Matern Child Health J (2008) 12:718–724
DOI 10.1007/s10995-007-0301-5

Gestational Weight and Dietary Intake During Pregnancy: Perspectives of African American Women

Mable Everette

Published online: 7 November 2007

Abstract *Objectives* This investigation explored the participants' perspective on weight, nutrition, and dietary habits during pregnancy. The data of interest were culled from a larger ethnographic research study designed to gather information and ideas about the socio-cultural, psychological, and behavioral influences on maternal health during pregnancy ($N = 63$). *Methods* My study focused on the six participants (including three teenagers) who delivered low birth weight and/or preterm babies and 13 participants aged $\leq$18 years (teenagers) who delivered normal weight babies. Data were analyzed utilizing qualitative methodology. *Results* Four of the participants who delivered low birth/weight preterm infants reported weight related concerns during pregnancy. These included: weight loss, lack of weight gain, and exceeding their expected weight gain. Frequently, the nutrition knowledge was based on miseducation, misconceptions, and/or 'a grain of truth' i.e. folk beliefs. Support group members had an influential role on participants' dietary habits during pregnancy. *Conclusion* The next step appears to be more qualitative work, with health care providers, the Women Infants and Children Program (WIC) nutrition counselors, clinical dietetic professionals, and women who already have children, to explore strategies for improving diet quality as well as address the issue of inadequate and excessive weight gain during pregnancy.

Keywords Qualitative research · Pregnancy · African American women · Nutrition · Dietary intake · Gestational weight

M. Everette (✉)
Community Nutrition Education Services, Inc, 110 S LaBrea Avenue, #213, Inglewood, CA 90302, USA
e-mail: mleverette@ca.rr.com

Introduction

The Centers for Disease Control and Prevention reported that the rate of preterm births (<37 completed weeks of gestation) had increased 30% in the last two decades [1]. African American women deliver their infants at 37 weeks gestation twice as often as women of other races and deliver their infants before 32 weeks of gestation three times as often as white women [1]. The same ethnic disparity is also evident for low birth weight (<2,500 g/5.51 lb). In 2001, for singleton births, the rate was 4.9% for non Hispanic whites and 11.9% for non Hispanic blacks [2].

Little is known about why African American infants are at risk of adverse outcomes. Many believe that scientists must take a fresh look at the problem and approach it from a different vantage point [3]. Rowley [4] purported that understanding the cause of the gap in preterm delivery and the potential interventions to eliminate this disparity required a multidisciplinary approach; this methodology would elucidate the biological pathways, stressors, and social environment associated with preterm birth.

The aim of this analysis was to describe the participants' perspective on weight, nutrition, and dietary habits during pregnancy. I examined the hypothesis that gestational weight, nutrition information/knowledge, and dietary habits are associated with neonatal weight outcome. In order to test the hypothesis, the analysis included the most vulnerable participants: (1) six participants (50% of whom were teenagers) delivering low birth weight and/or preterm babies and (2) 13 teenagers who delivered normal weight babies.

MC Ganity et al. [5] define a biologically mature female as a young woman who is at least 5 years postmenarchal. The growth demands of the pregnancy and the fetus superimposed on the growth demands of an adolescent

during the first year after menarche may result in undesirable reproductive outcomes [5]. Maternal age younger than 18 years of age and 35 years or older has been associated with preterm birth, but the effect seems to be confined to the female who has never borne an offspring [6].

Among the other factors that have been implicated as possible contributing factors to preterm delivery are: low pregravid weight; inadequate weight gain during pregnancy; iron deficiency anemia early in pregnancy; and poor diet [7].

A positive relationship between weight gain and birth weight has been consistently reported in both developing countries and among different ethnic groups [8, 9]. Maternal pregravid weight or Body Mass Index (kg/m^2) and weight gain appear to have independent and additive effects on birth weight outcome [10]. Although total weight gain is an important predictor of birth weight, the pattern of weight gain and rates appear to play a significant role in predicting preterm delivery [10–12]. Scholl [13] noted that the increasing evidence for an association between low rates of maternal weight gain and preterm delivery does not imply causality. The importance of optimal body mass index (BMI) at the start of pregnancy was emphasized in a study conducted by Jain et al. [14]. The researchers noted that of the women considered overweight or obese before conceiving, more than half gained excessive weight during pregnancy [14].

