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Authors

Thomas, Melanie

Vieten, Cassandra

Adler, Nancy

et al.

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Potential for a stress-reduction intervention to promote healthy gestational weight gain: focus groups with low income pregnant women

Melanie Thomas, MD, MS[1], **Cassandra Vieten, PhD**[2], **Nancy Adler, PhD**[1], **Ingrid Ammondson, PhD**[2], **Kimberly Coleman-Phox, MPH**[3], **Elissa Epel, PhD**[1], and **Barbara Laraia, PhD, MPH, RD**[4]

Melanie Thomas: Melanie.Thomas@ucsf.edu; Cassandra Vieten: vietenc@sutterhealth.org; Nancy Adler: Nancy.Adler@ucsf.edu; Ingrid Ammondson: iammondson@gmail.com; Kimberly Coleman-Phox: ColemanPhoxK@chc.ucsf.edu; Elissa Epel: Elissa.Epel@ucsf.edu; Barbara Laraia: blaraia@berkeley.edu

[1]Department of Psychiatry, University of California, San Francisco, San Francisco, CA, USA

[2]California Pacific Medical Center Research Institute, San Francisco, California, USA

[3]Center for Health and Community, University of California, San Francisco, San Francisco, CA, USA

[4]School of Public Health, University of California, Berkeley, Berkeley, CA, USA

Introduction and Background

The magnitude of the obesity epidemic among women of childbearing age in the U.S. is staggering: 60% of all women ages 20-39 and 40% of pregnant women are either overweight or obese (Yeh and Shelton 2005) with women of lower socioeconomic status (SES) and women of color sharing a greater portion of the burden (Ogden, Carroll et al. 2006). Given the increasing prevalence of obesity among pregnant women, the Institute of Medicine (IOM) recently established new guidelines for gestational weight gain (GWG) according to pre-pregnancy body mass index (BMI). Specifically, these recommendations include a total GWG of 15-25 pounds for overweight women (BMI 25.0-29.9) and 11-20 pounds for obese women (BMI ≥ 30.0) (Rasmussen and Yaktine 2009). Excessive GWG confers risk to the pregnant woman and her fetus. Maternal complications include increased risk of gestational diabetes mellitus (GDM), pre-eclampsia, Cesarean section, maternal mortality (Mamun, Callaway et al. 2011; Norman and Reynolds 2011), and post-partum weight retention (Mamun, Kinarivala et al. 2010; Nehring, Schmoll et al. 2011; Hernandez 2012). For offspring, associated risks include increased rates of obesity in childhood and adulthood (Mamun, O'Callaghan et al. 2009; Schack-Nielsen, Michaelsen et al. 2010),

Correspondence to: Melanie Thomas, Melanie.Thomas@ucsf.edu.

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greater potential for developing metabolic syndrome (Boney, Verma et al. 2005), and increased incidence of autism spectrum disorders (O'Higgins, Doolan et al. 2013).

In spite of the importance of healthy GWG, approximately 60% of women gain in excess of the IOM recommendations (Carmichael, Abrams et al. 1997; Webb 2008). The reasons for this “non-compliance” are myriad and have significant policy and practice implications for women's health. Studies to date show mixed results for dietary and other behavioral interventions designed to reduce excessive GWG (Skouteris, Hartley-Clark et al. 2010; Tanentsapf, Heitmann et al. 2011). A recent review concludes that insufficient research exists to make evidence-based recommendations regarding clinical interventions targeting GWG (Ronnberg and Nilsson 2010). Given the magnitude and scope of problems associated with excessive GWG and the paucity of evidence for effective interventions, new approaches are needed. Since depression has been related to excessive gestational weight gain among low income women (Wright, Bilder et al. 2013), interventions targeting psychological factors alongside dietary change have promise.

