with regards to their knowledge of nutritional needs of pregnant women (see above). Also, a large proportion (87.8%) of postpartum women indicated that at some point during their pregnancy their provider discussed gestational nutrition. However, throughout the qualitative interviews, lack of nutritional information dissemination was identified as a proposed change to prenatal care. As such, it seems as if providers feel confident regarding their nutritional knowledge and this topic is addressed. However, the level of detail and time that can be devoted to it in practice appears suboptimal.

Source of healthy lifestyle information. A significant number of providers (43.3%) indicated a belief that they were their patients' primary source of information about healthy lifestyle management during pregnancy. Fewer believed family (33%) and the internet (10%) were among the top pregnancy-related information resources for their patients. Many mothers (66.6%, $n = 14$) did cite providers as a primary source of information. However, qualitative results indicate that expectant mothers utilize a large number of sources to supplement their knowledge. Overall, when asked about their sources of information with regarding healthy lifestyle management in pregnancy, most women (71.4%) cited use of the internet; 66.6% cited cellular phone applications; 66.6% cited provider advice; 42.8% cited guidance of family and friends, and 23.8% indicated use of pregnancy books.

Discussion

This study evaluated perceptions of GWG guidance through examination of various stakeholder perspectives. It was hypothesized that discrepancies would exist between stakeholder groups regarding needs and expectations during prenatal care visits. Identification of these discrepancies could serve as a target for improved patient-provider communication and information dissemination. Findings from the formative qualitative interviews, provider surveys, and postpartum questionnaires are described in the following paragraphs.

Application of the Health Belief Model

Perceived susceptibility. The first major component of health behavior change via the HBM is the notion that an individual must feel that he or she is susceptible to a given health problem, in this case, excessive GWG. Interestingly, a major finding that emerged was a general sense of deference to providers regarding weight gain during pregnancy. Indeed, although women reported using a variety of information sources other than provider guidance (phone applications, internet searches, friends/family), a significant proportion indicated deference to providers regarding their GWG trajectories. Many women expressed a belief that their provider would indicate if something were wrong and therefore, paid less attention to weight guidelines. Further, a number of women denied receipt of weight gain guidelines (in pound ranges) while many others were reportedly told they were "on track" and not given additional information. This is concerning as women may not internalize their actual risks of excessive GWG with this method of information delivery. For example, only 68.3% of women in this sample indicated that their HCP conveyed optimal weight ranges (in pounds), despite HCPs' reports that GWG is an essential component of routine visits. Other research has also found that only a subset of women receive some information about weight, nutrition, or physical activity during pregnancy;

however, the size of this subset ranges widely, from 41.7% to 76.1% in recent studies (Delgado, Stark, Macri, Power, & Schulkin, 2018; Mercado et al., 2017; Phelan et al., 2011). When women do report receipt of dietary or physical activity guidance, they voice that the information is often overwhelming and not personalized (Ferrari et al., 2013).

Perceived severity. In addition to individuals believing they are susceptible to excessive GWG, they must also believe that the consequences of this condition are significant enough to warrant behavior change. It is critical that women understand the risks associated with excessive GWG. Indeed, evidence suggests (Ledoux, Van Den Berg, Leung, & Berens, 2015) that women are generally unaware of the harmful weight-related maternal and infant outcomes associated with excessive GWG. Prior studies suggest that women understand that obesity and excess GWG are linked to pregnancy complications, but suggest that there is very limited specific knowledge outside of common conditions like gestational hypertension or gestational diabetes mellitus (Shub et al., 2013). Furthermore, research indicates there is a greater likelihood women will adhere to providers' weight-related advice when recommendations are specific and the rationale for them is clear (Lucas et al., 2014). However, when asked about the IOM guidelines based on BMI, most women expressed some level of disagreement with the criteria or with the guidelines in general.

Perceived benefits. The HBM asserts that, not only must women recognize that they are vulnerable to excessive GWG its negative consequences, but also, they must identify significant perceived benefits to behavior change. As mentioned above, it appears that women frequently underestimate the risks associated with excessive GWG. As such, it follows that women might also fail to recognize the benefits of preventing excessive GWG. Additionally, similar to women's lack of knowledge about risks associated with excessive GWG, mothers might not

appreciate the benefits of dietary modification and physical activity, and therefore de-value related recommendations made by providers (Ferrari et al., 2013). Mothers in the current study also frequently cited other barriers to health eating and physical activity, such as lack of time, fatigue, or physical limitations.

Perceived Barriers. The HBM further posits that, in addition to acknowledging the benefits of behavior change to prevent excessive GWG, expectant mothers must also feel that the barriers to this behavior change are minimal. The current data indicate that expectant mothers' opinions about the perceived practicality of GWG recommendations are mixed. Quantitative data showed that only 4.8% of postpartum participants believed the weight ranges given by HCP's were impractical. In contrast, over half (52%) of women in the qualitative interviews reported general disagreement with the ACOG guidelines. Parity and spacing of births also emerged as a salient barrier for women. Many mothers discussed difficulty with GWG as a result of weight retention from a previous pregnancy (or pregnancies), or a history of weight concerns. Additionally, multiparous women noted receipt of information about GWG only during their first pregnancy, and indicated that their providers seemed to assume they already knew GWG recommendations in subsequent pregnancies. One possible explanation for this discrepancy is that perhaps the weight ranges given by HCPs were not equivalent to the ACOG guidelines based on BMI. Participants in the both interviews and surveys were only asked what they recalled their provider communicating. Unfortunately, there is no direct way to understand objectively from these data what information was communicated during prenatal visits.

Cues to action. Lastly, in addition to the above-mentioned criteria, the HBM recognizes the importance of motivation, self-efficacy, and other cues to action in an individual's process of

behavior change. In general, survey results indicate that the overall sample was functioning well. For example, on average, patients indicated relatively low levels of depressive symptoms, and parental stress. Levels of maternal adjustment, social support and self-efficacy were also within the normal range. These data contrast with the qualitative interview data gathered from patients within the same clinic. Perhaps one reason for these differences was because qualitative interviews were conducted in a private room whereas quantitative surveys were completed inside patient examination rooms. The structure of the qualitative interviews allowed for greater rapport building and probing during participant responses. For example, patients were able to discuss their overall satisfaction with their HCPs, while also identifying additional targets for intervention, and using personal anecdotes to support their claims. It is important to note that participants were solely recruited from the faculty pediatric practice and not from the medical resident clinic (that serves a greater percentage of indigent/Medicaid patients) due to recruitment restrictions. As such, it is important to note that the sample of postpartum mothers recruited in aim II might not be readily generalizable to the population of postpartum mothers served by this health facility.

Providers.

Patients were not alone in expressing a desire for changes regarding communication about GWG during prenatal visits. Specifically, although all providers were associated with the same department at the same academic medical center, their approaches to the topic of GWG varied. Providers broadly indicated that they believed appropriate weight gain during pregnancy was an important topic to discuss in clinic visits and one they were comfortable addressing. However, consistent with prior literature (Lutsiv et al., 2012; Stotland et al., 2010), providers

revealed a belief that their patients are not highly responsive to weight-related counseling, and are broadly non-adherent with their recommendations.

Assumptions based on patient characteristics. There is also evidence suggesting that HCPs are less likely to offer nutritional counseling to women they view as "healthy," (based on their BMI) compared with women with higher BMIs (Lutsiv et al., 2012). This is concerning, as outward physical appearance is not necessarily indicative of health habits (Tomiyama et al., 2016). Prior research suggests that HCPs do not often provide GWG counseling if the patient has a healthy weight status, because this was believed to imply that the patient had positive nutritional habits (Lutsiv et al., 2012; van der Pligt et al., 2011). The same study also found providers did not provide counseling if the patient did not explicitly communicate weight or weight gain as a concern (Lutsiv et al., 2012; van der Pligt et al., 2011). As such, many providers appear to use a reactive, rather than proactive, approach to counseling, only addressing the topic of weight gain if the patient brought up the issue during the visit (Lutsiv et al., 2012; Stengel et al., 2012; Stotland et al., 2010). This notion was supported somewhat by provider data in the current study. Providers indicated that weight was one of several patient characteristics that might influence the topics they chose to cover in a typical prenatal care visit. Further, it appears as though there might be interplay between weight and socioeconomic status, as more providers identified weight as a perceived challenge for Medicaid/indigent care populations than for privately insured patients.

Patient/Provider Discrepancies.

Past research has frequently documented the lack of congruence between patients' and providers' experiences across health specialties (Whitaker, Wilcox, Liu, Blair, & Pate, 2016b).

The prenatal care setting poses unique challenges, but both previous and current results suggest a similar incongruence in communication experiences between expectant mothers and their HCPs.

In the current study, several discrepancies were noted among stakeholder groups regarding the frequency and content of GWG counseling in patient-provider interactions. This was most apparent in the perception of the frequency with which weight-related topics were discussed during prenatal care visits. Only a little over half of providers (53.3%) noted that ACOG guidelines were shared with all patients. Indeed, it appears that providers in the current study shared ACOG guidelines with patients selectively, and often based on patient BMI category or when weight was expressed as a concern. Approximately ~70% of Aim II participants noted discussion of weight-related topics at some point in their pregnancy. This is consistent with prior literature indicating a incongruence among stakeholders regarding reported weight counseling in routine visits (Lutsiv et al., 2012).

One must consider not only frequency of GWG communication between patients and providers, but also the participants' perceptions of the feasibility of these guidelines. Women, particularly those who were participated in the interview portion of this study, expressed broadly negative views of the IOM GWG guidelines, stating that they were not feasible or realistic. Some women also took issue with the fact that these guidelines were based solely on BMI, indicating that this did not account for factors such as body frame, muscle mass, or metabolic factors. However, in direct contrast, only a small percentage of women in the postpartum survey group indicated that the provider guidance that they received regarding weight gain seemed impractical. Providers, on the other hand, expressed an optimistic view of the practicality of the ACOG GWG guidelines for their patients. Overall, it is clear that results regarding stakeholders' perspectives might differ by research methodology used, as well by the group studied. Results

from the current study could serve as a potential starting point for future research. Additional data, from women across all BMI categories, should be obtained to develop an appropriate tailored approach to GWG guidance.

Lastly, it is important to consider HCPs' GWG guidance within the context of all information received by expectant mothers. Results of the current study indicate that pregnant women obtain information about healthy lifestyle management from many sources. As such, it is necessary to situate findings about patient-provider communication within the full array of information sources utilized by expectant mothers. Prior work has demonstrated that women who received weight-related guidance from providers are more likely to adhere to HCPs' guidance (Ferrari et al., 2013). However, other results indicate patients perceive provider guidance as "useless" (Stengel et al., 2012; Stotland et al., 2010).

Contributions to the literature.

This study utilized a mixed-methods approach across stakeholder groups to examine the complex topic of excessive GWG, and as such, provides a valuable contribution to this area of study. Results indicate a general sense of deference to providers. Patient reliance on and trust in providers' guidance is often viewed as a positive outcome. However, women in this study reported that their HCPs did not consistently communicate ACOG GWG guidelines. Thus, in this case, overreliance on providers, and underutilization of self-monitoring might prevent early detection and implementation of necessary health changes to curtail excessive GWG (Deputy et al., 2018; Dugdale et al., 1999).

This study also highlights the need to consider the various ways in which new mothers obtain information about healthy lifestyle management. In particular, many women reported obtaining pregnancy information from cellular phone applications, and providers may not

recognize the extent of this shift. In many ways, the rapid proliferation of available information is promising, as more women have access to helpful information. However, the quality of content can potentially vary widely across platforms (Funnell et al., 2018). It is important to consider the distinct types of internet-based information as "internet" is a frequently a catch-all category in prior studies (Mercado et al., 2017; Sayakhot & Carolan-Olah, 2016). Providers and researchers should consider the seemingly ubiquitous nature of phone applications, as well as their potential utility for dissemination of both high and low-quality information.

Implications for Intervention.

The current study has implications for interventions targeting patient-provider communication in the prenatal period as a mean of health promotion for both women and future generations. Results are consistent with prior literature indicating many mothers report receiving little to no guidance about weight gain, or indicate they were not told to curtail GWG until late in pregnancy (e.g. third trimester). This timing is likely too late for many women, as the majority of weight is gained in the third trimester, due to the growth of the fetus (Kraschnewski & Chuang, 2014). A more feasible goal seems to be the prevention of excessive weight gain in the first and second trimesters. This goal could be achieved, in part, by increasing women's awareness (very early in pregnancy) of recommended weight gain over the course of gestation.