Poor maternal nutrition status (diet low in most necessary food nutrients) has been implicated as a possible contributing factor to preterm delivery [7]. In terms of overall calories, after controlling for confounding variables, women with inadequate gestational weight gain consumed fewer kilocalories/day (−173 kcal/d) than did those women whose pregnancy weight gain was adequate for gestation [13]. Sufficient energy is a primary dietary requirement of pregnancy. If energy needs are not met, available protein, vitamins and minerals cannot be used effectively. Limited information is available regarding the nutrient needs of pregnant adolescents [15, 16].

When detected early in pregnancy, iron deficiency anemia was associated with a lower caloric and iron intake, an inadequate gestational weight gain over the whole pregnancy, as well as with a greater than twofold increase in the risk of preterm delivery [13, 17].

Vitamins and minerals, referred to collectively as micronutrients, have important influences on the health of pregnant women and their growing fetuses [18]. Previous observational studies in both young and older gravidas have shown that low intakes of iron and zinc were related to preterm deliveries [13, 15]. The risk of preterm delivery with low dietary zinc intakes was particularly strong (threefold increased risk) for those whose rupture of membrane preceded labor [15]. Other studies on micronutrients await larger studies before recommendations on their appropriate levels of intake can be made [19].

Methods

The data of interest were culled from an ethnographic study conducted by the Healthy African American Family I Project (HAAF 1). The project was funded by the Centers for Disease Control and Prevention (CDC), Division of Reproductive Health, at the University of California Los Angeles (UCLA) and Charles R Drew University of Medicine and Science. The aim was to study the reasons for low birth weight and infant mortality among African Americans in Los Angeles, California. Data were collected during the years 1992–1995. All of the research participants were selected using a convenience sampling methodology. During the life of the project, over 100 pregnant African American women were interviewed at home, work, or in a community setting. Sixty-three women qualified for the HAAF1 study. Written informed consent was obtained from all women and family and community members interviewed. Approval to conduct the ethnographic study was obtained from UCLA's Human Subjects Protection Committee. While women under 18 years of age fell within the sample, pregnant minors are considered "emancipated minors" by the State of California, and as such may give informed consent to participate in a research project without the involvement of parents.

The Ethnographers were recruited and trained in qualitative interview technique methods including didactic instructions, readings, practice interviews, and feedback by the HAAF I Project's Anthropologist. The study utilized data triangulation methods across data sources in order to check the data from various perspectives [20]. All interviews were audiotape recorded. To retain the colloquial flavor of the client's language, their words were reported verbatim from the audiotapes. In those instances where the Ethnographer or the Anthropologist felt the transcriber's interpretation of the taped interview was sufficiently ambiguous, bracketed changes or substitutions were made to aid the reader in comprehending what the client was communicating.

Questions (of interest for this analysis) explored the participants' perceptions on weight, nutrition, and eating habits during pregnancy. A semi structured open-ended interview style was used to elicit open-ended responses. For example, "What did you eat yesterday?" Probes followed the question, for example: "So tell me what you have been eating? What did you have yesterday? Like from morning to evening?" Another question addressed prepregnancy weight, "How much did you weigh before you got pregnant?" Probes followed the question, for example:

"Are you concerned about gaining weight?" Another question addressed vitamin and mineral supplements, "What kind of prenatal medications were you taking?" Probes followed the question, for example: "So when they gave you your prenatal vitamins and stuff like that, who did-did you have questions or anything like that?"

Prior to analysis of the data of interest, a coding template was developed based on a content analysis of the transcripts [21]. The responses were categorized under two broad themes for all 63 subjects: (1) "Maternal Weight Gain" and (2) "Eating Habits during Pregnancy." The latter category also included, "Vitamin and Mineral Supplements Use." Two coders independently coded the data. Interrater reliability was 82% percent, an indication of good consistency. These codes were reviewed by both coders until 100% agreement was achieved. Following the agreement, the major themes and subthemes were assigned a code, the codebook was finalized, and the analysis was conducted.

The study used self reported data for socioeconomic status (SES), prepregnancy weight, and weight gained during gestation. The height of participants was not available for this analysis. The actual neonatal birth weights were provided by the medical care facility.

Results

The Results for the 13 Teenagers Delivering Normal Weight Babies Follow Each of the Tables in this Section

The characteristics of the participants delivering preterm/low birth weight babies are presented in Table 1. Five of the 63 participants delivered preterm/low birth weight babies; one subject delivered a small for gestational aged infant at full term. This total group of six comprised 10.5% of the total sample. One-half the participants delivering preterm/low birth weight babies were 18 years or younger; the other 50% were over age 18. Four of the six participants (67%) reported themselves as being, " low income." This was the first pregnancy for a participant under the age of 18.