Recently, Davis et al. highlighted the overlap of stress, coping, and eating behaviors and hypothesize that these interactions play a critical role in the obesity disparities among women of childbearing age (Davis, Stange et al. 2010). Chronic stress and stress during pregnancy are associated with many of the same maternal and offspring risks as maternal obesity and excessive GWG (Wadhwa 2005; Entringer, Buss et al. 2010; Dunkel Schetter 2011). The public health impact of stress within this population is amplified by the association between increased psychosocial stress and antepartum depression (Jesse and Swanson 2007; Melville, Gavin et al. 2010; Dailey and Humphreys 2011). Thus, the interactions among stress, eating behavior, and GWG warrant further exploration. Several recently published qualitative studies examine various contextual factors related to diet and GWG among low income pregnant women (Goodrich, Cregger et al. 2013; Paul, Graham et al. 2013; Reyes, Klotz et al. 2013). Our study extends this work to ask women specifically about their perceptions of the relationship between stress and eating and their interest in a stress reduction intervention during pregnancy.

Maternal stress may impact GWG by two primary pathways: alteration of maternal psychoneuroendocrine physiology and health-related behaviors such as dietary intake and exercise. There is growing evidence of the relationship between stress and eating behaviors, and the role of the HPA-axis and reward circuitry with increased intake of calorically dense food (Adam and Epel 2007). Non-pregnant women with chronic stress have been found to be more prone to emotional eating and visceral deposition of fat (Tomiyama, Dallman et al. 2011) and reduction in abdominal fat was shown among overweight women who experienced a reduction in stress and cortisol awakening response after participating in mindfulness training (Daubenmier, Kristeller et al. 2011). Furthermore, low income women who report higher levels of stress and depression also have lower quality of dietary intake during the first trimester (Fowles, Stang et al. 2012). There is evidence indicating the effectiveness of stress-reduction interventions during pregnancy to ameliorate negative mood and perceived stress (Beddoe and Lee 2008; Vieten and Astin 2008; Urizar and Munoz 2011), but this has not been extended to the relationship with GWG.

Our research team is developing a mindfulness-based stress reduction and nutrition intervention for low-income, overweight and obese pregnant women to achieve healthy GWG. To inform intervention development, we conducted focus groups with women representative of the target population to elicit information about stress, eating behaviors, weight and other health concerns, and to gain feedback about our proposed intervention. By asking women directly about their lives, we are adding their voices to the theoretical construct of pregnancy as a "window of opportunity" for obesity intervention. Their responses provide critical information from low-income overweight women that should influence the dilemma of weight management in pregnancy.

Methods

Focus groups were chosen because we aimed to create a participant-informed intervention that would reflect the needs of the population being served. Focus groups are effective in gathering information on sensitive topics (Halcomb, Gholizadeh et al. 2007) and in populations that tend to be marginalized (Steward and Shamdasani 1994; Halcomb, Gholizadeh et al. 2007). The group interaction of focus groups can elicit responses and data that might not be accessible from individual interviews (Morgan 1993). We were particularly interested in what women would reveal in a group setting about their experience of stress and eating behaviors since we were planning a group intervention.

Women were recruited through prenatal care providers, clinics, and advertisements in community settings. Inclusion criteria were: 1) currently pregnant, 2) BMI ≥ 25.0, 3) income to poverty ratio ≤ 500% specific to family size. Exclusion criteria were: 1) inability to read or speak English, and 2) psychiatric or physical limitations that would limit participation in the focus group. One hundred and twenty-six women were screened, 69 of whom met eligibility criteria. The most common reasons for ineligibility were BMI < 25.0 or income to poverty ratio > 500%. Ten eligible women did not participate in focus groups because of scheduling difficulties or illness.

A total of 59 women participated in focus groups of 2-9 participants each. Participants provided written informed consent and completed a pre-focus group questionnaire to collect basic demographic and health information. Groups were led by two female facilitators: an African-American social worker and a Caucasian clinical psychology post-doctoral fellow. Both were experienced in conducting focus groups with women in a healthcare context. A semi-structured script consisting of open-ended questions with probes was used. Examples of questions asked include: a) "Are you concerned about how much weight you gain during pregnancy? If so, what are your main concerns? If not, why not?" b) "Now I want you to think about some of the things in your life that make you feel stressed. What are some of the things that stress you out?" and c) "If you said that you would like to participate in a class like this, what is the single most important thing that would make you want to do so?" Group duration was approximately two hours and women were compensated with $50.00 gift cards.

