A Randomized Trial of Augmented Prenatal Care for Multiple-Risk, Medicaid-Eligible African American Women

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ABSTRACT

Objectives. This project investigated whether augmented prenatal care for high-risk African American women would improve pregnancy outcomes and patients' knowledge of risks, satisfaction with care, and behavior.

Methods. The women enrolled were African American, were eligible for Medicaid, had scored 10 or higher on a risk assessment scale, were 16 years or older, and had no major medical complications. They were randomly assigned to augmented care (n=318) or usual care (n=301). Augmented care included educationally oriented peer groups, additional appointments, extended time with clinicians, and other supports.

Results. Women in augmented care rated their care as more helpful, knew more about their risk conditions, and spent more time with their nurse-providers than did women in usual care. More smokers in augmented care quit smoking. Pregnancy outcomes did not differ significantly between the groups; however, among patients in augmented care, rates of preterm births were lower and cesarean deliveries and stays in neonatal intensive care units occurred in smaller proportions. Both groups had lower-than-predicted rates of low birthweight.

Conclusions. High-quality prenatal care, emphasizing education, health promotion, and social support, significantly increased women's satisfaction, knowledge of risk conditions, and perceived mastery in their lives, but it did not reduce low birthweight. (*Am J Public Health.* 2001;91:105–111)

Low birthweight and preterm deliveries are associated with elevated rates of infant mortality and of childhood illnesses and disabilities. In the United States, 3 major strategies have been used to reduce low-birthweight and preterm delivery: urging women to seek prenatal care earlier and more often, improving the quality of prenatal care, and attempting to inhibit labor. The first method has not shown striking success. Although birth certificate data show that the percentage of African American women (the focus of this report) seeking prenatal care in the first trimester of pregnancy rose from 59.9% in 1989 to 72.3% in 1997 (a 20.7% increase), the percentage of African American infants born at low birthweight declined only slightly, from 13.5% to 13.0%, and the percentage of African American infants born before 37 completed weeks of gestation declined only slightly more, from 18.9% to 17.5%, over the same 8-year period.[1]

The second strategy, improving the content or quality of prenatal care, has been tested in many studies, usually in nonrandomized studies of Medicaid populations using linked record sets. The effects of expanded or augmented prenatal care, such as providing case management and offering additional support services (nutritional counseling, health education, after-hours appointments, home visiting), have been mixed, ranging from no overall reductions in low birthweight to small or modest reductions, often only for subgroups. Examples of such programs include the effect of care coordinators in North Carolina,[2] the Comprehensive Perinatal Service Program in California,[3] the HealthStart program in New Jersey,[4] the First Steps program in Washington State,[5] and the Prenatal Care Assistance Program in New York City.[6] The few programs that randomize have generally reported no significant effects overall but have sometimes detected effects in small subgroups.[7,8] The third method, the use of tocolytic drugs to inhibit labor, has generally not reduced the preterm birth rate.[9]

Results from previous research on improving the content or quality of prenatal care are questionable, because most did not document or carefully control the quality or content of prenatal care, failed to consider factors such as the convenience and cultural appropriateness of the care, did not record patient participation in educational activities, and did not measure patient satisfaction. Further, most were not randomized but instead used inadequate historical controls or comparison groups, or did not have sufficient numbers of high-risk women to detect statistically significant effects, or both, thus precluding definitive results that were not biased by factors such as motivation for care and psychosocial conditions. A grant from the federal Agency for Health Care Policy and Research to the University of Alabama at Birmingham for a Patient Outcomes Research Team directed at reducing low birthweight among African American women provided an opportunity for conducting a randomized controlled trial of augmented prenatal care designed to minimize the flaws of earlier studies.

