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Reasons for late night eating and willingness to change: A qualitative study in pregnant black women

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Abstract

Objective: Late night eating during pregnancy is associated with greater risk for gestational diabetes. The purpose of this study was to describe reasons that women engage in late night eating and understand perceptions about changing this behavior.

Design: Focus groups using a semi-structured interview script.

Setting: Urban university-affiliated obstetric clinic.

Participants: Low-income black women (n=18) with overweight/obesity at entry to prenatal care.

Phenomenon of interest: Late night eating.

Analysis: Exhaustive approach coding responses to specific questions.

Results: Individual and interpersonal contributors to late night eating included hunger, altered sleep patterns, fetal movement, and the influence of others. Food choices were largely driven by taste and convenience. Some women reported that they could alter nightly eating patterns, while

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others would only consider changing if late night eating was associated with a severe illness or disability for the child.

Conclusions and Implications: There was considerable heterogeneity among the participants of this study about reasons for late night eating during pregnancy and attitudes toward changing this behavior. Although the themes identified from this study cannot be generalized, they may be useful to inform future studies. Future research should develop strategies to overcome the individual and social factors that contribute to late night eating during pregnancy.

Keywords

feeding patterns; pregnancy; obesity; nocturnal; diet; focus groups

INTRODUCTION

One in every three American women of reproductive age is obese, and the prevalence among black women is significantly greater than among white women.¹ Maternal obesity increases the risk for complications during pregnancy, such as impaired glucose tolerance and gestational diabetes mellitus (GDM).² In addition to the risks for the mother, maternal obesity is associated with greater risk of obesity for the child.^{3,4} This risk is believed to be at least partially attributable to the delivery of excess fuel across the placenta, which in turn, programs fetal metabolism in a manner that promotes weight gain and adiposity.³⁻⁵ Consequently, maternal obesity is a significant driver of the intergenerational transmission of obesity.

Although it would be optimal for women to lose weight prior to pregnancy so they conceive when their BMI is within normal range, this is not always feasible. In the United States, almost 50% of pregnancies are unplanned and this rate is higher among low-income black women.⁶ The next best approach is to intervene during pregnancy to prevent excess weight gain and related complications.

A prior study reported that black women of low-socioeconomic status frequently engaged in late night eating during the third trimester of pregnancy.⁷ On average, 23% of their daily calories were consumed between 8pm and 6am.⁷ Further, among women who were obese prior to pregnancy, late night carbohydrate intake was associated with higher glucose concentrations following an oral glucose challenge; a pattern not seen in women of normal weight.⁷ This finding is consistent with another study reporting that women with longer overnight fasts during pregnancy have lower fasting and post-challenge glucose concentrations.⁸ Together with the emerging evidence of adverse consequences associated with shift-work, altered meal times, and disrupted circadian rhythms,⁸⁻¹⁴ this research suggests that late night eating may impair glucose tolerance in late pregnancy, at least among women who were obese prior to pregnancy. Little is known about reasons for late night eating during pregnancy. Reyes, et al reported themes surrounding general healthy eating during pregnancy for low-income black women,¹⁵ but late night eating was not specifically addressed.

The types of foods and beverages consumed during late night eating is also important. In the aforementioned study, the increase in blood glucose associated with late night eating was attributable predominantly to carbohydrate intake.⁷ Although this study did not distinguish carbohydrates with a high versus low glycemic index (GI), foods with a high GI, such as refined breads, cookies, and soda, are potentially more detrimental because they generate a larger increase in circulating glucose concentrations as compared to those with lower GI.¹⁶ Consequently, it may be possible to improve both maternal and fetal health during pregnancy by specifically targeting late night eating of high GI foods and beverages.