The 13 teenagers (21% of total sample of 63) ranged in age from 14 to 18 years. Ninety two percent of the teenagers reported themselves as "low income." Fifty four percent ($n = 7$) reported at least one prior pregnancy (data not shown).

The subthemes related to weight gain during pregnancy for those participants delivering LBW/preterm babies are noted in Table 2. Four of the participants who delivered LBW/preterm infants reported weight related concerns during pregnancy. These included: lack of weight gain, weight loss, and exceeding their expected weight gain.

The subthemes (followed by selected quotes) for the teenagers reflected misconceptions about weight including justifications for weight gain/loss, for example, "weight gain not always related to being pregnant" and " weight loss was planned prior to pregnancy." Subtheme: (1) Weight gain not always associated with being pregnant. " When I first-when I was 3 months, I put-by the time I was 3 months, I had gained 30 lb already. I didn't even know I was pregnant because I was spotting still when it was time for my period to come...when she [Aunt] took me to the doctor and I was pregnant." Subtheme: (2) Depression related to body image. "I get depressed when I look at myself...[referring to weight gain]. That's why I don't look at myself. Only my face." Subtheme: (3) Planned weight loss prior to pregnancy. "...but I lost some weight before I got pregnant so I can get pregnant because I did not want to weigh because then I would have been bigger so I just went down to 112–115 something like that...then I got pregnant so I would be an even weight when I have the baby."

The subthemes related to the role of diet/nutrition during pregnancy for those participants delivering low birth weight (LBW)/preterm babies are noted in Table 3. The issues included skipping meals/inadequate food intake, the role of cultural influences on food selections, and a specific food being related to the health of the baby.

Table 1 Characteristics of participants delivering preterm/low birth weight babies ($n = 6$)

Age	SES	# Children	# Previous pregnancy	Education achieved	Weight of new baby
18(1)	Middle	2	2	12	4 lbs, 9 oz
21(2)	Low	2	2	13	4 lbs, 14 oz
22(1)	Low	2	2	12	4 lbs, 12 oz
14(1)	Low	1	1	8	2 lbs, 13 oz
22(1) (a)	Middle	0	0	12	4 lbs, 8 oz; 5 lbs, 8 oz
16(1)	Low	0	0	10	5 lbs, 8 oz

(1) Indicates birth outcomes that were both pre-term and low birth weight (LBW); (2) Indicates birth outcomes that were LBW; (a) Indicates twins; SES (self-reported socio-economic status)

Table 2 Gestational weight gain subthemes for the participants delivering low birth weight/preterm babies

Weight focus subthemes	Selected quotes illustrating themes
The lack of weight gain was noted as a sign of not looking pregnant to others	"People used to always be like, you sure you pregnant?...[I] Never got bigger. But I used to like-I used to throw up in the end [vomiting]."
Weight loss occurred during pregnancy	"Well, I have lost weight-I went in the doctor at 183 and now I/m 170. So the Doctor's worried about my weight. By me dropping so much weight [during pregnancy]...He said that, you know, you're just need to eat more."
Weight gain during pregnancy was not seen as related to weight of baby	"You know I gained 43 lbs, you know when I sit have the baby, this baby is 4 lbs and 14 ounces and I—like why it happen?"[full term birth, delivered @ 40 + weeks gestation.]
Exceeded expected weight gain	"I ran over 5 lbs and then that was bad."

Table 3 Nutrition subthemes for participants delivering low birth weight/preterm babies

Nutrition/food intake sub themes	Selected quotes illustrating themes
Eating habits secondary to emotional issues	"...Then for dinner, I had some cereal because I had a roommate here an um, and we were going through some motions, you know what I'm sayin' with her. So my mind wasn't really focused on eating. So I didn't really eat too much-eat too good yesterday."
Cultural influences on food intake	"Been pro-Black...Don't eat no pork. Cut off a lot of junk food. A lot of cookies and junk food like that. Cut out a lot of fast foods."
Specific foods related to the health of baby	"I had some corn, some brown rice with some chicken with something on the side. But, um, 'cause I like brown rice better than white rice because brown rice is better for the baby, my mom said."