Methods

Study Design

All pregnant women who sought prenatal care from the Jefferson County (Alabama) De-

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partment of Health from March 1994 to June 1996 were screened for eligibility. Women were eligible if they met the following criteria: (1) African American, (2) eligible for Medicaid, (3) less than 26 weeks' gestation, (4) at least 16 years old, and (5) score of 10 or higher on a risk assessment scale. The scale was based on multiple analyses of a computerized database that included all Medicaid-eligible pregnancies in the area during 1993 and 1994 and a prospective study of high-risk pregnancies.[10,11] These analyses revealed that for African American, Medicaid-eligible women, the following factors were associated with a 20% to 25% rate of low birthweight (compared with 10% to 13% for African American women without these additional risks): a prior preterm birth at 25 to 36.6 weeks, a prepregnancy weight of 50 kg or less, and no automobile for transportation (which was highly correlated with a self-report of high stress levels). In addition, each of the following risk conditions was associated with a 17% to 20% rate of low birthweight in a multiparous African American sample: a previous full-term low-birthweight infant (term intrauterine growth retardation); smoking at the time of pregnancy; body mass index (BMI; calculated as weight in kilograms divided by the square of height in meters) of less than 19.8 for women who weighed more than 50 kg; and perceived lack of mastery in one's life situation, ascertained by agreement with the statement "There is little that I can do to change many of the important things in my life." The risk assessment scale assigned 10 points for each factor in the first group and 5 points for each in the second group.

To be eligible for study participation, a woman needed to have at least 1 of the factors in the first group or at least 2 in the second. Exclusion criteria were alcoholism and substance abuse, asthma, cancer, diabetes, epilepsy, high blood pressure, sickle cell disease, and HIV/AIDS, primarily because women with these conditions were eligible for recruitment into other high-risk clinics or randomized controlled trials targeted toward their particular risk conditions. We considered it unethical to enroll them in a nurse-managed program when specialty clinics were available to them.

A sample size of 285 women in the experimental group and a similar number of controls were adequate to detect a reduction in the rate of low birthweight from 20%–25% to 10%–12%; a 2-tailed significance test with $\alpha = .05$ and a power of 80% was used.

Eligible women were recruited in person by a research nurse who described the purpose of the study and answered any questions. Of 712 eligible women, 56 declined to participate (7.9% refusal rate). After written informed consent was obtained, the nurse opened a sealed envelope revealing the woman's assignment to augmented care or usual care (with approximately equal monthly assignments to both conditions). Usual care was provided by the county health department or the university's obstetrics department. Augmented care was provided through a specially created center. The study was approved by the University of Alabama at Birmingham's institutional review board.

Augmented Care

Augmented care was provided in a newly created Mother and Family Specialty Center, which sought to minimize risk conditions and improve pregnancy outcomes. Priority was placed on informing women about their risk conditions and what behaviors might improve their pregnancy outcome. Prior research[12] had indicated that low-income minority women were significantly less likely than women of higher income or White women to report being informed by their health care practitioner about the harmful effects of maternal smoking and alcohol consumption and the value of weight gain during pregnancy. At the center, each woman was informed by her nurse about her own risk conditions and behaviors likely to reduce risk. Each woman was given an ideal weight goal, based on prepregnancy weight, and weight gain was discussed at each visit. All women were encouraged to take their daily prenatal vitamin–mineral supplement, which included appropriate levels of zinc.[13] A small, appealing pill was provided, and instruction was offered to help with swallowing and remembering to take the pill daily.

For women who smoked before pregnancy, a structured smoking cessation/reduction program, adapted from Ershoff et al.,[14] was implemented with individualized follow-up activities, logs, and technical assistance from a behavioral medicine specialist.

Reduction of stress and feelings of helplessness was actively attempted through discussions of actual and potential problems with patients during each visit. Women met, if necessary, with the social worker during their clinic visit. Efforts to strengthen positive social support included encouraging women to bring the father-to-be, relatives, and close friends to the Mother and Family Specialty Center and promoting informal social support during group sessions.

Prenatal care followed American College of Obstetricians and Gynecologists guidelines, and all procedures were documented. Nurses were highly experienced in prenatal care and received additional training (4 half-day sessions) for this trial, followed by biweekly staff meetings with the first 2 authors and training review sessions throughout the 2 years of implementation. Nurses did not advocate ineffective practices, such as bed rest and abstaining from intercourse (often recommended elsewhere). Treatment for all medical conditions was provided promptly by physicians on call. A detailed operations manual was created for this trial.

The center scheduled appointments for every 2 weeks—more frequently than the American College of Obstetricians and Gynecologists recommends—until the last month, when weekly appointments were scheduled. At each appointment, the woman had scheduled a 40-minute session with her nurse-clinician or nurse-practitioner, who performed all routine clinical activities (e.g., weighing in, drawing blood). The protocol called for each woman to be seen within 5 minutes of her scheduled appointment time, thus eliminating the long waiting typical of many clinics for low-income women. The center was welcoming and conveyed culturally appropriate messages through the behavior of personnel, the decor, and specially developed video and print materials, following general principles for creating culturally competent systems of care.[15] On-site child care was provided, including planned activities and snacks. Evening hours were available. Transportation was provided, if needed. Women were contacted by a phone call and a mailed "friendly reminder" card before each appointment.