Before developing an intervention to address late night eating, it is important to understand the factors that contribute to this behavior, potential barriers to change, and identify potential low GI foods/beverages that would be acceptable alternatives for this population. Theoretical models of health-related behaviors such as the Social Ecological Model,¹⁷ Theory of Planned Behavior,¹⁸ and Health Belief Model,¹⁹ posit that there are numerous influences on behavior, ranging from those that are specific to the individual such as their beliefs, perceptions and underlying physiology, to interpersonal factors such as relationships with others in the household, and more broad environmental and societal factors. These models provide a useful framework to address the overall goals of this project, which were to: (1) identify the individual and interpersonal influences on late night caloric intake of black women who were overweight or obese prior to pregnancy; (2) examine women's attitudes and perceptions about changing this behavior; and (3) obtain women's perceptions and acceptance of lower GI food and beverages.

METHODS

PARTICIPANTS

This study was conducted at a single, university-affiliated prenatal care clinic located in an urban southeastern region of the United States. Electronic medical records were used to identify women who were potentially eligible for this study. Black women aged 18 years and older, who were in their third trimester of pregnancy, and had a BMI of 25.0–45.9 kg/m² at the first prenatal care visit, were eligible to enroll. Women were contacted by telephone, informed of the study, and asked whether they regularly ate between 8pm–6am. Only those who reported doing so, and whose late night eating was not attributed to working night shifts were invited to participate. Eligible women were scheduled to attend a focus group at the prenatal care clinic.

DATA COLLECTION

Focus group methodology was used to explore the shared group experience and perceptions of late night eating. The moderator was trained and experienced in multiple qualitative data collection methods including focus groups, nominal group technique, and motivational interviewing. The *a priori* plan was to conduct 3–4 focus groups, comprising of 6–8 participants per group, which has been suggested as adequate to achieve saturation.²⁰ The moderator used a semi-structured interview script to help guide the focus groups (Table 1). One researcher (PCL) who had experience with metabolic health during pregnancy in the black community, developed the interview script using guidelines from Krueger and Casey.

²⁰ Two different researchers (MB and TC), who were familiar with the patient population at the clinic and had prior experience with qualitative research,^{21,22} reviewed the interview script for clarity and appropriateness. The questions posed in the script prompted conversation about participants' perceptions of individual and interpersonal factors that contributed to late night eating, specific food and beverage choices, barriers to changing this behavior, and perceptions of a proposed intervention to modify late night food and beverage choices. Sessions were audio-recorded and a note taker was present. To facilitate familiarity with the participants and to promote openness to share during the focus group session, both the moderator and note-taker were selected to be racially concordant with participants.²⁰ The moderator reviewed the study procedures and the consent form at the beginning of each session, and informed consent was obtained from each participant.

As part of the focus group sessions, a buffet of foods and beverages was offered at a table within the room and women were encouraged to consume as much or as little as they wanted before, during, and after the session. The choices provided had a lower GI than had previously been reported as consumed by women in this clinic population.⁷ For example, diet soda was provided instead of regular, slices of cheese and salami were offered with no bread or pizza-type base, and fruit and vegetables were offered with low-sugar yogurt, ranch, and peanut butter dips. Towards the end of the focus group session, the moderator solicited feedback from the participants about their acceptance and liking of the food and beverages offered. The goal was to identify potential lower-GI food/beverages that could replace those typically consumed at night. Foods/beverages offered at the next focus group were revised after participant feedback. If an item was not discussed by the women or had positive feedback, it was offered during the next focus group to obtain continued feedback. If a food/beverage item had negative feedback, a Registered Dietitian identified an alternative to be offered at the next focus group. For example, diet soda was the lower-GI alternative to regular soda provided but received negative comments during the first focus group and so sparkling water was added for subsequent groups.

At the end of the focus groups, participants completed the Hollingshead Four Factor Index of Social Status,²³ along with two additional questions regarding the number of adults and children living in their household. Following each focus group, the moderator and note taker met to de-brief and discuss questions included in the interview script. Given that participants did not bring up topics that were not addressed in the interview script, no further changes were made to the script.

Focus group sessions were conducted until data saturation was reached.²⁴ Notes and transcripts were reviewed by the investigative team following the second session and it was determined that saturation had been met; however, a third focus group was held to confirm. No new themes emerged from the third focus group and thus data collection was concluded.²⁵ Childcare was provided in the clinic's waiting area for children who accompanied women to the focus group. Monetary compensation for time and travel was provided at the end of the session. The university's Institutional Review Board approved the study.