Focus groups and interviews were audio-recorded and transcribed verbatim. Transcripts were read in entirety and analyzed independently by two members of the research team (MT

and IA). Our primary coding scheme used three *a priori* determined categories of interest: a) sources and significance of stress; b) relationship between stress and eating; and c) motivation for a pregnancy intervention. These represented the key topics of interest in designing the intervention: (1) were women in this population concerned about weight management during pregnancy? (2) did they experience high levels of stress?, and (3) would they be interested in participating in a stress reduction intervention linked to weight management? A separate content analysis of transcripts conducted by research team member and focus group facilitator (IA) confirmed the prevalence and saturation of these *a priori* themes as presented in our results.

This study was approved by [names of IRBs blinded by *WHI* editors for peer review].

Results

Participant characteristics

Fifty-nine low income, overweight or obese pregnant women completed a questionnaire and participated in a focus group. Participants were racially/ethnically diverse (50% Black, 23% White, 14% Latino, 13% Other) and the average age was 29.4. Fifty-five percent had an income-poverty ratio <100% and the remainder had a ratio < 500%. Thirty-eight percent of participants were overweight (BMI 26.0-29.9), 30% were in obesity class I (BMI 30.0-34.9), 24% were in obesity class II (BMI 35.0-39.9), and 8% were in obesity class III (BMI ≥ 40.0). Additional information obtained from pre-focus group questionnaires showed that 61% of the current pregnancies were unplanned and 78% of women were concerned about weight gain in pregnancy. Seventy percent of women participated in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) and 42% reported that fresh foods were either “only somewhat” or “not accessible.” In response to the survey question, “How would you rate the current level of stress in your life,” the majority of women selected moderate (51%) or high (29%).

Focus group themes

Table 1 illustrates the quantitative tally conducted using our focus group transcripts. These numbers are not used explicitly in our results, but provide evidence for saturation of themes and were used as guidance in choosing terms such as “many,” “most,” or “some,” to describe the prevalence of themes and ideas.

Sources and significance of stress

(1) Stress related to SES: Women linked financial difficulties to various specific stressors including insufficient or unstable housing, job insecurity, and food insecurity. These financial concerns were amplified in the context of pregnancy and fears of being unable to provide adequately for their children. One woman reported: “Especially at the end of the month, I run out of food. You need to have food, especially my kids. Like me, I can go, but my kids I definitely want them to eat.”

Another participant's experience illustrates the difficulty of a growing family and insufficient affordable housing:

> "Currently my son sleeps in the bedroom and my husband and I sleep in the living room. And we need a bigger place and we're not able to afford that right now… that is very stressful."

(2) Stress related to relationships: Relationships were frequently mentioned as another source of stress. Although a number of women talked about the joy they received from their children, many also discussed children as a stressor, especially in combination with unsupportive or absent partners. One woman describes the interaction of these primary relationship stressors with eating as a coping mechanism:

> "I have a very stressful life 'cause I'm a single mother of four now. Their father is nowhere in the picture. They're rebelling and I'm like it just stresses me out because I don't know how to deal with it. … I stress, I eat and I want to go to sleep."

(3) Stress related to pregnancy: Psychological stress expressed by our participants included anxiety related to their pregnancy and the transition to motherhood. Several women linked this anxiety to the unplanned nature of their pregnancy. Women in our groups described conflicts between their excitement and concerns about the changes to come. Some women were worried that the coming baby would increase demands on their already limited time and resources. Many women talked about their desire to be good mothers and some discussed stress management as a way to achieve this goal. One participant who was anxious about the transition to motherhood and her success in this new role described her fears:

> "Am I gonna be a good mom?! You know, and, my cousin she had a baby and I didn't know what to do with that little thing, you know. And like I didn't even want to touch it and I'm kinda like oh man, this is gonna be me, I'm gonna have to with my own kid… At this particular point I need something different and so far it's been good but everything is stressful, you know. Like, you know, do you eat enough, are you not eating enough… So it's just, I mean when is it not stressful?"