It is particularly important to acknowledge divergent information dissemination for multiparous women compared with primiparous women. The ideal strategy for prevention of excessive GWG would be the incorporation of information about healthy weight management and lifestyle modifications during routine primary care or gynecological visits prior to conception. There is evidence (Kraschnewski & Chuang, 2014) to support the effectiveness of preconception counseling, as the first prenatal care visit is typically halfway through the first

trimester. Communication about appropriate GWG continues to be an important component of prenatal care. Moreover pregnancy presents a "teachable moment" for women at risk of excessive GWG and postpartum weight retention, given high maternal motivation for health behavior change and frequent interaction with providers (Kraschnewski & Chuang, 2014; Washington Cole et al., 2017). However, it is unclear to what extent parity plays a salient role in provider counseling. This is troubling given that data suggest childbearing and parity are closely associated with weight gain across the lifespan (Hill, McPhie, & Skouteris, 2016). The impact of GWG on maternal and child health is particularly troubling for multiparous women as GWG has long-term implications for family structure. Women who gain in excess of IOM guidelines during pregnancy are more likely to repeat these patterns in subsequent pregnancies (Montpetit et al., 2012; Webb, Siega-Riz, & Dole, 2009).

In the current study, 70% of providers indicated that parity is a consideration in their decision making about counseling during prenatal care visits. Research has indicated a link between multiparty and obesity in women of reproductive age (Lan-Pidhainy et al., 2013). In addition, research suggests that primiparous women frequently gain more weight during pregnancy than multiparous women, which has significant consequences for weight retention postpartum (Lan-Pidhainy et al., 2013). Accordingly, some research has posited that multiparous women receive lower GWG range recommendations to curtail postpartum weight retention (Lan-Pidhainy et al., 2013). It is important to consider data suggesting primiparous women report higher rates of weight-related guidance from HCPs than multiparous women (Whitaker et al., 2016c). Although the first pregnancy is an easily identifiable target for intervention, knowledge can always be improved, even among multiparous women who received comprehensive weight-related information in prior pregnancies. However, given the number of women reporting an

absence of weight-related guidance from HCPs, it seems misguided to assume all multiparous women obtained exhaustive GWG guidance during their first pregnancy. Further, it is critical to consider the role of parity in GWG (Haugen et al., 2014). In addition, information about prenatal care or weight management might have changed since a woman's prior pregnancy and she might therefore benefit from up-to-date information (Mercado et al., 2017).

Constraints on patient-provider communication. Although variation in provider communication is likely to occur across clinic settings and training modalities, results of prior research (Herring et al., 2010; Lucas et al., 2014; Stotland et al., 2010), indicate a few common barriers that hinder optimal patient-provider communication. These include time constraints, the wide range of potential topics to discuss, lack of specialized training, and assumptions about which patients need guidance.

Time constraints. Intervention opportunities within routine prenatal care visits are significantly impacted by time-constraints placed on providers. HCPs are frequently asked to provide several services to each patient, and they must do so within the significantly limited face-to-face time allotted at each visit (Konrad et al., 2010). Also, prior work has demonstrated that across service providers, wait time at clinical visits is significantly linked to patients' satisfaction and willingness to return (Anderson et al., 2007; Bleustein et al., 2014). Indeed, qualitative results from the current study highlight women's displeasure with the frequently hurried process of prenatal care visits; this displeasure is compounded by women's reports of long clinic wait times. Evidence suggests that more time allotted for direct patient-provider interactions is associated with better health outcomes (e.g. decreased provider stress, improved patient satisfaction, patient retention) (Konrad et al., 2010). Future work should examine the

possibility of ameliorating any significant logistical barriers that exist regarding modifying appointment length and wait times in clinical settings (Ogden et al., 2004).

Multitude of visit topics. In addition to potential time limitations as result of clinic patient flow, providers are often required to address many topics during each prenatal visit. Previous studies have indicated that, when a patient presents with serious health issues such as smoking, substance abuse or domestic violence, weight-related counseling might simply not be seen as a high priority (Duthie, Drew, & Flynn, 2013). Similarly, patients in the current study noted that issues such as previous pregnancy complications, test results, or pressing concerns about nausea dominated their time-limited interactions with providers.

Specialized provider training. Providers might receive insufficient training on nutritional topics and limited guidance on navigating sensitive issues related to weight (Deputy et al., 2018). Moreover, prior work demonstrates that as few as 14% of providers refer patients to nutritional counseling (Herring et al., 2010). This is puzzling, as results from the current study indicated that patients felt they received very little information about nutrition, and were eager for this to be remedied. Past findings convey that even when nutrition information is communicated, women often feel overwhelmed, confused, and do not view this guidance as personalized to them (Ferrari et al., 2013). Similarly, when providers offer routine communication about GWG guidelines, they frequently believe that their counseling is ineffective or unheeded (Lutsiv et al., 2012). Therefore, providers are reticent to broach this sensitive topic during very time-limited prenatal visits (Stotland et al., 2010). This is concerning given that a recent systematic review (Muktabhant et al., 2015) suggested that physical activity and dietary counseling were effective strategies for curtailing excessive GWG.

Assumptions and biases. It is also important to consider the obesogenic environment in which we live and the very real issue of fat-stigma in our society. Providers need to be trained to recognize their own personal biases regarding weight and nutrition in order to counsel all patients effectively (not just patients with a BMI >25) about the risks of excessive GWG, as negative consequences are seen across weight categories (Washington Cole et al., 2017; Wong et al., 2015). Further, despite the frequent assumption that providers are more likely to discuss nutrition, weight, and physical activity with patients who have overweight or obesity, this is not consistently true in the literature. Prior studies have not found differences in patient-provider discussion of diet, weight gain, and physical activity by prepregnancy BMI, and have frequently cited providers' discomfort with or concern about damaging rapport as reasons for HCPs' avoidance of these conversations (Phelan et al., 2011; Stotland et al., 2012). Training addressing appropriate weight-related counseling presents an ideal opportunity for providers to recognize their role in the perpetuation of weight-stigma (Wong et al., 2015). Indeed, providers should be intimately aware of the strong stigmatization of obesity, and the tendency of this patient characteristic to engender negative feelings about a given individual, such as disgust, blame, or anger (Phelan et al., 2015). Moreover, receipt of weight-stigmatizing care by an HCP can have serious negative consequences, such as low self-esteem and depression, as well as reduced patient satisfaction, delayed screenings, and postponement of care (Phelan et al., 2015).

Communication of risk and public health campaigns. Results of the current study highlighted participants' desire for more personalized information and guidance, particularly regarding healthy food choices and safe physical activity. One way that the lay community can more readily identify areas of salient risk and appropriate corrective behavior is through public health campaigns. The use of targeted public health campaigns correcting misconceptions about

health lifestyle management in pregnancy has been proposed as a strategy to enhance public recognition of this health issue (Deputy et al., 2018; Harrison et al., 2017). Moreover, there is a historical precedent for using public health campaigns to change public opinion and parental behavior. For example, public health campaigns have effected significant change in parental behaviors surrounding precautions for sudden infant death syndrome (Deputy et al., 2018). Thus, it seems plausible that these campaigns, particularly in the age of social media, could be both powerful and wide reaching.

"Eating for two." The vast majority of women recognize that their dietary consumption impacts fetal growth (Poston, 2017). However, in practice, many pregnant women engage in suboptimal eating patterns (Keely et al., 2017). One common misconception widely identified in the literature is the colloquial concept of "eating for two." This pervasive social norm purports that pregnant women can eat and gain weight freely during pregnancy (Kraschnewski & Chuang, 2014). There is a seemingly large divide between scientific knowledge and societal conventions about what weight gain in pregnancy should look like (Funnell et al., 2018). In the qualitative portion of the current study, women identified "pregnancy cravings (P4)," "eating for two (P12)," "eating whatever I want (P5)," and having a "free pass" [regarding eating] as factors associated with GWG. Further, although some mothers might view "eating for two" as eating whatever one wants during pregnancy, for many, these eating behaviors are often exacerbated by genuine maternal concern about "not eating enough" to properly feed their child (Whitaker et al., 2016a). Indeed, it appears that the risks associated with inadequate nutritional intake are more salient to the public than the risks (both short- and long-term) associated with excessive GWG (Whitaker et al., 2016a). However, women tend to overcompensate, frequently consuming more daily calories than necessary (Kraschnewski & Chuang, 2014). As such, a focus on dietary

quality during pregnancy, rather than quantity, or "eating for two" appears to be an ideal target for a public health campaign.

Physical activity during pregnancy. Another aspect of healthy GWG that might be strategically targeted via public health campaigns is physical activity during pregnancy. The IOM and ACOG also provide recommendations for women regarding safe and approved activities for women during pregnancy (Poston, 2017; Whitaker et al., 2016c). Despite the numerous sources of information, including health care providers, family, friends, printed materials, internet sources, and mass media, patients continue to find activity recommendations confusing or inapplicable to their specific situation (Evenson & Bradley, 2010). Thus, many women report low activity engagement during pregnancy, despite evidence of the benefits for both mother and fetus (Kraschnewski & Chuang, 2014). One potential explanation is maternal concern about harming the baby or disrupting the pregnancy. Many of these behaviors are based on misguided concerns or inaccurate information about potential harm to the child that could be easily rectified through proper education (Duncombe et al., 2009). Indeed prior work suggests that providers might reinforce patient concern about activity during pregnancy through the provision of activity guidance that is relatively conservative in terms of both dose and intensity (Evenson & Bradley, 2010). For example, often activity descriptions are vague or limited to being told to increase walking (Ferrari et al., 2013).

Future Directions. Despite a large body of literature exploring the numerous benefits of improved GWG guidance during pregnancy, researchers have not yet identified the best approach for clinical dissemination of this information to patients (Bick, 2015). Given the numerous time constraints for both providers and their patients, it is increasingly important to examine effective and efficient ways to disseminate IOM GWG guideline-consistent information

to expectant mothers in clinical settings. Supplementing the information provided in primary care settings might serve as one avenue for intervention. Indeed, perhaps more widespread use of a dietician in interdisciplinary care visits could increase the likelihood that weight-related topics would be effectively and appropriately discussed. Further, incorporation of additional dietary counseling could scaffold existing information from providers, as well as alleviate burden on midwives, obstetricians, and other primary providers. In addition, incorporation of interdisciplinary team members might allow for more personalized application of healthy lifestyle intervention information. This is an avenue that would potentially address mothers' concern about the lack of individualized practical application of GWG recommendations. Another avenue that some clinics have utilized is the inclusion of Centering Pregnancy programs (Kominiarek, Gay, & Peacock, 2015). These meetings typically occur in the same (or affiliated) clinic as routine visits, contributing to both their credibility and feasibility.

In addition to changes to prenatal care visits, it is important to consider supplementing information presented at clinic visits with visual and graphical materials. Participants in the current study voiced a desire for more concrete and tangible representations of GWG recommendations. For example, the idea of breaking up larger weight gain targets (e.g. 15-25 pounds) into targeted weight gain per week or visual representation of the projected weight gain trajectory across the pregnancy in a timeline fashion. Patients noted that sole reliance on a total weight gain goal was less concrete and therefore it was challenging to predict how current behaviors might impact overall weight gain at end of pregnancy. Another avenue to consider is supplementing provider-communication with technological programs. Given the ubiquitous nature of smart phones and associated applications, social media and apps are promising avenues for large-scale information distribution. Provision of approved applications or websites by

prenatal care providers or OBGYN clinics might also serve to allay concerns about information reliability of internet sources (Lucas et al., 2014).

Conclusion

The purpose of this study was to examine stakeholders' perspectives regarding guidance on excessive GWG from pregnant women, postpartum women, and prenatal HCPs. Findings indicate a discrepancy between HCPs' perceptions of GWG information dissemination, and patients' reported experiences. Several factors appear to contribute to this issue, and it is likely that improved understanding across stakeholder groups is key to successful outcomes.

Lessons learned.

Upon the initiation of this study, no validated measure existed of postpartum women's ranked concerns. Thus, as part of this study, an effort was made to create this type of measure. However, this measure was evidently not easily understood by participants, as indicated by confusion about the ranking process. The creation of a more optimal measure of concerns among women in the postpartum period is warranted.

The current study also demonstrated that patients were amenable to completing research in clinic waiting room and during "down-time" at provider visits. However, the quantitative portion of the current study was deemed too lengthy by several participants. As such, a smaller number of items and measures should be used in future research.

Strengths.

This study extended prior work in a number of innovative ways. A strength of the current study is the mixed-method approach to the understanding of stakeholders' perspectives on the IOM GWG guidelines. Most previous studies have relied solely on qualitative approaches, and often focused on only one stakeholder group (i.e., mothers or HCPs, Gould Rothberg et al.,

2011; Stengel et al., 2012). In the current study, both qualitative data (from pregnant and postpartum women and HCP's) and quantitative data were collected to provide a more nuanced picture of obstetric trends. Although survey data from Aim II focused exclusively on postpartum women, both pregnant and postpartum women were surveyed in Aim I because postpartum women's recollections might be affected by recall bias. Discussing GWG with pregnant women optimized the relevance of the subsequent survey targeting postpartum women. However, interviewing only pregnant women would have failed to capture women's full experience of pregnancy. Thus, a combination of current and retrospective sampling was utilized to yield a more cohesive picture. Additionally, because pregnant women interact with a variety of HCPs during their pregnancy, Aim III included HCPs from various specific health professions to enhance the generalizability of results.