QUALITATIVE ANALYSIS

Audio recordings of the sessions were transcribed verbatim (Same Day Transcriptions, Inc., Lakewood Ranch, FL) and names and other identifiers were removed. Transcripts were uploaded into NVivo (version 11, QSR International [Americans], Inc., Burlington, MA, 2015),⁷ a qualitative management software program.

Data were coded separately by two investigators (EK and IH), and emergent themes to the specific questions from the script were identified. EK and IH have each completed graduate-level qualitative research courses and have several years of qualitative research experience. Data coding and analysis occurred as an iterative process, using an exhaustive approach.²⁶ EK and IH separately developed a codebook, which listed and described identified themes. Using a consensual process, the two coders and the PI, who acted as an outside auditor in cases of code disagreement, reviewed both codebooks and the direct quotes from the participants, until consensus was reached on the final codes. Throughout this process, coders kept separate reflection journals to track and reduce personal bias during the coding process. Intercooder reliability was not calculated because coders worked together to create the final codes through a consensual process.²⁷ The final codes were reviewed and confirmed to be representative of the focus group discussions by the two focus group moderators. Quotes presented in the results below are verbatim and not edited in order to respect the authentic voices of the study participants.

RESULTS

Thirty-six women were contacted about the study and four of these women declined due to a lack of interest. The remaining 32 were scheduled for one of three focus groups, but 14 women did not attend their session. Each of the three focus group sessions included four to eight participants and lasted approximately one hour. Demographic and clinical information of 18 participants are reported in Table 2. Education, occupation, and marital status were recorded from all but three of the women (n=15). The majority of participants had graduated high school (n=12) and of these, five had at least one year of college or specialized training. Six women were currently employed and one was a student. Thirteen women reported that they had never married and two were separated. The number of adults living in their home ranged from one to four (1.9 ± 0.8) and the number of children living at home ranged from zero to three (1.6 ± 1.1).

REASONS FOR LATE-NIGHT EATING

In general, participants characterized their late night eating as snacking, rather than one of the three typical daily meals. Reasons for late night eating were provided by the women in direct response to this question (#2), and also indirectly, as part of the discussion regarding barriers to changing their late night eating behavior. Responses are summarized below into individual and interpersonal contributors to late night eating.

Individual.—Participants described a number of physiological reasons for late night eating, such as hunger, thirst, fetal movement, altered sleep schedules, and nausea. Some of the

women described late night eating as more of a choice, rather than a response to any specific physiological experience.

Hunger.: A number of women attributed late night eating to hunger. One reported “I do not ever get that full feeling like I was before I was pregnant...I am constantly eating but I still be hungry...” Several indicated that they were routinely hungry at 2:00 or 3:00 in the morning. For example, one said “I want something to eat at like 2:00 or 3:00 in the morning, that’s when I am real hungry and I actually eat at that time”.

Thirst.: Being thirsty at night was a common complaint. Women commented: “I always wake up thirsty” and “That is my purpose of getting up, drinking.” For some, drinking at night also led to eating, “I either thirst and lack for water...and I drink water. I eat and go right back to sleep.”

Altered or disturbed sleep.: Women discussed how changes in their sleep patterns contributed to late night eating. Some woke later in the morning because of difficulty sleeping during the night, which shifted their mealtimes. One participant explained, “Because I sleep the majority of the morning, because I toss and turn the majority of the night anyway. So that is why I sleep so late. And then when I get up, I’m on the go...I don’t think about eating”. Others described sleep being disturbed because of heartburn, the need to use the restroom, or fetal movement. Interestingly, fetal movement was interpreted by some women as an indication that the fetus was hungry: “I think my baby make me know it when she hungry. She like [hunger noises] I am like okay, I am about to get up, hold on, just a minute.” Others agreed, stating, “Oh they wake you up! I eat whenever the baby says get up.” Within this context, some women commented that eating helped them fall back to sleep, “after I eat that I be like okay I can go back to sleep now.”