Immediately before or after each woman's appointment with her nurse, she joined a 40-minute group session that offered education about pregnancy, the importance of health behaviors to minimize risk conditions, and peer social support. Trained professionals with extensive community experience led the sessions. Key topics, for which training and presentation materials were provided to group leaders, included nutrition and weight gain, smoking and substance abuse, stress reduction and control over life-affecting decisions, and labor and delivery (2 sessions on each). Supplemental written and video materials to take home were available, as well as a "welcome to the center" videotape. The center emphasized all the health promotion activities recommended by the Public Health Service Expert Panel on the Content of Prenatal Care[16]: counseling to promote and support healthy behavior, education to provide general knowledge of pregnancy and parenting, and information on proposed care. Nutritious snacks were available. (For key differences between augmented care and usual care, see Table 1.)

Efforts to keep the cost of care in the augmented care condition within current or likely reimbursement rates led to the elimi-

TABLE 1—Key Features of the Mother and Family Specialty Center Compared With Typical Care for Pregnant Medicaid Patients

Mother and Family Specialty Center	Typical Care for Medicaid Patients
1. Focus on risk reduction. All mothers-to-be informed clearly, individually, and repeatedly about their risks and what they could do to lower risk.	1. Focus on general maternity care. Variable levels of informing mothers-to-be about individual risks and how to change.
2. Specific programs related to 3 major risk conditions: smoking cessation, weight gain and vitamin/mineral supplementation, and amelioration of psychosocial stress/isolation.	2. No specific programs provided for all women to maximize smoking cessation, ensure weight gain and daily vitamin/mineral supplementation, or enhance psychosocial situation.
3. Appointments and group sessions every 2 weeks throughout pregnancy (weekly after 36 weeks).	3. Appointments monthly until 28 weeks, bimonthly from 28–36 weeks, and weekly after 36 weeks.
4. Regular, standing appointment; no need to schedule next visit each time.	4. Each appointment scheduled at prior visit; if appointment missed, patient must contact clinic to reschedule.
5. No waiting time: all patients seen within 5 minutes of scheduled session.	5. Variable waiting time (average of more than 1 hour).
6. Evening hours available.	6. Usually only standard work hours.
7. Individualized care with the same health care practitioner.	7. Care with multiple practitioners.
8. Forty-minute private sessions with practitioner (more if special conditions warranted).	8. Variable time (10–40 minutes).
9. Health care record given to patients and updated (or replaced, if lost) at each visit, with key relevant information.	9. No health care records given to patients.
10. All women received 2 reminders before each appointment (1 phone call, 1 mailed card).	10. Reminders typically not provided.
11. Transportation provided (via taxi, bus, or gas vouchers paid by center) whenever needed.	11. Some transportation assistance provided but cumbersome and not available to all.
12. Child care provided at center (with planned activities, snacks).	12. No child care routinely available.
13. Fathers-to-be, relatives, and friends encouraged to come to center and join in group.	13. No special outreach to fathers-to-be, relatives, or friends.
14. Physical environment designed to provide welcoming, positive messages; culturally appropriate images; snacks and beverages; comfortable seating; easy directions to laboratory and special rooms. Setting conveyed a celebration and affirmation of pregnancy, families, and community.	14. Variable settings, often minimal in terms of positive messages, comfort, cheerfulness, and cultural appropriateness.
15. Discussion groups (40 minutes) held as an integral part of each center visit to increase both social support and knowledge.	15. No systematic provision of groups for social support with other pregnant women. Time and location of prenatal classes different from those of clinic appointment.
16. Information compiled and distributed to mothers-to-be in both video and easy-to-read print formats.	16. Some print information available, but often limited in substance and not targeted directly at high-risk population.

nation of home visits, weekend clinic hours, and direct provision of additional books and equipment. The single greatest additional cost was for transportation, followed by the more modest cost of providing on-site child care.