Limitations.

It is also important to note several limits of the current study. Although the mixed-method approach serves as a unique element of the current study, little quantitative data were collected in this patient sample. As such, results should be interpreted with acknowledged hindrances on generalizability. Study limitations precluded use of interviewers from diverse backgrounds with regards to race, age, and gestational history. The relative lack of diversity in interviewer demographic characteristics is an important limitation of the methodology of the current study. Further, the representativeness of participants should be considered. For all aims of the study, only stakeholders who were willing and able to participate were included. The opinions, perspectives, and experiences of women and HCPs who chose to complete the current study might not be representative of these stakeholder groups as a whole, although efforts were made to diversify the samples as much as possible. Despite the fact that the participants in the

current sample are not readily comparable to the general obstetrics population, results from the current study indicate that issues surrounding excessive GWG are not exclusive to low-SES or marginalized communities. Rather, it appears that women from all socioeconomic, racial, and educational backgrounds experience issues related to healthy lifestyle management in the pre and postnatal periods.

Another limitation of the current study involves the use of self-reported weight throughout pregnancy. This study used electronic medical records (when available) to identify prepregnancy weight, and weights recorded during prenatal visits to identify potentially eligible participants. However, if updated weight information was not properly and routinely recorded in the medical record, it was necessary to rely on self-report information. Nonetheless, prior research has demonstrated the overall accuracy of self-reported height and weight of women of reproductive age (Brunner Huber, 2007).

Further, it appears that the inter-item reliability of the MAMA and the PSQS were sub-optimal in the current study. These measures have been validated in postpartum samples in previous work, and demonstrated adequate reliability and validity. It is important to consider how the patient population, number of participants, or other factors might account for the low inter-item reliability in the current sample. Specifically, current postpartum participants were recruited when their children were between the ages of 6 and 12 months. It is likely that postpartum sleep quality may differ across the postpartum period, as infant sleep patterns evolve, as major disturbances appear most evident in the 6 weeks following birth (Yang, et al., 2013). Further, prior work with the MAMA has focused on maternal adjustment during the first 12 weeks postpartum (Koubaa et al., 2008). A barrier encountered by researchers in the current study was the dearth of validated measures designed to capture maternal functioning up to 12

months postpartum. Operationalization of the postpartum period varies across studies, and this might account for some of the discrepant results obtained in the current study.

This study was conducted at an academic medical center in the southeastern United States. It is possible that the experiences of the women in this study are not comparable to those who attend other types of clinics for obstetric and pediatric care both in this region and across regions of the country. Similarly, due to scheduling, high patient traffic, and the large numbers of providers and trainees in this clinic, research staff was unable to recruit from the OBGYN medical resident clinic that primarily serves indigent care populations. This accounts for the higher percentage of White women, individuals from high-income brackets, and advanced degrees seen among the postpartum survey participants. Low-income women appear to be at increased risk for obesity compared with women from higher socio-economic backgrounds (Anderson et al., 2015; Phelan, 2010). Indeed, African American women have the highest risk for postpartum weight retention across the lifespan (Anderson et al., 2015). Thus, there is a clear need for interventions appropriately tailored to the needs of these groups to address this growing health concern. However, a large majority of previous intervention work targets primarily White women, or fails to account for differences across groups by racial category (Liu et al., 2014). This absence of intervention work targeting African American women is of particular concern given the high-risk for negative weight-related health outcomes associated with GWG in this subpopulation (Liu et al., 2014). Future studies should include larger and more diverse samples so that researchers can investigate potential racial and ethnic differences in GWG management and create more culturally tailored interventions.

Likewise, future studies could seek to obtain more detailed information about HCPs' approaches to clinic visits. Given HCPs' many responsibilities and variable schedules, their

participation in the current study was limited to a brief survey. However, this hindered the degree to which this topic could be explored. For example, in the current study, providers were not asked if they communicated the risks (maternal/infant) of excess GWG with the patients. Recent work with obstetric providers demonstrates that the overwhelming majority are aware of the adverse maternal and infant health outcomes associated with excess maternal weight and GWG. However, as few as 13% communicate these risks to their patients (Lutsiv et al., 2012). Furthermore, among those providers who do communicate adverse maternal and infant health risks associated with GWG, many do not feel comfortable with their ability to deliver counseling on the topic (Lutsiv et al., 2012). In addition, the current study did not ask providers explicitly to discuss their own personal and professional barriers to initiating conversations about weight and healthy lifestyle management.

References

Abraham, C., & Sheeran, P. (1996). The Health Belief Model. In M. Conner & P. Norman (Eds.), *Predicting Health Behavior* (2nd ed., pp. 29–80). Berkshire: McGraw-Hill.

Adamo, K. B., Ferraro, Z. M., Goldfield, G., Keely, E., Stacey, D., Hadjiyannakis, S., … Barrowman, N. J. (2013). The maternal obesity management (MOM) trial protocol: A lifestyle intervention during pregnancy to minimize downstream obesity. *Contemporary Clinical Trials*, *35*(1), 87–96. http://doi.org/10.1016/j.cct.2013.02.010

Anderson, C. K., Walch, T. J., Lindberg, S. M., Smith, A. M., Lindheim, S. R., & Whigham, L. D. (2015). Excess Gestational Weight Gain in Low-Income Overweight and Obese Women: A Qualitative Study. *Journal of Nutrition Education and Behavior*, *47*(5), 404–411.e1. http://doi.org/10.1016/j.jneb.2015.05.011

Anderson, R., Camacho, F., & Balkrishnan, R. (2007). Willing to wait? The influence of patient wait time on satisfaction with primary care. *BMC Health Services Research*, *7*(1), 31. http://doi.org/10.1186/1472-6963-7-31

Baker, J. L., Gamborg, M., Heitmann, B. L., Lissner, L., Sorensen, T. I., & Rasmussen, K. M. (2008). Breastfeeding reduces postpartum weight retention. *American Journal of Clinical Nutrition*, *88*(6), 1543–1551. http://doi.org/10.3945/ajcn.2008.26379

Baranowski, T., Cullen, K. W., Nicklas, T., Thompson, D., & Baranowski, J. (2003). Are Current Health Behavioral Change Models Helpful in Guiding Prevention of Weight Gain Efforts? *Obesity Research*, *11*(S10), 23S–43S. http://doi.org/10.1038/oby.2003.222

Berry, J. O., & Jones, W. H. (1995). The Parental Stress Scale: Initial Psychometric Evidence. *Journal of Social and Personal Relationships*, *12*(3), 463–472. http://doi.org/10.1177/0265407595123009

Bick, D. (2015). The challenge of obesity during pregnancy: When to intervene and what could work? *Midwifery*, *31*(7), 655–656. http://doi.org/10.1016/j.midw.2015.06.001

Bleustein, C., Rothschild, D. B., Valen, A., Valatis, E., Schweitzer, L., & Jones, R. (2014). Wait times, patient satisfaction scores, and the perception of care. *The American Journal of Managed Care*, *20*(5), 393–400. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/25181568

Branum, A., Kirmeyer, S., & Gregory, E. (2016). Prepregnancy body mass index by maternal characteristics and state: Data from the birth certificate, 2014. *National Vital Statistics Reports*, *65*(6).

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. http://doi.org/10.1191/1478088706qp063oa

Brown, M. J., Sinclair, M., Liddle, D., Hill, A. J., Madden, E., & Stockdale, J. (2012). A systematic review investigating healthy lifestyle interventions incorporating goal setting strategies for preventing excess gestational weight gain. *PloS One*, *7*(7), e39503. http://doi.org/10.1371/journal.pone.0039503

Brunner Huber, L. R. (2007). Validity of Self-reported Height and Weight in Women of Reproductive Age. *Maternal and Child Health Journal*, *11*(2), 137–144. http://doi.org/10.1007/s10995-006-0157-0

Buschur, E., & Kim, C. (2012). Guidelines and interventions for obesity during pregnancy. *International Journal of Gynaecology and Obstetrics: The Official Organ of the International Federation of Gynaecology and Obstetrics*, *119*(1), 6–10. http://doi.org/10.1016/j.ijgo.2012.04.025

Center for Disease Control and Prevention. (2015). Retrieved from http://www.cdc.gov/healthyweight/assessing/index.html

Chang, S.-M., & Chen, C.-H. (2016). Effects of an intervention with drinking chamomile tea on sleep quality and depression in sleep disturbed postnatal women: a randomized controlled trial. *Journal of Advanced Nursing*, *72*(2), 306–315. http://doi.org/10.1111/jan.12836

Classen, S., Lopez, E. D. S., Winter, S., Awadzi, K. D., Ferree, N., & Garvan, C. W. (2007). Population-based health promotion perspective for older driver safety: Conceptual framework to intervention plan. *Clinical Interventions in Aging, 2(4), 677-693*.

Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *The British Journal of Psychiatry*, *150*(6), 782–786. http://doi.org/10.1192/bjp.150.6.782

Creswell J.W., Fetters M.D., & Ivankova N.V. (2004). Designing a mixed methods study in primary care. Annals of Family Medicine, 2:7–12. doi: 10.1370/afm.104

Daddario, D. K. (2007). A review of the use of the health belief model for weight management. *Medsurg Nursing : Official Journal of the Academy of Medical-Surgical Nurses*, *16*(6), 363–6. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/18390255

Delgado, A., Stark, L., Macri, C., Power, M., & Schulkin, J. (2018). Provider and Patient Knowledge and Views of Office Practices on Weight Gain and Exercise during Pregnancy. *American Journal of Perinatology*, *35*(02), 201–208. http://doi.org/10.1055/s-0037-1606582

Dennis, K. E., & Goldberg, A. P. (1996). Weight control self-efficacy types and transitions affect weight-loss outcomes in obese women. *Addictive Behaviors*, *21*(1), 103–116. http://doi.org/10.1016/0306-4603(95)00042-9

Deputy, N. P., Sharma, A. J., Kim, S. Y., & Olson, C. K. (2018). Achieving Appropriate Gestational Weight Gain: The Role of Healthcare Provider Advice. *Journal of Women's Health*, *27*(5), 552–560. http://doi.org/10.1089/jwh.2017.6514

Dodd, J. M., & Briley, A. L. (2017). Managing obesity in pregnancy - An obstetric and midwifery perspective. *Midwifery*, *49*, 7–12. http://doi.org/10.1016/j.midw.2017.03.001

Dugdale, D. C., Epstein, R., & Pantilat, S. Z. (1999). Time and the patient-physician relationship. *Journal of General Internal Medicine*, *14*(S1), S34–S40. http://doi.org/10.1046/j.1525-1497.1999.00263.x

Duncombe, D., Wertheim, E. H., Skouteris, H., Paxton, S. J., & Kelly, L. (2009). Factors related to exercise over the course of pregnancy including women's beliefs about the safety of exercise during pregnancy. *Midwifery*, *25*(4), 430–8. http://doi.org/10.1016/j.midw.2007.03.002

Duthie, E. A., Drew, E. M., & Flynn, K. E. (2013). Patient-provider communication about gestational weight gain among nulliparous women: a qualitative study of the views of obstetricians and first-time pregnant women. *BMC Pregnancy and Childbirth*, *13*(1), 231. http://doi.org/10.1186/1471-2393-13-231

Evenson, K. R., & Bradley, C. B. (2010). Beliefs about exercise and physical activity among pregnant women. *Patient Education and Counseling*, *79*(1), 124–9. http://doi.org/10.1016/j.pec.2009.07.028

Fereday, J., & Muir-Cochrane, E. (2008, November 26). Demonstrating Rigor Using Thematic Analysis: A Hybrid Approach of Inductive and Deductive Coding and Theme Development. *International Journal of Qualitative Methods*. Retrieved from http://ejournals.library.ualberta.ca/index.php/IJQM/article/view/4411

Ferrari, R. M., Siega-Riz, A. M., Evenson, K. R., Moos, M.-K., & Carrier, K. S. (2013). A qualitative study of women's perceptions of provider advice about diet and physical activity during pregnancy. *Patient Education and Counseling*, *91*(3), 372–7. http://doi.org/10.1016/j.pec.2013.01.011

Finer, L. B., & Zolna, M. R. (2014). Shifts in Intended and Unintended Pregnancies in the United States, 2001–2008. *American Journal of Public Health*, *104*(S1), S43–S48. http://doi.org/10.2105/AJPH.2013.301416

Fisher, S. C., Kim, S. Y., Sharma, A. J., Rochat, R., & Morrow, B. (2013). Is obesity still increasing among pregnant women? Prepregnancy obesity trends in 20 states, 2003-2009. *Preventive Medicine*, *56*(6), 372–8. http://doi.org/10.1016/j.ypmed.2013.02.015

Frederick, I. O., Williams, M. A., Sales, A. E., Martin, D. P., & Killien, M. (2008). Pre-pregnancy body mass index, gestational weight gain, and other maternal characteristics in relation to infant birth weight. *Maternal and Child Health Journal*, *12*(5), 557–67. http://doi.org/10.1007/s10995-007-0276-2

Funnell, G., Naicker, K., Chang, J., Hill, N., & Kayyali, R. (2018). A cross-sectional survey investigating women's information sources, behaviour, expectations, knowledge and level of satisfaction on advice received about diet and supplements before and during pregnancy. *BMC Pregnancy and Childbirth*, *18*(1), 182. http://doi.org/10.1186/s12884-018-1834-x

Goldring, M. R. & Persky, S. (2018). Preferences for physician weight status among women with overweight. Obesity Science & Practice, 4(3), 250-258.