The subtheme (followed by selected quote) for teenagers delivering a normal weight baby also reflected a specific food being related to both the health of mother and baby. Subtheme: Specific foods related to the health of baby. "...I have to drink a lot of milk-I drink at least 2 gallons of milk a week, 'cause I love milk.' And plus, I have to drink a lot of milk because my mother was telling me that since I have bad teeth, the baby will take all the milk from me, and my teeth will start hurting."

The subthemes related to family/support group for those participants delivering LBW/preterm babies are noted in Table 4. The influence of members of the support system was evident in the selected quotes presented.

The subthemes for the teenagers delivering normal weight babies also reflected the role of support/family members. The subthemes are noted as follow (subtheme/ selected quote). Subtheme: (1) Father of baby. "She got a lot of cravings, too. All of a sudden. Once she gets finished, like, she'll say, pour her some juice, and she finished that, I want some of this, some of that, you know, so it builds up. So I guess I have to get used to that." Subtheme: (2) Mother of one teenager. "She [mother] started keeping, since I like to snack, she started keeping like fruits and I like fruits, I just, it never was around."

Other findings: The subthemes related to the use of prenatal vitamin and mineral supplements for participants delivering pre/term low birth weight babies. (1) "Took prenatal vitamins, calcium and iron." (2) "Prenatal vitamins caused nausea and vomiting when taken on an empty stomach." (3) "Three times a day [iron and calcium] and then a prenatal vitamin once a day."

The subthemes related to the use of vitamin and mineral supplements for the teenagers delivering normal weight babies are noted as follow: (1) "Started taking supplements

Table 4 Family/support for women delivering pre term/low birth weight babies

Family/support group-influence on foods eaten	Selected quotes illustrating themes
Father of baby	"He (baby's father) pretty much wants me to eat everything, I mean regardless to how many calories it is or if I should eat it or if I shouldn't eat it."
Mother of one teenager	"And I don't be eating a lot of junk food and candy. I used to drink beer and stuff but I do everything in front of my mom to let her know I ain't trying to hide, she figures as long as I do it in front of her, it's ok."

when 6 months pregnant." (2) "Learned how these should be taken in a class." (3) "Taking prenatal care pills, but made me vomit." (4) "Mother made me start taking."

There was one reference to the use of the Women Infant and Children (WIC) Program. The Question: "How did you find out about WIC?" The answer, "You know...as part of information on the different kind of programs available to pregnant women."

Discussion

The hypothesis examined was that gestational weight, nutrition information/knowledge, and dietary habits were associated with neonatal weight outcome. Although a wide range of themes and subthemes emerged from the ethnographic study, the data were individualized for each participant.

Four of the participants who delivered low birth/weight preterm infants reported weight related concerns during pregnancy. The lack of sound, basic information related to the importance of and the role of weight gain and its relevance to the health of the infant for both the teenagers and the participants delivering low birth weight/preterm babies was evident.

Frequently, the nutrition knowledge was based on miseducation, misconceptions and/or 'a grain of truth' i.e. folk beliefs. Vitamin and mineral supplement intake was problematic for participants. The support group members had an influential role on dietary habits of participants during pregnancy.

An important strength of the data was that the actual birth weights were provided by the medical care facility. Kramer [22] stated birth weight, defined as the sum result of the rate and duration of a fetus' growth, is a reliably collected variable and is still frequently used as a predictor of the mortality and morbidity of infants.

The data for this study have several limitations. The sample size was small; larger studies are recommended. A potential limitation is "researcher bias" where the researcher's age, sex, ethnicity, personality traits, and other characteristics could influence what the researcher is told or allowed to see and how he or she perceives events and people. The larger study utilized the triangulation methodology [20] in order to lessen the 'researcher effect.' The study relied on the participant's self reported information, particularly for pregravid weight and weight gain during pregnancy. The reliability of the self reported data gives rise to the question: "How accurate are self-reported data?" Cook and Campbell [23] pointed out that participants tend to report what they believe the researcher expects to see, or report what reflects positively on their own abilities, knowledge, beliefs, or opinions. Self reported data also centers on whether participants are able to accurately recall past behaviors. Cognitive psychologists have warned that the human memory is fallible [24] and thus the reliability of self-reported data is tenuous. The semistutured interviewing techniques interwove questions regarding pregravid weight, nutrition and dietary habits, and vitamin and mineral supplements among the total of all questions asked related to socio-cultural, psychological, and behavioral influences on maternal health during pregnancy. The data were ascertained in different ways by Ethnographers. The results were difficult to quantify.