Data Collection

Data about patient care were gathered from clinic records, special forms prepared for this study, and a computerized database that contained information about routine aspects of care and birth outcome data for all Medicaid patients. During the second year, a structured postpartum interview with women in both the augmented care and usual care groups was administered by interviewers blind to the treatment group. (Inconsistencies in the administration of postpartum interviews during the first year raised questions about their validity, so they were not included in this analysis.)

We hypothesized that women enrolled in augmented care, compared with those in usual care, would (1) have more positive perceptions of their prenatal care, (2) become more knowledgeable about their risk conditions and more motivated to reduce them, and (3) have better pregnancy outcomes.

Characteristics of the Study Sample

A total of 656 African American women enrolled in the trial. Outcome data were available for 619 who delivered in area hospitals, where 318 received augmented care and 301 received usual care. The groups were almost identical in demographic and maternal risk characteristics (Table 2). Most (61%) were aged 20 to 29 years (mean=22.5 years). More than 90% were not currently married. The mean educational level was just over 11 years. More than half (58%) were multiparous. Both groups sought prenatal care at a mean of about 11 weeks of gestation. The mean score on the risk assessment scale was 15.6 (SD=15.1), with most women having 2 or 3 risk factors. The most common risk (70%) was not owning a car, a marker variable previously correlated with psychosocial stress. About one third had each of the following risks: a prepregnancy weight of 50 kg or less, a BMI of less than 19.8, and perceived lack of mastery in their lives. Only about 15% had experienced a previous preterm delivery or a term intrauterine growth retardation birth.

Comparison of the 118 women who participated in postpartum interviews (year 2) on all variables listed in Table 2 revealed only 1 significant difference from the total study sample: those in augmented care who provided interview data were significantly more likely to own a car (41.5%) than those in the total group (31.4%) (P=.04), a difference not found in the usual care group.

Results

Perceptions of Received Prenatal Care

Women in augmented care rated all aspects of their prenatal care significantly more favorably than did those in usual care. Participating in the Mother and Family Specialty Center was associated with highly positive

TABLE 2—Demographic and Maternal Risk Characteristics of African American, Medicaid-Eligible Women in Augmented and Usual Prenatal Care

	Augmented Prenatal Care (n = 318)	Usual Prenatal Care (n = 301)	*P*
Demographic variables			
Maternal age group, %			
16–19 y	29.6	27.6	.83
20–29 y	60.4	61.5	
≥30 y	10.1	11.0	
Not currently married, %	92.4	92.8	.86
Mean maternal education, y (SD)	11.5 (2.2)	11.2 (2.8)	.12
Parity, %			
0	41.2	42.2	.96
1	33.3	33.2	
2 or more	25.5	24.6	
Mean gestational age when prenatal care sought, wk (SD)	10.9 (4.6)	10.7 (4.5)	.66
Maternal risk factors,[a] %			
Previous preterm delivery (10)	14.5	15.3	.78
Prepregnancy weight ≤50 kg (10)	32.8	35.9	.42
Does not own car (10)	68.6	70.1	.68
BMI < 19.8 if weight > 50 kg (5)	31.8	31.9	.97
Previous term IUGR infant (5)	13.8	12.6	.65
Smoking when became pregnant (5)	20.4	20.9	.88
Perceived lack of mastery (5)	36.5	34.3	.55
Mean risk assessment total score of 10–40[b] (SD)	15.4 (5.5)	15.7 (5.9)	.46

Note. BMI = body mass index; IUGR = intrauterine growth retardation.
[a]The points assigned to each risk factor are indicated in parentheses. Risk factors assigned 10 points were associated with higher risk for low birthweight (>20%) than those assigned 5 points.
[b]To be eligible for the study, participants needed a minimum risk assessment total score of 10.

appraisals of helpfulness, a belief among multiparous women that care was better this time (74% vs 30% for usual care), increased amounts of time spent with their regular nurse, and an almost universal perception that their nurse was "very helpful" (Table 3). In contrast, those in usual care had more mixed evaluations of their prenatal care, although 80% judged their overall care to be "very helpful" (compared with 94% in augmented care). Nearly one third of those in usual care reported that they spent 3 hours or more at each clinic visit, nearly 3 times the rate of those in augmented care, whose total reported clinic time included a 40-minute group session as well as time in their individual appointment. Further, most multiparous women in usual care rated their care as being the same as (55%) or worse than (15%) during their last pregnancy, despite ongoing efforts to improve care by the health department and the university.