Nausea.: Participants reported nausea, particularly in the morning and during the first trimester, had impacted their eating patterns. One stated that eating frequently helped to stave off nausea: “If I go longer than two hours I get so nauseated...So it’s like I have to right on the hour and forty-five minutes, we need to find something to eat”. Some participants stated that because of nausea in the morning, they ate less during the early part of the day, but more at night. One participant described how nausea affected her morning eating as follows, “My first trimester I was real sick. And then after that... about 2:00 or 3:00 in the morning, I be starved out and I be wondering why... and then I got now a bag that sits on the side of my bed like Little Debbie cakes because I have to reach over just something to put in my mouth to just soothe.”

Non-physiological reasons.: Comments from several of the women suggested that there was not a physiological reason for their late night eating, but rather, they simply chose to eat overnight. For example, one woman said “There won’t be no reason, like I don’t even be hungry”, and another commented “Sometimes I don’t even be hungry.....I am going to eat some more of this because I’m awake”.

Interpersonal.—Participants partially attributed their late night eating to psychosocial influences. For some, eating was triggered by others in the household, such as children,

significant others, and parents, who were eating. One explained, "...because, my momma sit in here and eat all night, too, so we just be eating together." Another referred to a grandparent when she said "...as long as I hear him eating, I'm going to eat." Being woken by other members of the household was also a trigger to eat. One woman stated "When somebody wakes me up, Oh, my goodness, I can't go back to sleep unless something hits my mouth like I'll be starving". Another was talking about her children when she said "Yeah, they snack...when I go downstairs I'm going to pour them some juice and pour me some juice and then, I'm going to look in the refrigerator....it don't mean that I'm hungry, I just be down there so..."

Some women explained that they ate late at night in order to avoid sharing their food with others. These women described how others would eat all of the food in the house, leaving them feeling "upset", "mad at the world", or with "an attitude". Their solution was to keep a supply of food in a closet or bedside cabinet. For example, one woman said, "I have a snack closet, I am going to be honest, in my room...So, whatever I want, I can just open the closet and take it. I actually hide it from the children..." Another said "I eat dinner and then late night snacks I do not really have to share with my children, so I can eat all of it... so it is a perfect time."

LATE NIGHT FOOD CHOICES

In general, the types of foods that women consumed at night were processed, energy dense foods that had little nutritional value. Examples mentioned by women included cereal, ice cream, candy bars, noodles, corn dogs, Hot Pockets, ham sandwiches, snack cakes, along with water, juice, and soda. Some women admitted to going out to get fast food at night, but others expressed a dislike for fast food, particularly if fried. Many of their comments implied that taste, accessibility, and convenience were primary drivers of late night food choices; for example, "It is just at night. I be half sleep anyway. So, something that I can just quickly grab I do not have to do too much for it." Some women reported that their food choices were influenced by what others wanted to eat, but many expressed that they had at least some autonomy to choose what they wanted from what was accessible to them. Only one of the women stated that others encouraged her to make healthier choices. Referring to a roommate, the participant said: "...she was like, 'no more sodas, no more sodas.' She'd see me with a soda, she would take it and she'd call my boyfriend." This participant also stated that the roommate encouraged her to choose healthy options at the grocery store.

WILLINGNESS TO CHANGE LATE NIGHT EATING

When asked about willingness to change their late night eating habits if they learned that eating at night was potentially harmful to them or their babies, some women expressed they could at least try to change. These women discussed strategies such as eating earlier or going to sleep earlier. For example, one woman said, "I would just have to try to be eating a little earlier or something", and another said "Oh, it won't be that hard. I just go to sleep". Other women, however, admitted that it would be very difficult to change their late night eating habits. One woman reflected the sentiment of several when she said "I mean, I care about my baby, don't get me wrong, but it's like once you get used to doing something, it is kind of hard to break out of it".

