

Factors Associated with Adolescents' Risk For Late Entry into Prenatal Care

By Constance M. Wiemann, Abbey B. Berenson, Leticia Garcia-del Pino and Sharon L. McCombs

Risk factors for late entry into prenatal care were examined among 533 pregnant adolescents younger than 18. Forty-seven percent entered prenatal care after 12 weeks' gestation. Logistic regression analysis indicated that adolescents who no longer had contact with their baby's father were 4.2 times as likely as those who did to enter prenatal care after the first trimester. Adolescents with no history of abortion were 3.2 times as likely to enter care late as those who had had an abortion. Young women who had not used alcohol in the last 30 days and those with only one sex partner in the last 12 months were more likely than adolescents exhibiting riskier behavior to receive care late (odds ratios of 2.7 and 1.6, respectively). Odds of late entry into care were also elevated for those who were unemployed (1.9), black or white (1.9 and 1.7, respectively) and less educated (1.2).

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Empirical evidence documenting the importance of prenatal care in reducing rates of prematurity and low birth weight has been equivocal.¹ Nevertheless, several studies suggest that early access to prenatal care, particularly from a comprehensive prenatal program, may benefit specific subgroups of women, including adolescents.² Pregnant adolescents are especially likely to receive inadequate prenatal services; as many as 55% enter care late or not at all.³

Few reliable data exist on factors associated with late access to prenatal care among adolescents, and published studies are difficult to interpret due to methodological shortcomings. For example, information obtained from young mothers immediately after delivery⁴ may be biased, since patients are required to recall events that transpired many months previously. In addition, important variables associated with inadequate care among adults, including race or ethnicity⁵ and substance use,⁶ have not been adequately examined in an adolescent population.

Finally, although sophisticated statistical analyses, including multiple regression, have been used to evaluate late entry into prenatal care among adolescents,⁷

evaluations of the extent to which resulting models discriminate between adolescents who enter care early and those who begin care later in pregnancy have been lacking. As a result, it is difficult for health care providers to accurately identify pregnant adolescents who are at the greatest risk for receiving inadequate care.

The purpose of this study was to examine risk factors (including race or ethnicity and the use of tobacco, alcohol and illicit drugs such as marijuana) for late entry into prenatal care among a large sample of pregnant adolescents.

Data and Methods

This study uses data on adolescents younger than 18 who initiated prenatal care at the Adolescent Obstetric Clinic at the University of Texas Medical Branch at Galveston between January 2, 1992, and December 31, 1994. Consistent with clinic policy, all patients had their pregnancy confirmed prior to their first prenatal visit. Pregnant patients were then scheduled to attend their first obstetrics appointment within two weeks. Prenatal counseling did not begin until the first prenatal visit.

As part of standard care, trained clinic personnel interviewed patients at their first prenatal visit, using a structured questionnaire. This interview elicited demographic and reproductive data, information on risk behaviors such as multiple sex partners and use of tobacco, alcohol and illicit drugs (marijuana, cocaine, hallucinogens and others), wantedness of the current pregnancy, the age at which the patient's mother had her first baby, transportation problems, relationship with the

baby's father and patient's financial status. Women were interviewed consecutively; none refused to be assessed. During the same visit, 95% submitted a urine specimen that was screened for drugs (cannabinoids, cocaine and opiates).

With Institutional Review Board approval, a trained research assistant extracted from medical records patients' responses to the interviews, the number of clinic visits, adolescents' reproductive histories, and results of the urine drug screens and ultrasonography. All data were entered into a computerized database by a second trained assistant. To ensure accuracy, 10% of data entries were randomly evaluated; agreement of 99% or greater was observed across all data items.

Gestational age at entry into care was determined according to the date of the adolescent's last menstrual period (corrected by ultrasound when necessary). We coded participant's age and last grade completed in school as continuous variables; all other variables were transformed into dichotomous measures. Socioeconomic status was determined based on the federally established poverty level for household income and the number of household members dependent on that income, and was defined as either 0-100% or greater than 100% of the poverty level.

The current relationship with the baby's father was coded as being either present or absent. We dichotomized marital status as either single, separated or divorced versus married or cohabiting. Pregnancy history was coded as none or one versus more than one prior pregnancy. Parity and abortion history (elective or spontaneous) were both dichotomized as none versus one or more. The number of sexual partners during the last 12 months was coded as either one or more than one.

Living with their mother, having transportation problems, school enrollment, employment status, mother's first birth by age 18, wantedness of the pregnancy, and use of tobacco, alcohol, marijuana or other illicit drugs in the previous 30 days were coded "yes" or "no." Use of tobacco and alcohol were based on self-reports, whereas illicit drug use was measured using both self-reports and urine drug screenings and

Constance M. Wiemann is an assistant professor, Abbey B. Berenson is an associate professor, Leticia Garcia-del Pino is a resident in family medicine and Sharon L. McCombs is a research associate in the Department of Obstetrics and Gynecology, The University of Texas Medical Branch, Galveston, Texas. The authors would like to thank the publications, grant and media support staff in the Department of Obstetrics and Gynecology for editorial assistance, and Vaughn I. Rickert for his helpful comments throughout the development of this article. No external funding was used in the preparation of this article.