As expected, the number of prenatal visits was significantly greater in augmented care (13.7; SD = 3.8) than in usual care (11.9; SD = 3.8) ($P = .001$). A dramatic difference between the 2 groups was self-report of participation in prenatal or childbirth classes: 79% for augmented care and 17% for usual care ($P < .001$).

Knowledge of Risks and Health-Promoting Behaviors

Informing women about their own risk conditions and about pregnancy and delivery was an important feature of augmented care. Significantly more women in augmented care than in usual care reported that they were told they or their baby were "at risk," although most still reported that they were *not* informed of their own specific risks. This self-report is at odds with the documented nurse records, which indicated that particular risks were discussed on multiple occasions. However, 69% of those aware of their risk conditions in augmented care reported positive behavior change as a result of prenatal care information, compared with 48% in usual care (this difference was not statistically significant, however).

Consistent with the emphasis placed on weight gain in augmented care, 92% stated that they were told how much weight to gain, a significantly higher proportion than for those in usual care (77%). About 80% in both groups reported taking their vitamin–mineral supplement regularly (i.e., on a daily basis or missed only infrequently). Smoking cessation was reported more often by those in augmented care than by those in usual care, although the sample size was quite small. Even in augmented care, half continued to smoke at least some cigarettes during pregnancy. At 1 month postpartum, women in augmented care were significantly more likely to perceive some degree of control over events in their lives (perceived mastery) than were those who received usual care (Table 3).

Pregnancy Outcomes

There were 7 fetal deaths in the augmented care group (3 before 20 weeks and 4 at 20 weeks or later) and 5 fetal deaths in the usual care group (3 before 20 weeks and 2 at 20 weeks or later). Overall, there were no statistically significant differences in pregnancy outcomes related to birthweight, gestational age, and growth indicators; child health status; or maternal health and delivery outcomes (Table 4). Although the mean birthweight of live-born infants was somewhat higher in augmented care than in usual care (3076 g vs 3032 g), the percentage weighing below 2500 g was slightly higher in augmented care (12.5% vs 11.2%) (Table 4). It is noteworthy that the 20%-or-higher rate of low birthweight that had been predicted for this study was not found in either treatment group.

Mean gestational age was approximately 39 weeks in both groups, with a reduction in the rate of preterm births in augmented care (10.6%) relative to usual care (14.0%). Nonetheless, intrauterine growth retardation, calculated by the standard of Williams et al.,[17] was slightly higher among augmented care infants (11.9%) than among usual care infants (9.1%). Low Apgar scores were not a concern for either group. Infants whose mothers received augmented care were less likely to be placed in a neonatal intensive care unit or to have a congenital anomaly.

Maternal weight gain in augmented care was greater than in usual care, particularly for those with a BMI below 19.8. Rates of cesarean sections also were lower in augmented care than in usual care (Table 4).

Because it is likely that minor variation in a number of variables, such as when women entered prenatal care, their actual risk scores, and the child's sex, could have combined in ways that obscured significant effects in this sample despite random assignment, we constructed and tested a series of models for the primary outcomes of birthweight and gestational age. Using general linear models as the primary analytic strategy, and either covarying or controlling for maternal and child variables and testing for 2- and 3-way interaction terms, we found no significant effects. We also conducted separate analyses for the multiparous and primiparous samples, the teen and adult samples, and the women enrolling in prenatal care earlier (<18 weeks) and later (≥18 weeks) to determine whether any variations in the pat-

TABLE 3—Perceptions of Care and Reported Behavioral Changes Among African American, Medicaid-Eligible Women in Augmented and Usual Prenatal Care