Gould Rothberg, B. E., Magriples, U., Kershaw, T. S., Rising, S. S., & Ickovics, J. R. (2011). Gestational weight gain and subsequent postpartum weight loss among young, low-income, ethnic minority women. *American Journal of Obstetrics and Gynecology*, *204*(1), 52.e1-11. http://doi.org/10.1016/j.ajog.2010.08.028

Groth, S. W., & Kearney, M. H. (2009). Diverse women's beliefs about weight gain in pregnancy. *Journal of Midwifery & Women's Health*, *54*(6), 452–7. http://doi.org/10.1016/j.jmwh.2009.03.003

Gunderson, E. P. (2009). Childbearing and Obesity in Women: Weight Before, During, and After Pregnancy. *Obstetrics and Gynecology Clinics*, *36*(2), 317–332. http://doi.org/https://doi.org/10.1016/j.ogc.2009.04.001

Gunderson, E. P., Rifas-Shiman, S. L., Oken, E., Rich-Edwards, J. W., Kleinman, K. P., Taveras, E. M., & Gillman, M. W. (2008). Association of Fewer Hours of Sleep at 6 Months Postpartum with Substantial Weight Retention at 1 Year Postpartum. *American Journal of Epidemiology*, *167*(2), 178–187. http://doi.org/10.1093/aje/kwm298

Hall, J. A., Barrett, G., Copas, A., & Stephenson, J. (2017). London Measure of Unplanned Pregnancy: guidance for its use as an outcome measure. *Patient Related Outcome Measures*, *8*, 43–56. http://doi.org/10.2147/PROM.S122420

Hanson, W. E., Creswell, J. W., Clark, V. L. P., Petska, K. S., & Creswell, J. D. (2005). Mixed methods research designs in counseling psychology. *Journal of counseling psychology*, *52*(2), 224. doi 10.1037/0022-0167.52.2.224

Harrison, C. L., Skouteris, H., Boyle, J., & Teede, H. J. (2017). Preventing obesity across the preconception, pregnancy and postpartum cycle: Implementing research into practice. *Midwifery*, *52*, 64–70. http://doi.org/10.1016/j.midw.2017.06.003

Haugen, M., Brantsæter, A. L., Winkvist, A., Lissner, L., Alexander, J., Oftedal, B., … Meltzer, H. M. (2014). Associations of pre-pregnancy body mass index and gestational weight gain with pregnancy outcome and postpartum weight retention: a prospective observational

cohort study. *BMC Pregnancy and Childbirth*, *14*(1), 201. http://doi.org/10.1186/1471-2393-14-201

Herring, S. J., Platek, D. N., Elliott, P., Riley, L. E., Stuebe, A. M., & Oken, E. (2010). Addressing obesity in pregnancy: what do obstetric providers recommend? *Journal of Women's Health (2002)*, *19*(1), 65–70. http://doi.org/10.1089/jwh.2008.1343

Hill, B., McPhie, S., & Skouteris, H. (2016). The Role of Parity in Gestational Weight Gain and Postpartum Weight Retention. *Women's Health Issues*, *26*(1), 123–129. http://doi.org/10.1016/j.whi.2015.09.012

Hill, B., Skouteris, H., McCabe, M., Milgrom, J., Kent, B., Herring, S. J., … Gale, J. (2013). A conceptual model of psychosocial risk and protective factors for excessive gestational weight gain. *Midwifery*, *29*(2), 110–4. http://doi.org/10.1016/j.midw.2011.12.001

Hinkle, S. N., Sharma, A. J., Kim, S. Y., Park, S., Dalenius, K., Brindley, P. L., & Grummer-Strawn, L. M. (2012). Prepregnancy Obesity Trends Among Low-Income Women, United States, 1999–2008. *Maternal and Child Health Journal*, *16*(7), 1339–1348. http://doi.org/10.1007/s10995-011-0898-2

Kaiser, L., & Allen, L. H. (2008). Position of the American Dietetic Association: Nutrition and Lifestyle for a Healthy Pregnancy Outcome. *Journal of the American Dietetic Association*, *108*(3), 553–561. http://doi.org/10.1016/j.jada.2008.01.030

Keely, A., Cunningham-Burley, S., Elliott, L., Sandall, J., & Whittaker, A. (2017). "If she wants to eat…and eat and eat…fine! It's gonna feed the baby": Pregnant women and partners' perceptions and experiences of pregnancy with a BMI >40kg/m2. *Midwifery*, *49*, 87–94. http://doi.org/10.1016/j.midw.2016.09.016

Kominiarek, M. A., Gay, F., & Peacock, N. (2015). Obesity in Pregnancy: A Qualitative Approach to Inform an Intervention for Patients and Providers. *Maternal and Child Health Journal*, *19*(8), 1698–712. http://doi.org/10.1007/s10995-015-1684-3

Kominiarek, M. A., Vonderheid, S., & Endres, L. K. (2010). Maternal obesity: do patients understand the risks? *Journal of Perinatology*, *30*(7), 452–458. http://doi.org/10.1038/jp.2010.52

Konrad, T. R., Link, C. L., Shackelton, R. J., Marceau, L. D., von dem Knesebeck, O., Siegrist, J., … McKinlay, J. B. (2010). It's about time: physicians' perceptions of time constraints in primary care medical practice in three national healthcare systems. *Medical Care*, *48*(2), 95–100. http://doi.org/10.1097/MLR.0b013e3181c12e6a

Koubaa, S., Hällström, T., & Hirschberg, A. L. (2008). Early maternal adjustment in women with eating disorders. *International Journal of Eating Disorders*, *41*(5), 405–410. http://doi.org/10.1002/eat.20521

Kraschnewski, J. L., & Chuang, C. H. (2014). "Eating for two": Excessive gestational weight gain and the need to change social norms. *Women's Health Issues : Official Publication of the Jacobs Institute of Women's Health*, *24*(3), e257-9. http://doi.org/10.1016/j.whi.2014.03.004

Kulie, T., Slattengren, A., Redmer, J., Counts, H., Eglash, A., & Schrager, S. (2011). Obesity and women's health: an evidence-based review. *Journal of the American Board of Family Medicine : JABFM*, *24*(1), 75–85. http://doi.org/10.3122/jabfm.2011.01.100076

Kumar, R., Robson, K. M., & Smith, A. M. R. (1984). Development of a self-administered questionnaire to measure material adjustment and material attitudes during pregnancy and after delivery. *Journal of Psychosomatic Research*, *28*(1), 43–51. http://doi.org/10.1016/0022-3999(84)90039-4

Laird-Fick, H. S., Solomon, D., Jodoin, C., Dwamena, F. C., Alexander, K., Rawsthorne, L., … Smith, R. C. (2011). Training residents and nurses to work as a patient-centered care team on a medical ward. *Patient Education and Counseling*, *84*(1), 90–7. http://doi.org/10.1016/j.pec.2010.05.018

Lambert, L., Raidl, M., Safaii, S., Conner, C., Geary, E. J., & Ault, S. (2005). Perceived benefits and barriers related to postpartum weight loss of overweight/obese postpartum WIC participants. *Topics in Clinical Nutrition*, *20*(1), 16–27.

Lan-Pidhainy, X., Nohr, E. A., & Rasmussen, K. M. (2013). Comparison of gestational weight gain–related pregnancy outcomes in American primiparous and multiparous women. *The American Journal of Clinical Nutrition*, *97*(5), 1100–1106. http://doi.org/10.3945/ajcn.112.052258

Ledoux, T., Van Den Berg, P., Leung, P., & Berens, P. D. (2015). Factors associated with knowledge of personal gestational weight gain recommendations. *BMC Research Notes*, *8*(1), 349. http://doi.org/10.1186/s13104-015-1306-6

Lindheim, S. R., Glenn, T. L., & Whigham, L. D. (2018). Recognizing and eliminating bias in those with elevated body mass index in women's health care. *Fertility and Sterility*, *109*(5), 775–776. http://doi.org/10.1016/J.FERTNSTERT.2018.03.002

Liu, J., Wilcox, S., Whitaker, K., Blake, C., & Addy, C. (2014). Preventing Excessive Weight Gain During Pregnancy and Promoting Postpartum Weight Loss: A Pilot Lifestyle Intervention for Overweight and Obese African American Women. *Maternal and Child Health Journal*, *19*(4), 840–849. http://doi.org/10.1007/s10995-014-1582-0

Lucas, C., Charlton, K. E., & Yeatman, H. (2014). Nutrition advice during pregnancy: do women receive it and can health professionals provide it? *Maternal and Child Health Journal*, *18*(10), 2465–78. http://doi.org/10.1007/s10995-014-1485-0

Lutsiv, O., Bracken, K., Pullenayegum, E., Sword, W., Taylor, V. H., & McDonald, S. D. (2012). Little congruence between health care provider and patient perceptions of counselling on gestational weight gain. *Journal of Obstetrics and Gynaecology Canada : JOGC = Journal d'obstétrique et Gynécologie Du Canada : JOGC*, *34*(6), 518–24. http://doi.org/https://doi.org/10.1016/S1701-2163(16)35267-7

Mamun, A. A., Callaway, L. K., O'Callaghan, M. J., Williams, G. M., Najman, J. M., Alati, R., … Lawlor, D. A. (2011). Associations of maternal pre-pregnancy obesity and excess pregnancy weight gains with adverse pregnancy outcomes and length of hospital stay. *BMC Pregnancy and Childbirth*, *11*(1), 62. http://doi.org/10.1186/1471-2393-11-62

Mamun, A. A., Kinarivala, M., O'Callaghan, M. J., Williams, G. M., Najman, J. M., & Callaway, L. K. (2010). Associations of excess weight gain during pregnancy with long-term maternal overweight and obesity: evidence from 21 y postpartum follow-up. *The American Journal of Clinical Nutrition*, *91*(5), 1336–41. http://doi.org/10.3945/ajcn.2009.28950

Mann, T., de Ridder, D., & Fujita, K. (2013). Self-regulation of health behavior: Social psychological approaches to goal setting and goal striving. *Health Psychology*, *32*(5), 487–498. http://doi.org/http://dx.doi.org/10.1037/a0028533

McDonald, S. D., Park, C. K., Timm, V., Schmidt, L., Neupane, B., & Beyene, J. (2013). What Psychological, Physical, Lifestyle, and Knowledge Factors Are Associated With Excess or Inadequate Weight Gain During Pregnancy? A Cross-Sectional Survey. *Journal of Obstetrics and Gynaecology Canada*, *35*(12), 1071–1082. http://doi.org/10.1016/S1701-2163(15)30757-X

McDonald, S. D., Pullenayegum, E., Taylor, V. H., Lutsiv, O., Bracken, K., Good, C., … Sword, W. (2011). Despite 2009 guidelines, few women report being counseled correctly about weight gain during pregnancy. *American Journal of Obstetrics and Gynecology*, *205*(4), 333.e1-6. http://doi.org/10.1016/j.ajog.2011.05.039

Mercado, A., Marquez, B., Abrams, B., Phipps, M. G., Wing, R. R., & Phelan, S. (2017). Where Do Women Get Advice About Weight, Eating, and Physical Activity During Pregnancy? *Journal of Women's Health*, jwh.2016.6078. http://doi.org/10.1089/jwh.2016.6078

Montpetit, A. E., Plourde, H., Cohen, T. R., & Koski, K. G. (2012). Modeling the Impact of Prepregnancy BMI, Physical Activity, and Energy Intake on Gestational Weight Gain, Infant Birth Weight, and Postpartum Weight Retention. *Journal of Physical Activity and Health*, *9*, 1020–1029. http://doi.org/https://doi.org/10.1123/jpah.9.7.1020

Morof, D., Steinauer, J., Haider, S., Liu, S., Darney, P., & Barrett, G. (2012). Evaluation of the London Measure of Unplanned Pregnancy in a United States Population of Women. *PLoS ONE*, *7*(4), e35381. http://doi.org/10.1371/journal.pone.0035381

Muktabhant, B., Lawrie, T. A., Lumbiganon, P., & Laopaiboon, M. (2015). Diet or exercise, or both, for preventing excessive weight gain in pregnancy. *Cochrane Database of Systematic Reviews*, (6). http://doi.org/10.1002/14651858.CD007145.pub3

Nitert, M. D., Foxcroft, K. F., Lust, K., Fagermo, N., Lawlor, D. A., O'Callaghan, M., … Callaway, L. K. (2011). Overweight and obesity knowledge prior to pregnancy: a survey study. *BMC Pregnancy and Childbirth*, *11*(1), 96. http://doi.org/10.1186/1471-2393-11-96

Nohr, E. A., Vaeth, M., Baker, J. L., Sorensen, T. I., Olsen, J., & Rasmussen, K. M. (2008). Combined associations of prepregnancy body mass index and gestational weight gain with the outcome of pregnancy. *Am J Clin Nutr*, *87*(6), 1750–1759. http://doi.org/https://doi.org/10.1093/ajcn/87.6.1750

O'Donnell, B. E., Lewkowitz, A. K., Vargas, J. E., & Zlatnik, M. G. (2016). Examining pregnancy-specific smartphone applications: what are patients being told? *Journal of Perinatology*, *36*(10), 802–807. http://doi.org/10.1038/jp.2016.77

Ogden, C. L., Carroll, M. D., & Flegal, K. M. (2015). Prevalence of obesity among adults and youth: United States, 2011–2014.