(4) Stress related to weight and health: Many women explicitly identified concerns about their health and weight as a source of stress. Women often expressed uncertainty about the appropriate weight gain for pregnancy and a sense of defeat about their ability to gain accordingly. One participant describes the connections between her pregnancy weight gain and mental health as follows:

> "I never been skinny, except for when I was really, really small. But, with my son I gained 70 pounds. So, I was like that was really, really bad 'cause I had that post-partum depression real bad because of all my weight gain. So now I do eat a lot healthier now and everything but I don't exercise as much as should. I had lost some weight before I got pregnant and yeah, I'm really concerned about it."

Both the questionnaire responses and the discussions in our focus groups indicate high levels of stress in this population. Although women experienced a variety of external stressors, the themes of financial, relationship, health, and pregnancy-related stress were robust.

Relationship between stress and eating—Many women in our focus groups recognized that stress and eating were linked in their lives. Occasionally women stated they

ate less when stressed, but the majority indicated that the more they felt stressed, the more they ate. These women varied in the ways in which they connected their emotional state with eating. Most frequently, eating was associated with negative emotional states including stress, sadness, loneliness, or anxiety. Other reasons for eating included mindless eating, eating for comfort, as well as a temporary sense of happiness or wellbeing. For example, one woman stated, “Does [stress] cause me to eat more? Yes, it does. I can take down a whole box of Ho Ho's and a half gallon of milk but it doesn't really make you feel better; it just makes you feel at ease for the moment.”

Some women described eating more as a coping mechanism for their stress. They discussed eating in response to acute stressors as well as a pattern of negative coping behavior:

> “It's so obvious the connection between stress and food in my life; like my husband will call me and he'll be like well my paycheck was actually $100 less than we thought it was going to be so we might not be able to pay PG&E this month but we'll do something else; and my first reaction is like – I just need to go eat something! Like how is that going to help anything? Eating a bowl of ice cream is not going to help me keep my electrical bill on.”

Another woman explicitly described her lifelong experience of eating as coping mechanism:

> “From the time that I was little I can remember I had a lot of stress in my family with my mother, and so my way of dealing with things was… fishing in the couch and finding 99 cents and going to McDonalds and grabbing a cheeseburger. And so to this day, my favorite food is a darned cheeseburger.”

Although a significant number of women in our groups saw a connection between eating and stress in their lives, some women did not. One woman stated, “I honestly don't think that the whole overweight and being concerned about your weight fits in with the stress thing.”

Overall, women in our groups provided insightful descriptions of the complex relationship between stress, emotions, and eating in their lives. Although they most often connected stress with eating more, they also talked about mindless eating. Some women recognized undesired consequences of their eating behaviors, including the intransigent nature of long-established patterns.

Motivations for stress reduction intervention during pregnancy—Most of the women in our focus groups expressed interest in attending a stress reduction intervention during pregnancy. In fact, several women expressed disappointment that they would be unable to attend the intervention classes. They appreciated the idea of an intervention that addressed the interconnection of their motivations and behavior rather than only offering dietary or nutritional advice. Women discussed their desire for a novel approach to the issue of weight. They expressed a sense of “been there done that” regarding traditional programs:

> “I like that [the proposed intervention] incorporates a holistic approach, trying to step out of the stress and see what your patterns are that can help me to change I think… the reason why I stay away from Weight Watchers or other, other groups, they just seem too rote to me.”

Because most women recognized connections between stress and eating, they were enthusiastic about learning specific skills to target stress eating. They discussed that an intervention designed to "get to the root" of their problems was appealing given that dietary recommendations alone have not helped them. One participant explained:

> "Because there's different forms of stress and if I could find out what's really triggering me to want to eat all those sweets, then I could work on that and maybe my sweet intake will go down…If I know that's a bad thing and I'm going to gain weight, why do I keep doing it? If I could learn better ways of coping with things…"

Participants were excited about an intervention that focused on stress reduction specifically during pregnancy. One woman expressed this preference by stating, "I like the thought of there being a special mindfulness class for pregnancy … I really like that pregnancy is the center of it."

Many women indicated that they were particularly interested in an intervention that could influence their own life course trajectory as well as the life course of their child. They wanted to learn skills that would be applicable during their pregnancy and beyond. One woman shared her enthusiasm about perceived long term benefits for herself and her baby:

> "It's okay having to gain weight because I'm pregnant anyways but then they're thinking but I want to eat healthy for my baby. So you're going in like I want to do the best thing for my baby, but really you're learning skills that are going to help you beyond just the time when you are carrying the baby."