This investigation explored the participants' perspective on weight during pregnancy. The lack of credible information related to the importance of and the role of weight (both inadequate and excessive) during pregnancy appeared to be the dominant theme for all participants. In the interviews participants usually justified weight gain from a cosmetic point of view rather than the relationship of weight to pregnancy outcomes. According to Henderson-King [25], women have long been evaluated in terms of their appearance as contemporary North American society has witnessed increased pressure on women to aspire to ideal images of beauty. The exact nature of the ideal is subject to change as fashion trends dictate; however, a focus on weight and body shape, with an increasing trend toward slenderness has characterized the "contemporary ideal." Harris et al. [26] further amplifies this theme noting that very few empirical studies to date have adequately examined non-white women's attitudes toward their bodies. The researchers further noted that absent from existing studies is an examination of the demographic and socio-cultural variables that related to the perception of and feeling toward the body among African American women.

The second focus of this study was an examination of nutrition information and dietary habits in the context of the environmental and family situations. An important component of note was the influence of family/support group members in determining/overseeing foods eaten by the participants.

The research of Mullings et al. [27] noted that pregnancy served to mobilize greater action by women to address housing, environmental and economic, and other social stressors that existed before pregnancy; among these were an active attempt to assess quality health care and nutrition. Chomitz et al. [28] purported that the health behaviors should not be isolated from the environment (society, community, and family) that fosters and support them, and thus a change in the elements within the environment will facilitate an individual's ability to change behaviors. Bronner [29] stated that nutrition counseling has not been as family centered as it could be. The involvement of the pregnant client's network of support in the nutrition

and health education counseling would begin to address the family centered concept.

Further Research and Conclusion

Multi-disciplinary research approaches have been recommended in order to determine the complex factors that are involved in preterm birth [4, 30]. Further studies that group outcome measures according to the proximate causes of preterm delivery and target individuals (versus populations) at risk are required to determine whether poor nutrition is a marker for or cause of preterm birth. Access to medical records in order to obtain prepregnancy weight as well as gestational weight gain would serve to strengthen the study results. Evidence suggests that populations at high risk of preterm births appear to have a poorer quality diet [11, 31]. Thus, the research should focus on macronutrients as well as micronutrients and the relevance to preterm/low birthweight infants.

The next step appears to be more qualitative work, with health care providers, the Women Infants and Children Program (WIC) nutrition counselors, clinical dietetic professionals, and women who already have children, to explore strategies for improving diet quality as well as address the issue of inadequate and excessive weight gain during pregnancy.