Ogden, J., Bavalia, K., Bull, M., Frankum, S., Goldie, C., Gosslau, M., … Vasant, K. (2004). "I want more time with my doctor": a quantitative study of time and the consultation. *Family Practice*, *21*(5), 479–483. http://doi.org/10.1093/fampra/cmh502

Oken, E., Rifas-Shiman, S. L., Field, A. E., Frazier, A. L., & Gillman, M. W. (2008). Maternal gestational weight gain and offspring weight in adolescence. *Obstetrics and Gynecology*, *112*(5), 999–1006. http://doi.org/10.1097/AOG.0b013e31818a5d50

Oken, E., Switkowski, K., Price, S., Guthrie, L., Taveras, E. M., Gillman, M., … Dietz, P. (2013). A qualitative study of gestational weight gain counseling and tracking. *Maternal and Child Health Journal*, *17*(8), 1508–17. http://doi.org/10.1007/s10995-012-1158-9

Olson, C. M. (2008). Achieving a healthy weight gain during pregnancy. *Annual Review of Nutrition*, *28*, 411–23. http://doi.org/10.1146/annurev.nutr.28.061807.155322

Ordóñez, L. D., Schweitzer, M. E., Galinsky, A. D., & Bazerman, M. H. (2009). Goals Gone Wild: The Systematic Side Effects of Overprescribing Goal Setting. *Academy of Management Perspectives*, *23*(1), 6–16. http://doi.org/10.5465/AMP.2009.37007999

Østbye, T., Peterson, B. L., Krause, K. M., Swamy, G. K., & Lovelady, C. A. (2012). Predictors of postpartum weight change among overweight and obese women: results from the Active

Mothers Postpartum study. *Journal of Women's Health (2002)*, *21*(2), 215–22. http://doi.org/10.1089/jwh.2011.2947

Phelan, S. (2010). Pregnancy: a "teachable moment" for weight control and obesity prevention. *American Journal of Obstetrics and Gynecology*, *202*(2), 135.e1-8. http://doi.org/10.1016/j.ajog.2009.06.008

Phelan, S. M., Burgess, D. J., Yeazel, M. W., Hellerstedt, W. L., Griffin, J. M., & van Ryn, M. (2015). Impact of weight bias and stigma on quality of care and outcomes for patients with obesity. *Obesity Reviews*, *16*(4), 319–326. http://doi.org/10.1111/obr.12266

Phelan, S., Phipps, M. G., Abrams, B., Darroch, F., Schaffner, A., & Wing, R. R. (2011). Practitioner advice and gestational weight gain. *Journal of Women's Health (2002)*, *20*(4), 585–91. http://doi.org/10.1089/jwh.2010.2316

Poston, L. (2017). Obesity in pregnancy; Where are we, where should we go? *Midwifery*, *49*, 4–6. http://doi.org/10.1016/j.midw.2017.01.007

Poston, L., Harthoorn, L. F., & Van Der Beek, E. M. (2011). Obesity in pregnancy: implications for the mother and lifelong health of the child. A consensus statement. *Pediatric Research*, *69*(2), 175–80. http://doi.org/10.1203/PDR.0b013e3182055ede

Rasmussen, K. M., Abrams, B., Bodnar, L. M., Butte, N. F., Catalano, P. M., & Maria Siega-Riz, A. (2010). Recommendations for weight gain during pregnancy in the context of the obesity epidemic. *Obstetrics and Gynecology*, *116*(5), 1191–5. http://doi.org/10.1097/AOG.0b013e3181f60da7

Rouhe, H., Salmela-Aro, K., Toivanen, R., Tokola, M., Halmesmäki, E., Ryding, E.-L., & Saisto, T. (2015). Group psychoeducation with relaxation for severe fear of childbirth improves maternal adjustment and childbirth experience – a randomised controlled trial. *Journal of Psychosomatic Obstetrics & Gynecology*, *36*(1), 1–9. http://doi.org/10.3109/0167482X.2014.980722

Samura, T., Steer, J., Michelis, L. D., Carroll, L., Holland, E., & Perkins, R. (2016). Factors Associated with Excessive Gestational Weight Gain: Review of Current Literature. *Global Advances in Health and Medicine*, *5*(1), 87–93. http://doi.org/10.7453/gahmj.2015.094

Sayakhot, P., & Carolan-Olah, M. (2016). Internet use by pregnant women seeking pregnancy-related information: a systematic review. *BMC Pregnancy and Childbirth*, *16*(1), 65. http://doi.org/10.1186/s12884-016-0856-5

Schwarzer, R., Bäßler, J., Kwiatek, P., Schröder, K., & Zhang, J. X. (1997). The Assessment of Optimistic Self-beliefs: Comparison of the German, Spanish, and Chinese Versions of the General Self-efficacy Scale. *Applied Psychology*, *46*(1), 69–88. http://doi.org/10.1111/j.1464-0597.1997.tb01096.x

Schwarzer, R., & Jerusalem, M. (1995). Generalized Self-Effiacy Scale. In J. Weinman, S. Wright, & M. Johnston (Eds.), *Measures in health psychology: a user's portfolio. Causal and control beliefs.* (pp. 35–37). Windsor, UK: NFER-NELSON. http://doi.org/10.1037/t00393-000

Sewell, M. F., Huston-Presley, L., Super, D. M., & Catalano, P. (2006). Increased neonatal fat mass, not lean body mass, is associated with maternal obesity. *American Journal of Obstetrics and Gynecology*, *195*(4), 1100–3. http://doi.org/10.1016/j.ajog.2006.06.014

Sharp, M., Campbell, C., Chiffings, D., Simmer, K., & French, N. (2015). Improvement in Long-Term Breastfeeding for Very Preterm Infants. *Breastfeeding Medicine*, *10*(3), 145–149. http://doi.org/10.1089/bfm.2014.0117

Shub, A., Huning, E. Y.-S., Campbell, K. J., & McCarthy, E. A. (2013). Pregnant women's

knowledge of weight, weight gain, complications of obesity and weight management strategies in pregnancy. *BMC Research Notes*, *6*, 278. http://doi.org/10.1186/1756-0500-6-278

Siega-Riz, A. M., & Gray, G. L. (2013). Gestational weight gain recommendations in the context of the obesity epidemic. *Nutrition Reviews*, *71*(suppl_1), S26–S30. http://doi.org/10.1111/nure.12074

Siega-Riz, A. M., Viswanathan, M., Moos, M.-K., Deierlein, A., Mumford, S., Knaack, J., … Lohr, K. N. (2009). A systematic review of outcomes of maternal weight gain according to the Institute of Medicine recommendations: birthweight, fetal growth, and postpartum weight retention. *American Journal of Obstetrics and Gynecology*, *201*(4), 339.e1-14. http://doi.org/10.1016/j.ajog.2009.07.002

Stengel, M. R., Kraschnewski, J. L., Hwang, S. W., Kjerulff, K. H., & Chuang, C. H. (2012). "What my doctor didn't tell me": examining health care provider advice to overweight and obese pregnant women on gestational weight gain and physical activity. *Women's Health Issues : Official Publication of the Jacobs Institute of Women's Health*, *22*(6), e535-40. http://doi.org/10.1016/j.whi.2012.09.004

Stotland, N., Gilbert, P., Bogetz, A., Harper, C. C., Abrams, B., & Gerbert, B. (2010). Preventing excessive weight gain in pregnancy: how do prenatal care providers approach counseling? *Journal of Women's Health (2002)*, *19*(4), 807–14. http://doi.org/10.1089/jwh.2009.1462

Stotland, N., Tsoh, J. Y., & Gerbert, B. (2012). Prenatal weight gain: who is counseled? *Journal of Women's Health (2002)*, *21*(6), 695–701. http://doi.org/10.1089/jwh.2011.2922

Stout, A. E. (1997). Prenatal Care for Low-Income Women and the Health Belief Model: A New Beginning. *Journal of Community Health Nursing*, *14*(3), 169–180. http://doi.org/10.1207/s15327655jchn1403_4

Teixeira, P. J., Silva, M. N., Mata, J., Palmeira, A. L., & Markland, D. (2012). Motivation, self-determination, and long-term weight control. *The International Journal of Behavioral Nutrition and Physical Activity*, *9*(1), 22. http://doi.org/10.1186/1479-5868-9-22

Thangaratinam, S., Rogozinska, E., Jolly, K., Glinkowski, S., Roseboom, T., Tomlinson, J. W., … Khan, K. S. (2012). Effects of interventions in pregnancy on maternal weight and obstetric outcomes: meta-analysis of randomised evidence. *BMJ (Clinical Research Ed.)*, *344*(may16_4), e2088. http://doi.org/10.1136/bmj.e2088

Tomiyama, A. J., Hunger, J. M., Nguyen-Cuu, J., & Wells, C. (2016). Misclassification of cardiometabolic health when using body mass index categories in NHANES 2005-2012. *International Journal of Obesity (2005)*. http://doi.org/10.1038/ijo.2016.17

Tripp, N., Hainey, K., Liu, A., Poulton, A., Peek, M., Kim, J., & Nanan, R. (2014). An emerging model of maternity care: Smartphone, midwife, doctor? *Women and Birth*, *27*(1), 64–67. http://doi.org/10.1016/J.WOMBI.2013.11.001

van der Pligt, P., Campbell, K., Willcox, J., Opie, J., & Denney-Wilson, E. (2011). Opportunities for primary and secondary prevention of excess gestational weight gain: General Practitioners' perspectives. *BMC Family Practice*, *12*(1), 124. http://doi.org/10.1186/1471-2296-12-124

Viswanathan, M., Siega-Riz, A. M., Moos, M. K., Deierlein, A., Mumford, S., Knaack, J., … Lohr, K. N. (2008). Outcomes of maternal weight gain. *Evidence Report/Technology Assessment*, (168), 1–223. Retrieved from http://www.ncbi.nlm.nih.gov/books/NBK38595/

Vohr, B. R., & Boney, C. M. (2008). Gestational diabetes: the forerunner for the development of maternal and childhood obesity and metabolic syndrome? *The Journal of Maternal-Fetal &*

Neonatal Medicine : The Official Journal of the European Association of Perinatal Medicine, the Federation of Asia and Oceania Perinatal Societies, the International Society of Perinatal Obstetricians, *21*(3), 149–57. http://doi.org/10.1080/14767050801929430

Waring, M. E., Moore Simas, T. A., Barnes, K. C., Terk, D., Baran, I., Pagoto, S. L., & Rosal, M. C. (2014). Patient report of guideline-congruent gestational weight gain advice from prenatal care providers: differences by prepregnancy BMI. *Birth (Berkeley, Calif.)*, *41*(4), 353–9. http://doi.org/10.1111/birt.12131

Washington Cole, K. O., Gudzune, K. A., Bleich, S. N., Cheskin, L. J., Bennett, W. L., Cooper, L. A., & Roter, D. L. (2017). Providing prenatal care to pregnant women with overweight or obesity: Differences in provider communication and ratings of the patient-provider relationship by patient body weight. *Patient Education and Counseling*, *100*(6), 1103–1110. http://doi.org/10.1016/J.PEC.2016.12.030

Webb, J. B., Siega-Riz, A. M., & Dole, N. (2009). Psychosocial determinants of adequacy of gestational weight gain. *Obesity (Silver Spring, Md.)*, *17*(2), 300–9. http://doi.org/10.1038/oby.2008.490

Weir, Z., Bush, J., Robson, S. C., McParlin, C., Rankin, J., & Bell, R. (2010). Physical activity in pregnancy: a qualitative study of the beliefs of overweight and obese pregnant women. *BMC Pregnancy and Childbirth*, *10*(1), 18. http://doi.org/10.1186/1471-2393-10-18