Finally, participants discussed emotional support from other women in the group as a significant motivation for attendance. One participant described this potential camaraderie both as a positive experience in itself and a corrective measure against other influences:

> "I think it's helpful to be in a group of people who are trying to be healthier, as opposed to being the only one in your circle or your family who's trying to eat healthy –feeling like you're struggling against a brick wall to make healthier decisions. It's much easier – or it would be for me – if I was in a group of people who were trying to do that also – I think it would be – it would help me get strength and eat healthier."

In summary, almost all women were enthusiastic about a stress reduction based pregnancy intervention to target healthy GWG and eating behaviors. They were particularly interested in a group intervention with other pregnant women that went beyond traditional nutritional advice to target the emotional components of eating. They expressed optimism that such an intervention could address their concerns about weight gain in pregnancy, help them cope with high levels of stress in their lives, and provide meaningful skills to promote their own wellbeing and a healthier trajectory for their baby.

Conclusions and Discussion

Previous work has recommended qualitative approaches for further understanding the socio-cultural components of GWG (Rasmussen and Yaktine 2009; Davis, Stange et al. 2010) and

our study addresses this gap. The women in our focus groups had substantive discussions about sources of stress, the relationship between stress and eating, and motivation for a stress-reduction intervention during pregnancy. Stress was a salient construct for women in our groups, with 80% describing their current life stress as “moderate” or “high.” This finding is consistent with other studies that have documented significant stressors, including inadequate financial resources, social conflict, and pregnancy-related anxiety among low-income pregnant women (Dailey and Humphreys 2011; Yu, McElory et al. 2011). In addition to stress during pregnancy, these life-stressors were often chronic, across multiple domains of life, and without the buffer of social and economic support afforded to women of higher SES. The coupling of chronicity with stressors that include a threat to wellbeing described by our participants may result in particularly damaging psychological and metabolic consequences (Adam and Epel 2007; Tomiyama, Dallman et al. 2011) and is likely more relevant to GWG and adverse outcomes that short-term acute stressors.

The enthusiasm for a more holistic intervention expressed by our participants has been seen in other studies approaching a variety of behaviors during pregnancy in a more integrated fashion (Katz, Blake et al. 2008; Mauriello, Dyment et al. 2011). Women were excited about a focus on pregnancy and stress reduction in the greater context of their lives and something more than routine dietary or exercise advice. The women in our groups expressed a desire to make behavioral changes not just for themselves, but for the future wellbeing of their child. Women in our groups also expressed optimism that learning stress reduction skills would have lasting effects.

This study has several limitations. We had a wide range of number of participants (range 2-9) in our focus groups and the level of disclosure is likely to be different in groups of two to three women. The variation in number reflects the difficulty of recruiting and scheduling this specific population of low income, overweight or obese pregnant women, and has implications for the ability to run groups in studies. Our study did not include a comparison group, limiting our ability to draw definitive conclusions about how the types of stress experienced by overweight/obese low income women may differ from women with lower BMIs or higher incomes. Also, given the availability and increased awareness of integrative or holistic aspects of healthcare in the San Francisco Bay area, generalizability may be somewhat limited. Finally, we report our findings according to *a priori* categories generated from our research interests. Although themes discussed in this paper were well represented throughout our groups, we did not report on all aspects of the discussions.

Implications for Practice and/or Policy

Our findings add qualitative evidence to the assertion we must broaden our thinking about obesity interventions (Kumanyika, Parker et al. 2010) and that women of childbearing age may be an important target population in the context of the larger obesity epidemic (Davis, Stange et al. 2010). This “window of opportunity” is enhanced by increased motivation for behavioral change and increased contact with the healthcare system during pregnancy (Herzig, Danley et al. 2006; Phelan 2010).