Although the moderator did not explicitly provide examples of potential health impacts from late night eating, the women discussed various scenarios as potential reasons to consider changing their eating habits. Most were concerned for their babies but not for themselves. One woman raised the issue of childhood obesity, but suggested that it was not a great enough deterrent to change late night eating. She said “Like an obese child? We can work on that.” Others in the room agreed. The possibility of a more serious or life threatening health impact was met with mixed feelings as one participant reported, “If it [the unborn baby] is terminally ill or somebody going to die from it then I might stop but it depends. I am going to be honest.” Others strongly disagreed with these participants and were willing to make dietary changes if there was a potential health impact, stating “birth defects, any heart problems” and “other things that would require hospitalization or handicap” would be serious enough to inspire changes.

When prompted by the moderator to consider changing what they ate at night rather than refraining from eating altogether, women’s opinions again diverged. Some women suggested that they could reduce the quantity they ate, others reported they would be willing to “change it up” or change the types of food they ate, but others were more cautious, commenting that it depends on what alternative items were available to them. In regards to sweet, sugary foods, specifically, some admitted that it would be very hard to give them up but they could try, while others were more reluctant. For example, one woman said that removing the sweet foods “defeats the purpose” of eating late at night.

When talking about how challenging it would be to change late night eating habits, women also discussed barriers to change. As mentioned earlier, a number of individual and interpersonal factors that were cited as contributors to late night eating, such as the influence of others, hunger, thirst, the need to use the bathroom, and altered sleep schedules were also described as barriers to changing this behavior. In addition, women talked about their preferences for sweet foods and dislike of alternatives. For example, one woman said, “I think one of the challenges would be is I didn’t like what I had to change it to.” Others said they could change some things but not everything, e.g., “I have to have the soda.”

Although women did not spontaneously volunteer any comments about the cost of alternate foods being prohibitive to changing their late night food choices, many shook their heads for “no” in response to this question from the moderator. Several women also commented that fruit was expensive, particularly in comparison to items like cookies. This prompted a discussion among several women about how they use their vouchers from the Special Nutrition Program for Women, Infants, and Children (WIC) to purchase fruit. One participant was referring to her voucher when she stated: “With that ten dollars, I get me some plums, some grapes and some strawberries. I be so happy and by the time they ring it up it will probably be about...it’ll never be the whole \$10.00, it’ll always be like eight, nine dollars. I be like okay, cool, that’ll last me till next month because I will just nibble and keep it moving. That way it helps me with my fruit because other than that I am not just going to go in the store and just buy fruit.”

When asked if there was anything other than a health concern that would encourage them to change their late night eating habits, several cited financial incentives. For example, one

woman said “If they told me, well, I will give you this amount of money if you do not eat again I will not eat.” Others did not agree, explaining, “If they say five dollars a night. If you do not eat at two or three in the morning, I will give you five dollars every day you do not do it. I might not do it.”

FOOD BUFFET FEEDBACK

Foods provided at the buffet are listed in Table 3, along with key participant quotes. Little of the food was consumed during the focus groups, but most women prepared a plate to take home after the session. Women discussed characteristics of the foods such as taste, preparation, and whether they caused heartburn. There was considerable hesitancy about trying foods that they had not eaten before (e.g. hummus) and some discussion of what they perceived to be lacking or “wrong” with the foods that were offered. For example, several women made comments about missing crackers, bread, or pizza base, which were not included in the buffet because of the carbohydrate content. Some women did not care for foods that were prepared differently than they were accustomed to, such as chicken nuggets that were served cold. Many of the women could name at least one or two items that they liked or could at least tolerate. Preferred foods (in no particular order) included chicken salad wraps, ham and cheese rolls (no bread), pepperoni, turkey wrapped string cheese, grilled chicken wrap, nut mix, strawberries, orange and apple slices, cantaloupe, grapes, cucumber and tomato salad, celery, baby carrots, cherry tomatoes and sliced cucumbers. Water and Crystal Light were the preferred drinks, and almost without exception, the women expressed dislike for the carbonated non-caloric drinks and diet soda. Interestingly, their reasons for not liking the non-caloric or diet drinks were varied, with some reporting that they were too sweet, others saying they were “bad” to drink during pregnancy, and others stated that they would not drink anything that was labeled with, or implied, “diet”.