Whitaker, K. M., Wilcox, S., Liu, J., Blair, S. N., & Pate, R. R. (2016a). African American and White women′s perceptions of weight gain, physical activity, and nutrition during pregnancy. *Midwifery*, *34*, 211–220. http://doi.org/10.1016/j.midw.2015.11.005

Whitaker, K. M., Wilcox, S., Liu, J., Blair, S. N., & Pate, R. R. (2016b). Patient and Provider Perceptions of Weight Gain, Physical Activity, and Nutrition Counseling during Pregnancy: A Qualitative Study. *Women's Health Issues*, *26*(1), 116–122. http://doi.org/10.1016/j.whi.2015.10.007

Whitaker, K. M., Wilcox, S., Liu, J., Blair, S. N., & Pate, R. R. (2016c). Provider Advice and Women's Intentions to Meet Weight Gain, Physical Activity, and Nutrition Guidelines During Pregnancy. *Maternal and Child Health Journal*, *20*(11), 2309–2317. http://doi.org/10.1007/s10995-016-2054-5

Wong, M. S., Gudzune, K. A., & Bleich, S. N. (2015). Provider communication quality: Influence of patients' weight and race. *Patient Education and Counseling*, *98*(4), 492–498. http://doi.org/10.1016/J.PEC.2014.12.007

Yamamoto, A., McCormick, M. C., & Burris, H. H. (2014). US provider-reported diet and physical activity counseling to pregnant and non-pregnant women of childbearing age during preventive care visits. *Maternal and Child Health Journal*, *18*(7), 1610–8. http://doi.org/10.1007/s10995-013-1401-z

Yang, C.-L., Yu, C.-H., & Chen, C.-H. (2013). Development and Validation of the Postpartum Sleep Quality Scale. *Journal of Nursing Research*, *21*(2), 148–154. http://doi.org/10.1097/jnr.0b013e3182921f80

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment*, *52*(1), 30–41. http://doi.org/10.1207/s15327752jpa5201_2

Appendix A
Demographic Screener

1. How old are you? _____ years

2. Which best describes you (select all that apply)?
   _ White/Caucasian
   _ African-American
   _ Hispanic/Latino
   _ Asian American
   _ Native American
   _ Multiracial/Multiethnic
   _ Other: _____

3. What is your highest level of education?
   _ Less than High School
   _ High school diploma or GED
   _ Some college
   _ Associates degree (2-years)
   _ Bachelor's degree (4 years)
   _Some grad school
   _Master's Degree
   _ Ph.D./MD/JD

4. What is your annual household income?
   _ $14,999 or less
   _ $15,000 – 24,999
   _$25,000 – 34,999
   _$35,000 – 44,999,
   _$45,000 – 54,999
   _$55,000 – 64,999
   _$65,00 – 74,999
   _$75,00 and above

5. Did you receive prenatal care through VCU health systems?
   _Yes _No

6. What is your current height? _____ft ____inches

7. What is your current weight? _____ pounds

8. What is your relationship status?
   _ Single (never married)
   _ Casually dating
   _ In a relationship
      _ Please indicate the length of this relationship: _____
   _ Married
   _ Divorced
   _ Widowed

9. If you indicated a current partner, is this partner the biological father of your most recent child?
   _Yes _No _Unsure

10. Number of pregnancies? ___

11. How many live births have you had? ____
   If yes, what is the age of your youngest child? _____ years, _____months

12. Are you currently pregnant? _Yes _No _Unsure

Next, we would like you to answer a few questions about your weight across your pregnancy. If you are currently pregnant please answer for your current pregnancy. If you are not currently pregnant, please answer for your most recent pregnancy and birth.

13. What was your approximate weight immediately BEFORE you became pregnant?
____lbs
14. What was your approximate weight at the end of your pregnancy (just before birth)?
____lbs
____Not applicable – I am currently pregnant
15. If you are not currently pregnant, what is your approximate weight now?
____lbs
____ I am currently pregnant

16. During your most recent pregnancy, did you doctor diagnose you with any of the following conditions (and if so, approximately when in your pregnancy, i.e., how many weeks pregnant were you at that time)?

a. Yes/No	Anemia	When (e.g., when I was ____ weeks pregnant)?
b. Yes/No	Depression	When (e.g., when I was ____ weeks pregnant)?
c. Yes/No	Gestational Diabetes	When (e.g., when I was ____ weeks pregnant)?
d. Yes/No	High Blood Pressure	When (e.g., when I was ____ weeks pregnant)?
e. Yes/No	Preeclampsia	When (e.g., when I was ____ weeks pregnant)?
f. Yes/No	Vaginal Bleeding	When (e.g., when I was ____ weeks pregnant)?
g. Yes/No	Abdominal Pain	When (e.g., when I was ____ weeks pregnant)?
h. Yes/No	Preterm labor	When (e.g., when I was ____ weeks pregnant)?
i. Yes/No	Placenta previa	When (e.g., when I was ____ weeks pregnant)?
j. Yes/No	Vitamin Deficiency	When (e.g., when I was ____ weeks pregnant)?

17. Do you currently take any prescription medications? _Yes _No
If yes, please list these medications:

18. In an average month, how many days per week do you use caffeine?
_<1 day _1-2 days _3-4 days _5-6 days _Every day
_N/A I do not drink caffeine

19. Please indicate which types of caffeine you drink (check all the apply)
_Coffee _Tea _Soda _Energy drinks

20. In an average month, how many days per week do you drink alcohol?
_<1 day _1-2 days _3-4 days _5-6 days _Every day
_N/A I do not drink alcohol

21. On the days that you do drink alcohol, how many drinks (on average) do you have?
_1 _2 _3 _4 _5 or more

22. Please indicate which types of alcohol do you drink (check all the apply)
I do not drink alcohol_
Beer
Wine
Liquor/Mixed drinks
23. Did you use tobacco products prior to pregnancy?
_Yes _No

24. Over the past few months, in an average month, how many days per week do you use tobacco products?

_<1 day _1-2 days _3-4 days _5-6 days _Every day
_N/A I do not use tobacco

25. Has your tobacco use changed since your pregnancy?

_I have never used tobacco
_I have previously used tobacco but stopped once I found out I was pregnant
_I currently use tobacco products
_I quit tobacco products during pregnancy but resumed in the postpartum period

26. In an average month, how many days per week do you use marijuana?

_<1 day _1-2 days _3-4 days _5-6 days _Every day
_N/A I do not use marijuana

27. In an average month, how many days per week do you use cocaine?

_<1 day _1-2 days _3-4 days _5-6 days _Every day
_N/A I do not use cocaine

28. In an average month, how many days per week do you use methamphetamines?

_<1 day _1-2 days _3-4 days _5-6 days _Every day
_N/A I do not use methamphetamines

29. In an average month, how many days per week do you use prescription medications (not prescribed to you_?

_<1 day _1-2 days _3-4 days _5-6 days _Every day
_N/A I do not use medications not prescribed to me

Appendix B

Revised Aim II Demographic Screener

1. How old are you? _____ years

2. Which best describes you (select all that apply)?

_ White/Caucasian
_ African-American
_ Hispanic/Latino
_ Asian American
_ Native American
_ Multiracial/Multiethnic
_ Other: _____

3. What is your highest level of education?

_ Less than High School
_ High school diploma or GED
_ Some college
_ Associates degree (2-years)
_ Bachelor's degree (4 years)
_Some grad school
_Master's Degree
_ Ph.D./MD/JD

4. What is your annual household income?

_ $14,999 or less
_ $15,000 – 24,999
_$25,000 – 34,999
_$35,000 – 44,999,
_$45,000 – 54,999
_$55,000 – 64,999
_$65,00 – 74,999
_$75,00 and above

5. Did you receive prenatal care through VCU health systems?

_Yes _No

6. What is your current height? _____ft ____inches

7. What is your current weight? _____ pounds

8. What is your relationship status?

_ Single (never married)
_ Casually dating
_ In a relationship
_ Please indicate the length of this relationship: _____
_ Married
_ Divorced
_ Widowed

9. If you indicated a current partner, is this partner the biological father of your most recent child?

_Yes _No _Unsure

10. Number of pregnancies? ___

11. How many live births have you had? ____

If yes, what is the age of your youngest child? _____ years, _____months

12. Are you currently pregnant? _Yes _No _Unsure

Next, we would like you to answer a few questions about your weight across your pregnancy. If you are currently pregnant please answer for your current pregnancy. If you are not currently pregnant, please answer for your most recent pregnancy and birth.

13. What was your approximate weight immediately BEFORE you became pregnant?
____lbs
14. What was your approximate weight at the end of your pregnancy (just before birth)?
____lbs
____Not applicable – I am currently pregnant
15. If you are not currently pregnant, what is your approximate weight now?
____lbs
____ I am currently pregnant

16. During your most recent pregnancy, did you doctor diagnose you with any of the following conditions (and if so, approximately when in your pregnancy, i.e., how many weeks pregnant were you at that time)?

a. Yes/No	Anemia	When (e.g., when I was ____ weeks pregnant)?
b. Yes/No	Depression	When (e.g., when I was ____ weeks pregnant)?
c. Yes/No	Gestational Diabetes	When (e.g., when I was ____ weeks pregnant)?
d. Yes/No	High Blood Pressure	When (e.g., when I was ____ weeks pregnant)?
e. Yes/No	Preeclampsia	When (e.g., when I was ____ weeks pregnant)?
f. Yes/No	Vaginal Bleeding	When (e.g., when I was ____ weeks pregnant)?
g. Yes/No	Abdominal Pain	When (e.g., when I was ____ weeks pregnant)?
h. Yes/No	Preterm labor	When (e.g., when I was ____ weeks pregnant)?
i. Yes/No	Placenta previa	When (e.g., when I was ____ weeks pregnant)?
j. Yes/No	Vitamin Deficiency	When (e.g., when I was ____ weeks pregnant)?

17. Do you currently take any prescription medications? _Yes _No
If yes, please list these medications:

18. In an average month, how many days per week do you use caffeine?
_<1 day _1-2 days _3-4 days _5-6 days _Every day
_N/A I do not drink caffeine

19. Please indicate which types of caffeine you drink (check all the apply)
_Coffee _Tea _Soda _Energy drinks

20. In an average month, how many days per week do you drink alcohol?
_<1 day _1-2 days _3-4 days _5-6 days _Every day
_N/A I do not drink alcohol

21. On the days that you do drink alcohol, how many drinks (on average) do you have?
_1 _2 _3 _4 _5 or more

22. Please indicate which types of alcohol do you drink (check all the apply)
I do not drink alcohol_
Beer
Wine
Liquor/Mixed drinks
23. Did you use tobacco products prior to pregnancy?
_Yes _No

24. Over the past few months, in an average month, how many days per week do you use tobacco products?

_<1 day _1-2 days _3-4 days _5-6 days _Every day
_N/A I do not use tobacco

25. Has your tobacco use changed since your pregnancy?

_I have never used tobacco
_I have previously used tobacco but stopped once I found out I was pregnant
_I currently use tobacco products
_I quit tobacco products during pregnancy but resumed in the postpartum period

26. In an average month, how many days per week do you use marijuana?

_<1 day _1-2 days _3-4 days _5-6 days _Every day
_N/A I do not use marijuana

27. In an average month, how many days per week do you use cocaine?

_<1 day _1-2 days _3-4 days _5-6 days _Every day
_N/A I do not use cocaine

28. In an average month, how many days per week do you use methamphetamines?

_<1 day _1-2 days _3-4 days _5-6 days _Every day
_N/A I do not use methamphetamines

29. In an average month, how many days per week do you use prescription medications (not prescribed to you_?

_<1 day _1-2 days _3-4 days _5-6 days _Every day
_N/A I do not use medications not prescribed to me

Appendix C
Pregnant & Postpartum Interview Protocol

Thank you so much for speaking with me today. The purpose of this interview today is to get a better understanding from pregnant and postpartum women about their experiences during pregnancy. I am going to be asking a variety of questions today, some of which may apply to you and some that may not. Your responses will be kept anonymous and your name will not be linked to the information you provide in any way. At the end of the interview you will be given a $25 gift card for your time and participation. Do you have any questions before we begin?

Tell me a little about what your prenatal care looks/looked like during your pregnancy

- Tell me about your prenatal healthcare provider(s)
    - Did you use a doctor/midwife/nurse?
- Did you see other providers during your pregnancy?
  *Refer to the indicated primary provider for remainder of interview, but probe for multiple sources of information

On a scale of 1 to 10, how satisfied would you say you were with your prenatal care?

What made you pick that number?

What made you rate your care as a ___ rather than a ___ or _____

Tell me about concerns you had during pregnancy?

- Tell me about concerns you had related to managing weight during pregnancy
    - Were you concerned about managing weight gain during your pregnancy?
    - What aspects of weight gain during pregnancy concerned you?
    - Was there any reason this was not a particular concern for you?
        - Why or why not

Tell me what you know about healthy nutrition/weight/physical activity during your pregnancy?