References

1. CDC. Preliminary Births for 2004. http://www.cdc.gov/nchs/products/pubs/pubd/hestats/prelimbirths04/prelimbirths04health.htm [accessed November 17, 2005]. 2005.
2. Martin J. A., Hamilton B. E., & Ventura S. J., et al. (2001). Births: Final data for 2001. 51, 1. National Vital Statistics Report.
3. Shino, P., & Behrman R. (1995). Low birth weight. The future of children, 5(1).
4. Rowley, D. L. (2001). Closing the gap, opening the process: Why study social contributors to preterm delivery among black women. *Maternal and Child Health Journal, 5*(2), 71–74.
5. McGanity, W. J., Dawson, E. B., & Van Hook, J. (1999). Maternal nutrition. In D. Balado, J. Schmidt, T. Williams, & J. D. Weir (Eds.), *Modern nutrition in health and disease* (pp. 811–838). Baltimore: Williams and Wilkins.
6. Pickering, R. M., & Deeks, J. J. (1991). Risk of delivery during the 20th to 36th week of gestation. *International Journal of Epidemiology, 20*(2), 456–465.
7. Berkowitz, G. S., & Papiernik, E. (1993). Epidemiology of preterm birth. *Epedemiologic Reviews, 85*, 60–64.
8. Institute of Medicine NAOS. (1990). *Nutrition during pregnancy*. Washington, DC: National Academy Press.
9. Johnston, E. M. (1991). Weight changes during pregnancy and the postpartum period. *Progress in Food & Nutrition Science, 15*, 117–151.
10. Hediger, M. L., Scholl, T. O., Belsky, D. H., Ances, I. G., & Salmon, R. W. (1989). Patterns of weight gain in adolescent pregnancy: Effects on birth weight and preterm delivery. *Obstetrics and Gynecology, 74*, 6–12.
11. Scholl, T. O. (2001) *Maternal nutrition and preterm delivery. Preventive nutrition. The comprehensive guide for health professionals* (pp. 387–413). Totowa: Humana Press.
12. Carmichael, S., & Abrams, B. (1997). A critical review of the relationship between gestational weight gain and delivery in a prospective study. *Obstetrics and Gynecology, 89*, 865–873.
13. Scholl, T. O., Hediger, M. L., Fischer, R. L., & Shearer, J. W. (1992). Anemia vs. iron deficiency: Increased risk of preterm delivery in a prospective study. *The American Journal Clinical Nutrition, 55*, 985–988.
14. Jain, N. J., Denk, C. E., Kruse, L. K., & Dandolu, V. (2007). Maternal obesity: Can pregnancy weight gain modify risk of selected adverse pregnancy outcomes ? *American Journal of Perinatology, 24*, 291–298.
15. Scholl, T. O., Hediger, M. L., Schall, J. I., Fischer, R. L., & Khoo, C. S. (1993). Low zinc intake during pregnancy: Its association with preterm and very preterm delivery. *American Journal of Epidemiology, 137*, 1115–1124.
16. Story, M., & Hermanson, J. (2000). Nutrient needs during pregnancy and adolescence. In M. Story & J. Stang (Eds.), *Nutrition and the pregnant adolescent: A practical reference guide* (pp. 38–46). Minneapolis: Center for Leadership, Education, and Training in Maternal and Child Nutrition, University of Minnesota.
17. Scholl, T. O., & Hediger, M. L. (1994). Anemia and iron deficiency anemia: Compilation of data on pregnancy outcomes. *The American Journal of Clinical Nutrition, 59*(suppl), 492S–501S.
18. Black, R. E. (2001) Micronutrients in pregnancy. *British Journal of Nutrition, 85* (supplement s2), 193–197.
19. Iams, J. D., & Creasy, R. K. (2004). Preterm labor and delivery. In R. K. Creasy & R. Resnik (Eds.), *Maternal-fetal medicine* (pp. 623–661). Columbus: Saunders.
20. Scrimshaw, S. C., & Hurtado, E. (1987). Rapid assessment procedures for nutrition and primary health care: Anthropological approaches to improving programme effectiveness. Tokyo, Los Angeles: United Nations University, UCLA Latin American Center Publications, University of California.
21. Morse, J. M., & Field, P. A. (1995). *Qualitative research methods for health professionals*, (2nd ed.). Thousand Oaks: Sage Publications.
22. Kramer, M. S. (1990). Birthweight and infant mortality: Perceptions and pitfalls. *Paediatric and Perinatal Epidemiology, 4*, 381–390.
23. Cook, T. D., & Campbell, D. T. (1979). Quasi-experimentation: Design and analysis issues. Boston: Houghton Mifflin Company.
24. Schacter, D. L. (1999). The seven sins of memory: Insights from psychology and cognitive neuroscience. *American Psychology, 54*, 182–203.
25. Henderson-King, E., & Henderson-King, D. (1997). Media effects on women's body esteem: Social and individual factors. *Journal of Applied Psychology, 27*, 399–417.
26. Harris, S. (1995). Family, self and sociocultural contributions to body image: Attitudes of African American families. *Psychology of Women Quarterly, 19*, 129–145.
27. Mullings, L., Wali, A., McLean, D., Mitchell, J., Prince, S., Thomas, D., et al. (2001). Qualitative methodologies and community participation in examining reproductive experiences: The Harlem birth right project. *Maternal and Child Health Journal, 5*(2), 85–93.
28. Chomitz, V., Cheung, L. W. Y., & Lieberman, E. (1995). The role of lifestyle in preventing low birthweight. *The Future of Children, 5*(1), 121–138.
29. Bronner, Y. (2000). Cross cultural issues during pregnancy and lactation: Implications for assessment and counseling. In M. Story & J. Stang (Eds.), *Nutrition and the pregnant adolescent: A practical reference guide* (pp. 173–180). Minneapolis: Center for

Leadership, Education, and Training in Maternal and Child Health Nutrition, University of Minnesota.
30. National Academy of Sciences (2006). Preterm birth: Causes, consequences, and prevention. http://www.books.nap.edu 8-15-0006.
31. Nielsen, J. N., Gittelsohn, J., Ankler, J., & O'Brien, K. (2006). Interventions to improve diet and weight gain among pregnant adolescents and recommendations for future research. *Journal of American Dietetic Association, 106*(11), 1825–1840.