We are unaware of other qualitative studies that have asked low income, pregnant women about the relationship of stress and eating in their lives. However, several quantitative

examples demonstrate associations between both general psychosocial stress and pregnancy-specific stress and dietary behavior in this population (Lobel, Cannella et al. 2008; Laraia, Siega-Riz et al. 2009; Fowles, Bryant et al. 2011). Our focus groups illustrate that low income, overweight/obese pregnant women are aware of the complex psychological and social factors that contribute to their eating behaviors and are interested in a comprehensive approach. This supports the notion that successful clinical or policy-level interventions will likely need to be comprehensive including attention to psychosocial factors (Nelson, Matthews et al. 2010). Programs and providers targeting GWG in low income women may need to be integrated with social services and psychological interventions that address the chronic and substantial stressors experienced by this at-risk population.

Our study suggests that low income, overweight and obese pregnant women experience significant stress, recognize a relationship between stress and overeating, and are enthusiastic about participation in a stress reduction and healthy weight gain intervention during pregnancy. These findings have particular relevance given the lack of evidence-based interventions targeting GWG and the recent assertion from the IOM that the new GWG recommendations will necessitate a “radical change in care as women clearly require assistance to achieve the recommendations in this report in the current environment” (Rasmussen and Yaktine 2009). Our focus groups demonstrate that low income pregnant women are invested and are potentially willing partners for practitioners working to develop and implement behavioral interventions. Future work should involve trials to test the acceptability, feasibility, efficacy, and effectiveness of stress-reduction interventions designed to target healthy GWG in this population.

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Table 1
Quantitative tally of participant responses to focus group questions

Questions	Participant Responses
Are you concerned about your weight gain during pregnancy?	**a.** Yes – tied to health risks (29) **b.** Yes – dislike of weight gain/worry over difficulty losing later (17) **c.** No (11) **d.** No – have lost weight (2) **e.** Yes - have lost weight so far but worried about future weight gain (2)
What are your current stressors?	**a.** Nutritional balance worries, difficulties (26) **b.** Existing children (17) **c.** Partner/relationship (16) **d.** Fear of unknown, preparation for the future, adjustment to motherhood (14) **e.** Finances (13) **f.** Aspects of school, work, schedule (12) **g.** Health/weight worries (11) **h.** Demands from family of origin, extended family relationships (11) **i.** Self-expectations (9) **j.** Being a single parent, not having family help (7) **k.** Homelessness or housing situation (6) **l.** Everything, everyday life (6) **m.** Unemployment, business loss (5) **n.** Sleeplessness (5) **o.** Emotional reactions to life situation (5) **p.** Worries about health of the baby (5) **q.** Lack of self-care (4) **r.** Don't feel a lot of stress right now (3) **s.** Living in rehab (3) **t.** Family illnesses (2) **u.** Starting new life with partner (2) **v.** Lack of health insurance (1) **w.** Current divorce, separation (1) **x.** Domestic violence (1) **y.** The past (PTSD) (1)
Do you think your stress is related to your health or weight?	**a.** Yes – emotional or stress eater – food as friend or comfort (21) **b.** Yes – concerned about stress effects on health and baby (14) **c.** Yes – lose weight when really stressed (9) **d.** No – stress does not affect eating, weight (8) **e.** Yes – not doing the right things to eat properly (4) **f.** Yes – stress causes serious sleep disturbance (4) **g.** Yes – eat mindlessly when under stress (2) **h.** Yes – stress affects everything in my life (2)

Questions	Participant Responses
	i. Yes – stress affects health, such as blood pressure (2) **j.** Yes – addicted to food, food as enemy (2) **k.** No – do not allow stress to affect me, even if it exists (2)
Would you be interested in a mindfulness-based stress reduction class to help with healthy weight gain during pregnancy? If so, why and if not, why not?	**a.** Stress reduction, changing habitual reactions, developing better coping (19) **b.** Overall concept - novel, diverse, positive, or holistic information (13) **c.** Sharing with others, group support (9) **d.** Mindfulness concept, mindful pregnancy, meditation (8) **e.** Healthy eating/weight management concepts (4) **f.** Helping children (3) **g.** Healthy pregnancy, motherhood information (2) **h.** Movement component (not just didactic & meditation) (2) **i.** Help with ability to sleep (2) **j.** Want to have a better life and future (2) **k.** Gaining control over life (1) **l.** Helping with ability to focus (1) **m.** Helping with dealing with children (1) **n.** Doing fun things and obtaining compensation (1) **o.** Not interested (0)