- What were your sources of information from during your pregnancy (friends, family, doctor, websites, books, etc.)?
    - Other sources of information?
- Where do you think other women get a lot of their pregnancy health information?

What information did your provider communicate with you about healthy weight gain during pregnancy?

- If so, what did your provider talk to you about? What did they say to you?
- Did you doctor talk to you specifically (in a range of pounds) about the amount of weight that is appropriate for you to gain during your pregnancy?
    - Do you recall at what point in your pregnancy your provider discussed this with you?
- How often were issues related to nutrition/weight/physical activity a part of your routine doctor visits during your pregnancy?
- How comfortable were you discussing weight issues with your provider?

Can you tell me what you know about managing weight during pregnancy?

Are you aware of any general guidelines about weight gain during pregnancy?

I am going to read to you what the Institute of Medicine suggests about weight gain based on women's height and weight prior to pregnancy.

- Underweight – 28-40 pounds
- Normal weight – 25-35 pounds
- Overweight – 15-25 pounds
- Obese – 11-20 pounds

- Does any of that sound familiar to you? How so?
- What do you think of these guidelines?
    - Probe for how realistic/practical these ranges are for pregnant women

What difficulties or challenges related to weight gain did you experience during your pregnancy (e.g. barriers to healthy eating or physical activity)? If so, please explain.

- What made managing your weight gain the most difficult?
- Were there factors that made managing your weight gain easier?

How satisfied are/were you with the nutrition/weight/physical activity guidance that you received from your doctor?

- If you could rate your satisfaction on a scale of 1 to 10, what would you pick?
    - What made you pick this number? What information did you consider when making this rating?
- If you had an opportunity to change the way your healthcare provider talked to you about these issues, what would you change?
- What do you wish you had known earlier about weight gain during pregnancy?

What do you wish you knew (in general) about pregnancy prior to this pregnancy?

How could prenatal care be improved to make it easier for women to eat well and gain healthy amounts of weight during pregnancy?

Appendix D
Healthcare Provider Survey Protocol

Thank you so much for taking time to complete this survey today. We know that physicians are very busy and the purpose of this survey is to get a better idea of how doctors manage and communicate information to their patients in a limited clinic visit. We also want to understand how we can possibly improve this process for both providers and patients.
Your responses to these questions will be anonymous and your name will not be liked to the information you provide in any way. At the end of this survey you will be entered into a raffle to win a gift card.

1. Given your limited time with a patient and lots of topics to cover, in a routine OB visit, which topics would you view as most important to address. Please rank order the following characteristics from 1 – most important to 10 – least important.

_ Medical complications (if present)
_ Mood (depression/anxiety)
_ Weight
_ Sleep
_ Smoking
_ Alcohol
_ Other substance use/abuse
_ Home life
_Intimate relationships
_ Postpartum contraception

2. What is your primary type of patient that you see in your clinic?

1	2	3	4	5
All privately insured		Evenly mixed		All indigent/Medicaid

3. If you see primarily indigent/Medicaid patients, what patient characteristics (if any) might influence the topics you cover during a routine prenatal appointment (check all the apply)?

_N/A I do not see this population
_Age
_Race
_Weight
_Medical risk
_Parity status
_Substance use history

4. If you see primarily privately ensured patients, what patient characteristics (if any) might influence the topics you cover during a routine prenatal appointment (check all the apply)?

_N/A I do not see this population
_Age
_Race
_Weight
_Medical risk
_Parity status
_Substance use history

5. When is substance use discussed with patients?

At intake only
At intake and predetermined follow-up
Every visit
Every other visit
Once every 3 visits
Once every 6 visits
Once per pregnancy
N/A A nurse or other staff member is typically responsible for this

6. How confident do you feel in your knowledge of appropriate treatment resources for women who are abusing substances during pregnancy?

1	2	3	4	5	6	7
Not at all Confident			Neither			Extremely Confident

7. How confident do you feel in your knowledge of appropriate management of substance use in pregnant women?

1	2	3	4	5	6	7
Not at all Confident			Neither			Extremely Confident

8. How often do you discuss weight and weight gain with your patients (select all the apply)?

_At intake
_At intake and predetermined follow-up visits
_Every visit
_Every other visit
_At predetermined follow-up visits
_Only when the mother requests information
_Only when the mother was overweight or obese prior to pregnancy
_A nurse (or other staff) it typically responsible for this topic

9. How important to do you think it is to discuss weight gain with your patients?

1	2	3	4	5	6	7
Not at all Important			Neither			Extremely Important

10. How confident do you feel in your knowledge of the nutrition needs of pregnant women?

1	2	3	4	5	6	7
Not at all confident			Neither			Extremely confident

11. How confident do you feel in your knowledge of physical activity recommendations for pregnant women?

1	2	3	4	5	6	7
Not at all confident			Neither			Extremely confident

12. How comfortable do you feel discussing gestational weight gain with your patients?

1	2	3	4	5
Very Uncomfortable		Neutral		Very Comfortable

13. How responsive do you feel patients are to information from providers about weight during pregnancy?

1	2	3	4	5
Very unresponsive		Neutral		Very responsive

14. How familiar are you with the ACOG guidelines for gestational weight gain?

1	2	3	4	5
Very unfamiliar		Neutral		Very familiar

15. With which patients do you discuss the ACOG gestational weight gain guidelines?

_All Patients
_Only patients who are overweight or obese
_Only patients who name weight as a concern
_Another staff member typically discusses this with patients

16. How practical do you think the ACOG gestational weight gain guidelines are for your expectant mothers?

1	2	3	4	5
Very impractical		Neutral		Very practical

_N/A I am not familiar enough with the guidelines to answer

17. How many of your patients who were <u>initially overweight (or obese)</u> are successful at adhering to the ACOG GWG guidelines?

_Less than 20% _20-40% _40-60% _60-80% _80%-100%
N/A I am not familiar enough with the guidelines to answer

18. Do you discuss weight ranges (in lbs.) with patients when discussing gestational weight gain?

_Yes _No _Unsure

19. How satisfied are you with the conversations you have with patients about gestational weight gain?

1	2	3	4	5
Very unsatisfied		Neutral		Very satisfied

20. For your <u>overall patient population</u>, what percentage of your patients do you think will adhere to your advice regarding gestational weight gain?

_Less than 20% _20-40% _40-60% _60-80% _80%-100%

21. For your <u>patients with overweight or obesity</u>, what percentage of these patients do you think will adhere to your advice regarding gestational weight gain?

_Less than 20% _20-40% _40-60% _60-80% _80%-100%

22. Of those patients who you feel do not adhere to your recommendations, which patient characteristics (if any) do you think influence this non-adherence? (check all that apply)

_ Education _ Weight
_ Maternal age _ SES
_ Psychosocial issues _ Family issues

23. What do you think is the main source of information for your patients regarding healthy lifestyle choices during pregnancy?

a) Provider guidance
b) Family
c) Friends
d) Internet
e) Pregnancy or parenting books/magazine

24a. Indicate which, if any, are topics your patients report as barriers to healthy lifestyle management

_____Finances/Money
_____Housing
_____Childcare
_____Family Issues/Relationship issues
Caring for other family members
_____No time/Too Busy
_____Mother's mental health
_____Mother's physical health
_____Other (please indicate): _____

24b. Of the barriers you just selected, which barrier seems to be the biggest barrier to lifestyle management for your patients?

Finances/Money
Housing
Childcare
Family issues/Relationship issues
Caring for other family members
No time/Too busy
Mother's mental health
Mother's physical health
Other (please indicate) _____

Appendix E
Postpartum Survey Protocol

Thank you so much for participating in this survey. The purpose of this survey today is to get a better understanding from women who have had children about their experiences during pregnancy. This form will ask a variety of questions, some of which may apply to you and some that may not.

Some questions will ask about your healthcare provider during your pregnancy. We recognize that many women see several providers during their prenatal care – please respond to the following items for the healthcare provider you feel is most appropriate.

Your responses will be kept anonymous and your name will not be linked to the information you provide in any way. At the end of the survey you will be given a $25 gift care for your time and participation. Do you have any questions before we begin?

1. My primary healthcare provider for my prenatal care is:
    a) A medical doctor
    b) A midwife
    c) A nurse midwife
    d) A nurse practitioner
    e) Other (please indicate):_____

2. At the beginning of this pregnancy I believe my weight fell into the category of
    a) Underweight
    b) Normal weight
    c) Overweight
    d) Obese

3. At the beginning of this pregnancy my healthcare provider told me that I was….
    a) Underweight
    b) Normal weight
    c) Overweight
    d) Obese
    e) My healthcare provider did not use any specific words to describe my weight

4. When I found out I was pregnant I assumed that my healthcare provider would talk to me about my weight
    Yes No Unsure

5. During my pregnancy my healthcare provider talked to me about weight gain.
    Yes every visit
    Yes more than once during my care
    Yes once during my care
    Not that I recall
    No, never

6. During my pregnancy my healthcare provider spoke to me about a specific weight range (number of pounds) that would be appropriate to gain during my pregnancy

Yes No Unsure

7. How much weight did your healthcare provider tell you to gain during pregnancy?

_My health professional did not tell me to gain a certain amount of weight
_0 pounds
_5-10 pounds
_10-20 pounds
_15-25 pounds
_25-35 pounds
_30-40 pounds
_More than 40 pounds
_I don't recall

8. If your healthcare provider spoke with you about a weight range, how practical did this range seem for you?

1	2	3	4	5
Very impractical		Neutral		Very practical

9. Please answer the following questions about your weight changes over the course of your pregnancy:

What was your approximate weight prior to becoming pregnant: _____ pounds
What was your approximate weight immediately after giving birth: _____ pounds
What was your approximate weight 1 month after birth: _____ pounds
What is your approximate weight currently: _____ pounds

10. How much weight did you think you should <u>ideally</u> gain during your most recent pregnancy?

_____ pounds

11. How much weight did you think you would <u>actually</u> gain during your most recent pregnancy?

_____ pounds

12. During my pregnancy, my weight gain was

_ Much less than I expected
_ A little less than I expected
_ About what I expected
_ A little more than I expected
_ Much more than I expected

13. During my pregnancy my healthcare provider talked to me about nutrition

_Yes _No _Unsure

14. During my pregnancy my healthcare provider talked to me about physical activity

_Yes _No _Unsure

15. During my pregnancy my healthcare provider talked to me about weight loss after the baby is born

_Yes _No _Unsure

16. I believe I will be able to lose the weight I gained during pregnancy:

_Yes _No _Unsure

17. I expected to return to my pre-pregnancy weight within _____ months of my child's birth date

LMUP - Circumstances of Pregnancy

Below are some questions that ask about your circumstances and feelings around the time you became pregnant. Please think of your current (or most recent) pregnancy when answering the questions below and choose the option that most applies to you.

1) In the month that I became pregnant.....

- I/we were not using contraception
- I/we were using contraception, but not on every occasion
- I/we always used contraception, but knew that the method had failed (i.e. broke, moved, came off, came out, not worked etc) at least once
- I/we always used contraception

2) In terms of becoming a mother *(first time or again)*, I feel that my pregnancy happened at the.....

- right time
- ok, but not quite right time
- wrong time

3) Just before I became pregnant.....

- I intended to get pregnant
- my intentions kept changing
- I did not intend to get pregnant

4) Just before I became pregnant....

- I wanted to have a baby
- I had mixed feelings about having a baby
- I did not want to have a baby

In the next question, we ask about your partner - this might be (or have been) your husband, a partner you live with, a boyfriend, or someone you've had sex with once or twice.

5) Before I became pregnant....

- My partner and I had agreed that we would like me to be pregnant
- My partner and I had discussed having children together, but hadn't agreed for me to get pregnant
- We never discussed having children together

6) Before you became pregnant, did you do anything to improve your health in preparation for pregnancy?