	Augmented Prenatal Care (n = 118)		Usual Prenatal Care (n = 105)		
	n	%	n	%	*P*
Prenatal care overall rated					.002
Very helpful	110	94.0	84	80.0	
Somewhat or not too helpful	7	6.0	21	20.0	
Compared with last time, prenatal care rated					.001
Better	49	74.2	18	30.0	
Same	16	24.2	33	55.0	
Worse	1	1.5	9	15.0	
Average time reported with nurse per visit[a]					.001
<15 min	18	15.7	41	40.2	
About 30 min	73	63.5	50	49.0	
About 45 min	16	13.9	6	5.9	
About 60 min	8	7.0	5	4.9	
Average reported time from entering to leaving clinic[b]					.001
About 1 h	20	17.2	17	17.4	
About 1½–2½ h	83	71.5	50	51.0	
About 3 h or more	13	11.2	31	31.6	
Same nurse reported as providing care each visit	112	96.6	88	83.8	.001
Nurse rated as "very helpful"	107	93.9	82	78.9	.001
Knowledge of risk factors					
Told she or her baby might be "at risk" or "have problems"	50	42.4	30	28.6	.03
Changed behavior during pregnancy in response to information about risks/problems (only if told at risk)	35	68.6	14	48.3	.07
Told how much weight to gain	108	92.3	80	76.9	.001
Self-report of behavioral change/status					
Regular vitamin–mineral supplementation	93	80.2	82	78.9	.81
Smoking cessation (for smokers only)	11	50.0	7	27.0	.09[c]
Perceived mastery (i.e., disagreed with statement "There is little I can do to change the important things in my life")	55	47.0	33	31.4	.02

[a]According to nurses' reports, women in augmented care spent an average of 30 to 35 minutes per visit with their nurse.
[b]This analysis excludes 6 women in the usual care group who reported that total time was "highly variable."
[c]Fisher exact test based on 22 smokers in augmented care and 26 in usual care.

TABLE 4—Pregnancy Outcomes for Live Births Delivered by African American, Medicaid-Eligible Women in Augmented and Usual Prenatal Care

	Augmented Prenatal Care (n = 311)	Usual Prenatal Care (n = 296)	*P*
Child outcomes			
Mean birthweight, g (SD)	3076 (584)	3032 (603)	.36
Low birthweight (<2500 g), %	12.5	11.2	.60
Moderate low birthweight (1000–2499 g)	10.6	8.1	
Very low birthweight (<1000 g)	1.9	3.0	
Mean gestational age, wk (SD)	39.0 (2.6)	38.7 (2.8)	.19
Preterm birth, %	10.6	14.0	.22
IUGR,[b] %	11.9	9.1	.26
Low (<7) Apgar score, %			
At 1 min	11.0	13.5	.35
At 5 min	1.6	1.0	.52
NICU stay, %	10.7	15.0	.11
Congenital anomalies, %	1.6	2.4	.50
Maternal outcomes			
Mean maternal weight gain during pregnancy, kg (SD)			
If BMI < 19.8 (at risk)	15.3 (6.3)	14.3 (6.4)	.27
If BMI ≥ 19.8 (not at risk)	12.9 (8.2)	12.8 (7.6)	.90
Cesarean deliveries, %	13.8	17.2	.24

Note. BMI = body mass index; IUGR = intrauterine growth retardation; NICU = neonatal intensive care unit.
[a]Based on χ^2 analyses, except for very low birthweight, where the numbers were below 10 per cell and the Fisher exact test was used.
[b]As determined by the standard of Williams et al.[17]

tern or magnitude of group differences emerged, even if not statistically significant. The results of these analyses confirmed the pattern of findings already presented in Tables 3 and 4. Further, because the rates of low birthweight were substantially below those anticipated, we explored within the present sample the validity of the risk index created on 2 previous samples. In fact, higher risk scores were clearly and significantly related to worse pregnancy outcomes, although many women in the sample had relatively low total risk scores (15 or less).

Discussion

Participation in the Mother and Family Specialty Center, a form of augmented prenatal care designed for high-risk, Medicaid-eligible, African American women, led to significantly more positive perceptions of the helpfulness of prenatal care, as well as to greater awareness of individual risk conditions, more active engagement in health-promoting behaviors, and a greater sense of mastery during the early postpartum period. The additional

cost of providing this form of prenatal care was quite modest: an average of 2 additional visits; extra training for clinic personnel; provision of educationally-oriented peer group sessions (during periods often spent in a waiting room); and transportation, snacks, and staffing for on-premises child care. Despite the fact that women in usual care generally received somewhat less individualized time, were less likely to be cared for by the same nurse, and reported very lengthy visits (3 or more hours), most women in usual care had favorable impressions of their experience.