DISCUSSION

The overall goal of this study was to identify reasons for late night caloric intake among overweight and obese, low-income, black women during late pregnancy, to explore their attitudes toward changing this behavior, and to identify lower GI foods/beverages that may be alternatives to current late night eating choices. As discussed below, women provided both individual and interpersonal reasons, many of which were consistent with aspects of the theoretical models of health behavior. Findings from this study will ultimately inform future late night eating interventions for this population.

Consistent with the Social Ecological Model of health promotion,¹⁷ there were a number of individual factors that contributed to late night eating, and these were also cited as barriers to changing this behavior. Individual physiological factors included hunger, thirst, nausea, altered sleep patterns, and fetal movement. Sleep disturbances are common in late pregnancy and are often attributed to general discomfort, fetal movement, and the need to use the bathroom.²⁸ Hunger, thirst, and nausea are also common experiences during pregnancy. A number of women mentioned the specific time of 2:00–3:00 in the morning as when they would regularly awaken because of hunger. Night waking is a relatively common phenomenon among women who are pregnant,²⁸ but little is known about the role of

appetite in this behavior. It is possible, however, that individuals who wake at night because of hunger have impaired nocturnal fat oxidation. Fatty acids are the primary source of fuel during overnight fasts, and prior research suggests that fat oxidation is blunted among individuals with obesity,²⁹ and those who are prone to obesity.³⁰ Blunted fat oxidation is also predictive of subsequent weight gain.³¹ To our knowledge, no prior study has examined whether blunted fat oxidation is associated with hunger at night during pregnancy, but this would be of interest in future research.

Night time fetal movement is common during the last trimester of pregnancy, with several studies reporting that fetal activity peaks between 9:00PM and 1:00AM. Some women in the current study interpreted fetal movement as a sign of fetal hunger, which is consistent with a previous study among pregnant women in New Zealand.³² It is interesting to note that in the New Zealand cohort, women who interpreted fetal movement as a sign of hunger went on to deliver infants who were lighter at birth than those who did not associate fetal movement to hunger.³² Given that on average, infants born to black mothers have lower birth weights than those born to white mothers,³³ it will be interesting in future research to explore whether endocrine markers of maternal appetite during pregnancy are predictive of fetal growth.

Several comments made by the women suggested that late night eating was more of a choice than a response to a physiological experience. Consistent with the Theory of Planned Behavior,¹⁸ their comments imply that they hold a belief or attitude about eating whenever they choose to rather than being constrained by normative meal patterns or eating only in response to hunger cues. Research from the general population showing that energy consumption from snacks has increased significantly in the last 35 years, particularly among black women,³⁴ is consistent with increasingly favorable attitudes towards snacking. In addition to increasing the intake of empty calories, frequent snacking could contribute to a shorter overnight fasting duration, which itself has been implicated in obesity and cardiometabolic disease.³⁵ Together with findings from the current study, this research suggests that any future interventions will need to address attitudes toward snacking, particularly at night, to facilitate adherence.

The influence of others in the household was cited as the primary psychosocial influence on late night eating, and was also discussed as a barrier to changing this behavior. Consistent with the Social Ecological Model of health promotion,¹⁷ women's comments reflected their interpersonal relationships with others in the household. Specifically, some comments implied that late night eating was at least partially attributable to social facilitation, whereby they ate because others were also eating. A recent qualitative study of overweight and obese pregnant women in Ireland also reported that social facilitation contributed to eating patterns.³⁶ Other women in the current study, however, hid food in their bedrooms to reserve it for themselves and avoid sharing. To our knowledge, this finding has not previously been reported in other studies of pregnant women; however, it is possible that some degree of food insecurity contributed to this behavior because the majority of women in this study were unemployed and unmarried. In a published study of family members of low-income children with obesity, hiding food and night time eating were topics that emerged from discussions with food insecure, but not food secure, households.³⁷ Any efforts to improve meal patterns in this population need to consider the importance of interpersonal

relationships within the household and develop strategies to address the social influences that are unique to each individual.