(Please tick all that apply)

- took folic acid
- stopped or cut down smoking
- stopped or cut down drinking alcohol
- ate more healthily
- sought medical/health advice
- took some other action, please describe _____
- I did not do any of the above before my pregnancy

Concerns in the Postpartum Period:

Please indicate whether you have been concerned about any of the following issues since the birth of your child. Then, if an items applies, please rate how concerning this issues is on a scale of 1 (a very small concern) to 5 (a very large concern)

_Finances/Money

1 2 3 4 5

Small Concern Large Concern

_Housing

1 2 3 4 5

Small Concern Large Concern

_Childcare

1 2 3 4 5

Small Concern Large Concern

_Doctor visits

1 2 3 4 5

Small Concern Large Concern

_Items for your baby

1 2 3 4 5

Small Concern Large Concern

_Being a "good" mother

1 2 3 4 5

Small Concern Large Concern

_Romantic relationships

1 2 3 4 5

Small Concern Large Concern

_Family relationships

1 2 3 4 5

Small Concern Large Concern

_The health of your baby

1 2 3 4 5

Small Concern Large Concern

_Breastfeeding/Formula feeding

1 2 3 4 5

Small Concern Large Concern

_How much your baby is eating

1	2	3	4	5
Small Concern				Large Concern

_How much your baby is sleeping

1	2	3	4	5
Small Concern				Large Concern

_Your weight

1	2	3	4	5
Small Concern				Large Concern

_Your sleep

1	2	3	4	5
Small Concern				Large Concern

_Your physical health

1	2	3	4	5
Small Concern				Large Concern

_Your mental health

1	2	3	4	5
Small Concern				Large Concern

_Return to work

1	2	3	4	5
Small Concern				Large Concern

Of the items you indicated concern about, please rank these items from 1 (most concerning) to 10 (least concerning)

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

Postpartum Sleep Quality Scale

The questions in this scale ask you about your usual sleep quality during the past 2 weeks. You are asked to rate the one best response by indicating "never", "few", "sometimes", "often", or "almost always" in the appropriate column. Please answer all questions

During the past 2 weeks:

1. Get to sleep within 30 minutes
    a. Never

   b. Few
   c. Sometimes
   d. Often
   e. Almost Always

2. Actual sleep over 7 hrs. per night
   a. Never
   b. Few
   c. Sometimes
   d. Often
   e. Almost Always

3. Difficult to fall asleep
   a. Never
   b. Few
   c. Sometimes
   d. Often
   e. Almost Always

4. Wake up in the middle of the night
   a. Never
   b. Few
   c. Sometimes
   d. Often
   e. Almost Always

5. Wake up early in the morning
   a. Never
   b. Few
   c. Sometimes
   d. Often
   e. Almost Always

6. Have to get up to use the bathroom
   a. Never
   b. Few
   c. Sometimes
   d. Often
   e. Almost Always

7. Have trouble sleeping because of infant care during the middle of night
   a. Never
   b. Few
   c. Sometimes
   d. Often
   e. Almost Always

8. Have trouble sleeping because of worry about baby's condition
    a. Never
    b. Few
    c. Sometimes
    d. Often
    e. Almost Always

9. Have trouble sleeping because of the disturbance of postpartum physical conditions
    a. Never
    b. Few
    c. Sometimes
    d. Often
    e. Almost Always

10. Have trouble sleeping because of bad dreams
    a. Never
    b. Few
    c. Sometimes
    d. Often
    e. Almost Always

11. Trouble sleeping resulting in low energy level during the day
    a. Never
    b. Few
    c. Sometimes
    d. Often
    e. Almost Always

12. Trouble sleeping resulting in lacking energy to get things done
    a. Never
    b. Few
    c. Sometimes
    d. Often
    e. Almost Always

13. Trouble sleeping resulting in blue mood
    a. Never
    b. Few
    c. Sometimes
    d. Often
    e. Almost Always

14. Overall satisfaction with sleep quality
    a. Never
    b. Few

c. Sometimes
d. Often
e. Almost Always

Breastfeeding Duration and Attitude Questionnaire

1. Are you still breastfeeding
    a. Yes
    b. No

2. How did you feed your baby immediately after leaving the hospital?
    a. Breast alone
    b. Breast plus formula
    c. Formula alone

3. If you breastfed, for how long
    a. Less than 1 month
    b. 1-2 months
    c. 3-6 months
    d. more than 6 months

4. What was your reason for stopping breastfeeding? (choose up to 3 choices)
    a. Inadequate milk supply
    b. Baby unsettled after feeds
    c. Breastfeeding too tiring
    d. Painful nipples
    e. Baby refused to breastfeed
    f. Too time consuming
    g. Maternal illness
    h. Breast abscess
    i. Return to work
    j. Disliked breastfeeding
    k. Infant illness
    l. Natural weaning
    m. Partner/Family wanted to feed baby
    n. Partner was not keen on me feeding
    o. Other….

5. What was your attitude towards breastfeeding this baby (as many choices as necessary)
    a. Enjoyed, but would not do again
    b. Disliked
    c. Breastfed as thought better for baby
    d. Family pressure to breastfeed
    e. Enjoyed, would breastfeed other babies
    f. Enjoyed, would have breastfed for longer if possible

Generalized Self-Efficacy Scale (GSES)

1 – Not at all True
2 – Barely True
3 – Moderately True
4 – Exactly True

1. I can always manage to solve difficult problems if I try hard enough.
2. If someone opposes me. I can find means and ways to get what I want.
3. It is easy for me to stick to my aims and accomplish my goals.
4. I am confident that I could deal efficiently with unexpected events.
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.
6. I can solve most problems if I invest the necessary effort.
7. I can remain calm when facing difficulties because I can rely on my coping abilities
8. When I am confronted with a problem, I can usually find several solutions.
9. If I am in a bind, I can usually think of something to do.
10. No matter what comes my way, I'm usually able to handle it.

Weight Control Self-Efficacy Scale
Please answer the following questions on a 7-point scale

3	2	1	0	-1	-2	-3
Most like me			Neither like me nor unlike me		Most unlike me	

1. When it comes to weight control, I am confident in my ability to reach my goal

2. When it comes to weight control, I'm able to do things as well as most other people

3. When it comes to weight control, I make decisions as well as anyone else

4. When it comes to weight control, I can stick to a plan over a period of time

5. When it comes to weight control, I seem to have a real inner strength

6. When it comes to weight control, I have a tendency to side-step my problems

7. When it comes to weight control, I'm afraid people will criticize me if I do the wrong things

8. When it comes to weight control, I give up very easily

9. When it comes to weight control, I just don't believe I've got what it takes

10. When it comes to weight control, I wind up kicking myself for the things I do

11. When it comes to weight control, I'm pleased with what I do in social situations

12. When it comes to weight control, I have a lot of self-control

13. When it comes to weight control, I think other people expect too much of me

Multidimensional Scale of Perceived Social Support

1 – Very Strongly Disagree
2
3
4
5
6
7 – Very Strongly Agree

1. There is a special person who is around when I am in need.
   1 2 3 4 5 6 7
2. There is a special person with whom I can share my joys and sorrows.
   1 2 3 4 5 6 7
3. My family really tries to help me.
   1 2 3 4 5 6 7
4. I get the emotional help and support I need from my family.
   1 2 3 4 5 6 7
5. I have a special person who is a real source of comfort to me.
   1 2 3 4 5 6 7
6. My friends really try to help me.
   1 2 3 4 5 6 7
7. I can count on my friends when things go wrong.
   1 2 3 4 5 6 7
8. I can talk about my problems with my family.
   1 2 3 4 5 6 7
9. I have friends with whom I can share my joys and sorrows.
   1 2 3 4 5 6 7
10. There is a special person in my life who cares about my feelings.
    1 2 3 4 5 6 7
11. My family is willing to help me make decisions.
    1 2 3 4 5 6 7
12. I can talk about my problems with my friends
    1 2 3 4 5 6 7

Maternal Adjustment and Maternal Attitudes Scale – Attitudes Towards Pregnancy and the Baby Subscale:

Please complete each question by putting a circle around the answer which most closely applies to you. Work quickly and please remember to answer each question. We want to know how you have been feeling during the past month. If you have not considered some of the questions during the past month, go ahead and answer them based on your present feelings

7. Have you been worrying that you might not be a good mother?
Not at all A little A lot Very Much
10. Have you worried about hurting your baby?
Not at all A little A lot Very Much
14. Have you had enough time for yourself since you had the baby?
Not at all A little A lot Very Much
16. Have you regretted having the baby?
Never Rarely Often Very Often
22. Have you felt proud of being a mother?
Very much A lot A little Not at all
24. Have you been feeling happy that you have a baby?
Not at all A little A lot Very Much
28. Has the thought of having more children appealed to you?
Not at all A little A lot Very Much
29. Have you felt disappointed by motherhood?
Very much A lot A little Not at all
40. Have you enjoyed caring for your baby's needs?
Not at all A little A lot Very Much
51. Have you been wondering whether your baby will be healthy and normal?
Not at all A little A lot Very Much
54. Has life been more difficult since the baby was born?
Not at all A little A lot Very Much
Very much A lot A little Not at all
60. Have you enjoyed feeding your baby?
Not at all A little A lot Very Much

Parental Stress Scale

The following statements describe feelings and perceptions about the experience of being a parent. Think of each of the items in terms of how your relationship with your child or children typically is. Please indicate the degree to which you agree or disagree with the following items by placing the appropriate number in the space provided.

1 = Strongly disagree 2 = Disagree 3 = Undecided 4 = Agree 5 = Strongly agree

____ 1. I am happy in my role as a parent.

____ 2. There is little or nothing I wouldn't do for my child(ren) if it was necessary.

____ 3. Caring for my child(ren) sometimes takes more time and energy than I have to give.

____ 4. I sometimes worry whether I am doing enough for my child(ren).

____ 5. I feel close to my child(ren).

____ 6. I enjoy spending time with my child(ren).

____ 7. My child(ren) is an important source of affection for me.

____ 8. Having child(ren) gives me a more certain and optimistic view for the future.

____ 9. The major source of stress in my life is my child(ren).

____ 10. Having child(ren) leaves little time and flexibility in my life.

____ 11. Having child(ren) has been a financial burden.

____ 12. It is difficult to balance different responsibilities because of my child(ren).

____ 13. The behavior of my child(ren) is often embarrassing or stressful to me.

____ 14. If I had it to do over again, I might decide not to have child(ren).

____ 15. I feel overwhelmed by the responsibility of being a parent.

____ 16. Having child(ren) has meant having too few choices and too little control over my life.

____ 17. I am satisfied as a parent.

____ 18. I find my child(ren) enjoyable.

Edinburgh Postnatal Depression Scale (EPDS)

As you are pregnant or have recently had a baby, we would like to know how you are feeling. Please check the answer that comes closest to hove you have felt IN THE PAST 7 DAYS, not just how you feel today.

In the past 7 days:

1. I have been able to laugh and see the funny side of things
    a. A much as I always could
    b. Not quite so much now
    c. Definitely not so much now
    d. Not at all

2. I have looked forward with enjoyment to things
    a. As much as I ever did
    b. Rather less than I used to
    c. Definitely less than I used to
    d. Hardly at all

3. I have blamed myself unnecessarily when things went wrong
    a. Yes, most of the time
    b. Yes, some of the time
    c. Not very often
    d. No, never

4. I have been anxious or worried for no good reason
    a. No, not at all
    b. Hardly ever
    c. Yes, sometimes
    d. Yes, very often

5. I have felt scared or panicky for no very good reason
    a. Yes, quite a lot
    b. Yes, sometimes

c. No, not much
d. No, not at all

6. Things have been getting on top of me
   a. Yes, most of the time I haven't been able to cope at all
   b. Yes, sometimes I haven't been coping as well as usual
   c. No, most of the time I have coped quite well
   d. No, I have been coping as well as ever

7. I have been so unhappy that I have had difficulty sleeping
   a. Yes, most of the time
   b. Yes, sometimes
   c. Not very often
   d. No, not at all

8. I have felt sad or miserable
   a. Yes, most of the time
   b. Yes, quite often
   c. Not very often
   d. No, Not at all

9. I have been so unhappy that I have been crying
   a. Yes, most of the time
   b. Yes, quite often
   c. Only occasionally
   d. No, Never

10. The thought of harming myself has occurred to me
   a. Yes, quite often
   b. Sometimes
   c. Hardly ever
   d. Never

Patient Satisfaction Questionnaire:
Please indicate how much you agree or disagree with each statement regarding your visit with this nurse/doctor. Please answer these questions based on your healthcare provider during your most recent pregnancy.

Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

1. I told my nurse/doctor everything that was on my mind
Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

2. I was able to tell my nurse/doctor what was bothering me
Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

3. I felt understood by my nurse/doctor
Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

4. My nurse/doctor did not make me feel rushed
   Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

5. I had confidence in my nurse/doctor's abilities
   Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

6. My nurse/doctor made me feel comfortable enough to tell them everything that was bothering me
   Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

7. My nurse/doctor made it easy to understand what, if anything, was wrong with me
   Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

8. My nurse/doctor gave me undivided attention
   Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

9. I got to ask my nurse/doctor all the questions I wanted
   Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

10. My nurse/doctor spent the right amount of time with me
    Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

11. I was pleased with my visits with my nurse/doctor
    Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

12. My nurse/doctor always seemed to know what he/she was doing
    Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

13. I have a good deal of confidence in my nurse/doctor
    Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

14. My nurse/doctor really cared about me as a person
    Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

15. My nurse/doctor never acted like I did not have any feelings
    Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

16. My nurse/doctor treated me with a great deal of respect
    Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

17. My nurse/doctor never "talked down" to me
    Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

18. My nurse/doctor was kind and considerate of my feelings
    Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

19. My nurse/doctor tried to make me feel relaxed
    Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

20. My nurse/doctor relieved my worries about medical conditions
    Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

21. My nurse/doctor made it easy for me to ask questions
    Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

22. My nurse/doctor listened to me closely
    Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

23. I trust my nurse/doctor
    Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree

24. My nurse/doctor spent enough time with me
    Strongly disagree Somewhat disagree Undecided Somewhat agree Strongly agree