The findings on patient satisfaction with augmented care are similar to those of Handler and colleagues. They found that having procedures explained by the provider was the most important determinant of satisfaction with prenatal care but that short waiting times at the prenatal care site, the availability of ancillary services, and reporting that the prenatal care provider was a male were associated with increased satisfaction in an African American/Mexican American sample.[18] Another study revealed that low-income women also valued the "art of care," the technical competence of the practitioner, continuity of caregiver, and the atmosphere and physical environment of the care setting.[19] All but male provider were features of the augmented care provided in this study.

A somewhat disappointing finding was that only 42% of the women in augmented care reported being aware of their own risk conditions, although this figure was nearly 50% higher than for women in usual care. One possible explanation is that women who became eligible primarily because they did not own a car or were light (≤50 kg) may not have considered these factors to be specific "risk conditions." In fact, many women had these as their only risk conditions, above and beyond their Medicaid status and being African American. Nonetheless, the fact that so many of the women—nearly 70%—who reported being informed of their risk conditions took positive steps to change their behavior is encouraging. This defies negative stereotypes that certain patient populations are noncompliant or unable to use relevant health information to alter their behavior. In contrast, a discouraging finding was that efforts to promote smoking cessation were only partially successful, although almost all smokers in both augmented care and usual care reported that they reduced the number of cigarettes smoked per day. Further, rates of smoking and number of cigarettes smoked per day were quite low in this inner-city, African American sample.

There were several limitations to this study. First, despite the positive appraisal of augmented care and the women's self-report of positive behavior change, pregnancy outcomes were not significantly better than in usual care. This may have been due to inadequate sample size. For most of the outcome variables (mean birthweight, mean gestational age, percentage of preterm births, percentage with a stay in a neonatal intensive care unit, percentage with congenital anomalies, mean weight gain, and percentage of cesarean deliveries), the trend was in the positive direction, as predicted. For differences of the observed magnitude to be statistically significant, however, a sample size 5 times larger would be required; this was impossible with the financial resources for this study.

Second, the exclusion of women with specific medical conditions and the enrollment of women with a relatively low score on the risk assessment scale may have led to an underenrollment of women who would have most benefited from this form of augmented care. Third, many women were not recruited into the study until the middle of their second trimester or later. Although an analysis by gestational age at a woman's enrollment did not alter the conclusions, longer exposure to the intervention possibly could have produced more positive results. Fourth, the women who received usual care in this study were likely to have received excellent care in the health department or university clinics. This would have minimized group differences, although it provided a strong test of the potential value of the additional supports, such as group educational and peer support sessions and extra time with nurses who focused on women's particular risk conditions.

Conclusions

Prenatal care of high quality, offered in a supportive environment, emphasizing health promotion and education, and provided in a culturally appropriate and individualized manner, did not reduce the rate of low birthweight within this group of African American women. This confirms a growing body of literature suggesting that providing more or higher-quality prenatal care is unlikely to achieve an important reduction in low birthweight and prematurity. On the positive side, the findings indicate that among low-income, minority women, a supportive prenatal care center increases the patient's level of satisfaction, knowledge about pregnancy, and perceived mastery of her life. This may be sufficient to recommend that this program of augmented care be offered routinely, even if it has no impact on pregnancy outcomes.

These findings have implications for public policy in an era of managed health care. For managed care organizations, offering services such as those provided by the Mother and Family Specialty Center might attract women in an increasingly competitive obstetric environment. Ideally, more research with larger samples would provide data about whether such augmented care can significantly reduce expensive outcomes such as preterm delivery, cesarean sections, and stays in neonatal intensive care units. Current research, however, suggests that specific biomedical conditions—in particular, treatable maternal infections—are responsible for many preterm deliveries.[20,21] As findings about treatable infections are translated into medical protocol, managed care organizations, as well as private practices and public clinics, may be motivated to develop supportive prenatal care settings, similar to the Maternal and Family Specialty Center, to ensure that low-income women receive early and continuous medical treatment to reduce their disproportionately high rates of poor pregnancy outcomes. □

Contributors

L. V. Klerman and S. L. Ramey planned and implemented the study, designed data collection instruments, and planned data analyses, and they were the primary authors of the manuscript. R. L. Goldenberg was the principal investigator on the grant that provided support for this trial and assisted in conducting the study and preparing the manuscript. S. Marbury was responsible for supervision of the Mother and Family Specialty Center as well as subject recruitment procedures. J. Hou and S. P. Cliver shared responsibility for data analyses.

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