Many reported eating convenience foods, such as packaged snacks, rather than meals that required preparation at night. Taste and convenience were themes that emerged from the discussion about their food choices and from the discussion about the buffet of potential alternate lower GI food/beverage options. Prior studies have reported that taste and convenience are important considerations among black men and women,³⁸ and among women who are below the poverty level.³⁹ Conversely, women who are above the poverty level are more likely to consider their health when choosing foods.³⁹ Prior research has also reported that black women have a poorer quality diet during pregnancy as compared to white women.⁴⁰ It is apparent from this study and prior research that if alternate foods are offered during an intervention, they should consider women's taste preferences along with any limitations they have for storing food and keeping it separate from the household supply. Further, if the alternate foods are not familiar to the women, it will be important to allow women to taste them prior to the study.

The discussion surrounding women's willingness to change their late night eating habits bore hallmarks of the Health Belief Model,¹⁹ which posits that the likelihood of a given behavior is related to an individual's perceptions. Specifically, individuals consider their perceived susceptibility to the problem or risk, the severity of that risk, benefits and barriers to action, their self-efficacy to change the behavior, and the presence of cues to action. Although some women commented that they were willing to change their late night eating behavior if suggested by a doctor (i.e. a cue to action), others expressed a need to evaluate the severity of any health concern and weigh that against their perceived costs of changing their late night eating. It was clear from the comments provided by women in this study that many of them were unaware of any potential adverse health consequences that might be attributed to late night eating. Consequently, any intervention to address late night eating should include education about the health risks associated with late night eating, information to help participants assess their susceptibility to risk, and strategies to address barriers and improve women's confidence in their ability to change their late night eating behavior.

During the sessions, most women were able to identify at least a couple of food/beverage items that they would eat. Several women expressed missing the sweet or bread-type options to which they were accustomed. Most of the women ate little during the session and prepared plates to take home. While we do not have data on why they did this, it is important to note that the women did not know in advance that food would be provided during the session, and therefore may have recently eaten.

Strengths of this study include the novel provision of alternate, lower GI foods/beverages to facilitate participant understanding about how their late night food choices could be improved. In addition, the discussion was restricted to a single health behavior (i.e. late night eating) that we have previously identified as common and being associated with weight gain and adverse metabolic health outcomes in the pregnant and non-pregnant population. While this study has many strengths, it is not without limitations. Participants were not screened for NES (Night Eating Syndrome), a nocturnal loss of control binge eating disorder

characterized by a disruption in the circadian rhythm.⁴¹ It is unclear what causes NES; however, some studies suggest a hormonal connection.⁴¹ To our knowledge, it is not known whether the hormonal changes that occur during pregnancy alter the risk for NES, but it will be important in future research to distinguish habitual night time eating from disordered binge-type eating that may indicate NES. Other limitations included the relatively small sample size and relative heterogeneity among the participants, which precludes generalization to other ethnic and racial groups.

IMPLICATIONS FOR RESEARCH AND PRACTICE

Findings from this study identified potential reasons and barriers for late night eating during pregnancy and feedback from women about the lower-GI food/beverage alternatives offered in the buffet. Participants cited several individual physiological and non-physiological contributors to late night eating, including hunger, thirst, fetal movement, and sleep disturbances, along with personal choice and the influence of others in the household, as reasons they engaged in late night eating. These divergent results highlight the heterogeneity of factors that influence this behavior across study participants. Consequently, intervention efforts in the future will need to educate women about the potential adverse consequences of late night eating, and then tailor interventions to address the contributors and barriers that are unique to each woman. In contrast to the heterogeneity among contributors to late night eating, the women's comments about food choices consistently focused on taste and convenience. It was clear from the discussion about the buffet of alternative lower-GI options, that any future interventions would need to include an education component about differences among higher- versus lower-GI options, and should provide women with opportunities to become accustomed to foods that are different from their usual choices. Future research should use objective measures to elucidate the role of underlying physiological processes in late night eating and then develop educational tools to inform women about how their physiology impacts eating behavior and vice versa. By understanding these relationships, women will be better informed about the role of meal timing and food choice on their health, and the importance of intentionally planning their meals and snacks for the betterment of their health. Programs to help women identify strategies to overcome the individual and social factors barriers to change will also be important, as will the development of indirect strategies to reduce late night eating, such as improving sleep hygiene.

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Table 1.

Questions from the semi-structured interview used during focus group sessions.

Question Number	Question
1	Do you often eat or drink after 8pm at night, and in the early morning hours before it's time to get up for the day?
2	Did you eat or drink after 8pm at night before you were pregnant or is this something that only started with this pregnancy?
3	What are some of the reasons that you choose to eat or drink after 8pm?
4	What types of things do you typically eat and drink after 8pm?
5	Why do you choose to eat those items to eat at night?
6	If you found out that eating late night was bad for your health, or could be bad for your baby's health, would you try to stop eating at night?
7	Lower GI foods were offered for you to try during the interview today. What do you think about the foods that we had available for you to eat today?
8	We are thinking about doing a study where we would provide foods like these to pregnant women to eat at night, instead of what they normally eat. They can eat what they want during the day. Do you think women would agree to do this just for the pregnancy, or just during the 3 rd trimester?

Table 2.

Demographic and clinical characteristics of low-income black women who participated in the focus group sessions (n=16)^a

Variables	Mean $\pm$ SD	Minimum	Maximum
Age (years)	26 $\pm$ 6	19	37
Body Mass Index ^b (kg/m ²)	33.0 $\pm$ 4.6	25.3	40.2
Gestational Weeks	32 $\pm$ 3	27	38
Gravidity	2.9 $\pm$ 1.8	1	7
Parity	1.2 $\pm$ 1.2	0	4

^aData for 2 participants are missing due to incomplete forms.

^bWeight of mother used to calculate BMI was measured at first prenatal visit.

Table 3.

Food/beverage buffet items available for participants to eat during focus groups and direct feedback of proposed low-GI food/beverage as alternatives to their usual late night choices.

Focus Group 1 (n= 8)			Focus Group 2 (n= 6)		Focus Group 3 (n= 4)	
Food/Beverage Category		Food/beverages Available				
Wraps (whole wheat)	•	Chicken Salad	+ Grilled Chicken	No changes made		
			+ Pimento Cheese			
			– Chicken Salad			
Other	•	Chicken Nuggets	+ String Cheese	No changes made		
	•	Nut Mix	+ Sunflower Seeds			
	•	Kind Bar	– Pepperoni			
	•	Turkey Wrapped String Cheese				
	•	Pepperoni				
	•	Cheese Slices				
Fruits	•	Apple Slices	+ Strawberries	+ Cantaloupe		
			+ Orange Slices			
Vegetables	•	Baby Carrots	+ Cucumber & Tomato Salad	+ Sliced Cucumbers		
	•	Celery	+ Cherry Tomatoes			
Dips/Spreads	•	Peanut Butter	+ Ranch Dressing	+ Mayonnaise		
	•	Hummus	+ Dijon Mustard	+ Greek Salad Dressing		
Drinks	•	Diet Mountain Dew	+ Water	+ Sparkling Ice		
	•	Crystal Light (variety)	– Diet/caffeine free soda	+ Diet Sierra Mist		
	•	Diet/caffeine free soda				
Key Quotes						
	•	“I’d eat the ham and cheese rolls with ranch.”	•	“The meats I would eat”	•	“That turkey and cheese is good.”
	•	“I would eat the apples or trail mix.”	•	“I’d suggest adding fruit drinks”	•	“I’d eat the hummus. I liked it.”
	•	“I like the fruits”	•	“I like clear drinks, no dark colored drinks”	•	“Lose the hummus...”
	•	“I’d eat tomatoes if they were here “	•	“I would eat the fruit, vegetables if I had ranch.”	•	“This celery is good; I might go buy some.”
	•	“I like the chicken salad and would eat this if it was already prepared.”	•	“Either plain water or Crystal Light.”	•	“Absolutely no carbonated water”

Abbreviations: +, Food/beverage items added to the buffet from the previous focus group; –, Food/beverage items taken off the buffet from the previous focus groups.