Table 1. Means (and standard deviations) and percentages of adolescent women initiating prenatal care, by selected characteristics, Galveston, Texas, 1992–1994 (N=533)

Characteristic	Mean or %
Mean age	15.9 (1.1)
Mean years of education	9.1 (1.3)
% enrolled in school	70.2
% black	39.2
% white	32.1
% Mexican American	25.3
% other race/ethnicity	3.4
% with family income below 100% of poverty	83.9
% employed	14.6
% with previous pregnancy	23.8
% with history of abortion	6.2
% reporting pregnancy as planned	15.6
Mean weeks' gestation at initiation of prenatal care	14.6 (7.4)
Mean no. of prenatal appointments attended	
Early care	10.3 (4.7)
Late care	7.3 (3.6)

affirmed if either was positive.

Demographic, reproductive and socioeconomic characteristics and data on the use of tobacco, alcohol and illicit drugs during pregnancy were compared initially among patients grouped by trimester of entry into prenatal care, and then by entry during the first 20 weeks of pregnancy versus the period beyond 20 weeks. Adolescents who entered care in the second trimester were similar in their experience to those who did so in the third trimester. Likewise, there were few differences between those who began care during the first versus the second half of gestation, and the latter group was small in size.

Thus, to increase our power to detect significant differences, we collapsed data on patients who initiated care in the second or third trimester (i.e., beyond 12 weeks' gestation) into one group and compared them to adolescents who entered care by 12 weeks' gestation. Comparisons were made using Student's t-tests, nonparametric tests for ordinal variables (Kruskal-Wallis) or chi-square tests, depending on the level of measurement and the extent to which parametric assumptions were satisfied. Student's t-tests were also used to compare mean gestational age at entry into care for each categorical factor.

We then considered bivariate correlates of late access to prenatal care ($p < .10$) for entry into stepwise logistic regression analyses to identify factors independently associated with the outcome. For ease of interpretation, we reverse-coded the last grade completed in school so that higher values denoted lower grades. We evaluated multicollinearity by examining correlations among independent variables, and examined separately the individual

contributions of highly correlated variables to the logistic regression model by adding and removing each in sequential analyses. We quantified the performance of the resulting model using Receiver Operating Characteristic curve analysis to estimate its overall ability to discriminate between adolescents who entered care in the first trimester and those who did so in the second or third trimester.⁸

Results

A total of 533 patients were included in the study. The adolescents' mean age was 15.9, and they had completed an average of nine years of schooling (Table 1). Thirty-nine percent of the study participants were black, 32% were white and 25% were Mexican American. The majority (more than 80%) came from families earning a gross monthly income of less than 100% of poverty level. Twenty-four percent of the young women in the sample reported a previous pregnancy, and 6% reported having had an abortion. Sixteen percent indicated that their current pregnancy had been planned.

Adolescents initiated prenatal care at an average of nearly 15 weeks' gestation. Forty-seven percent of surveyed patients entered prenatal care in the second (N=199) or third (N=54) trimester. As expected, those patients who entered care early attended a greater number of prenatal appointments (10.3, on average) than did those who entered care late (7.3).

Compared with patients who began prenatal care during their first trimester, those who received care after 12 weeks' gestation were significantly younger and less educated, were less likely to be employed or to have had an elective or spontaneous abortion and were more likely to have had a child (Table 2). They were also significantly less likely to report any type of relationship with the father of their baby, and were more likely to be living with their mother. Patients who accessed care by 12 weeks' gestation were significantly more likely than those who entered care late to report having had more than one sexual partner

in the last 12 months and to have used alcohol in the previous 30 days.

Adolescents who entered prenatal care after their first trimester were less likely than those who initiated care early in their pregnancies to have experienced a previous pregnancy, were more likely to report that their current pregnancy was unwanted and were less likely to be Mexican American ($p = .06$ for all). Although differences were not significant at $p < .05$, these variables met the criteria for entry into the logistic regression analyses.

Employed adolescents entered prenatal care significantly earlier than those who were unemployed (Table 3). Young women who already had a child began care later than did those who had not, while those with a history of abortion entered care earlier than those with no such history. Adolescents who reported their pregnancy as unwanted entered care later than did those carrying a wanted pregnancy.

Young women who continued to have a relationship with their baby's father entered care earlier, and teenagers living with their mother began care later, than did others. Adolescents who had more than one sexual partner in the previous 12 months and those who had used alcohol or marijuana in the last 30 days all entered care earlier than their non-risk-taking counterparts. Average gestational age at entry into care did not differ significantly among

Table 2. Means (and standard deviations) and percentages of adolescent women, by selected characteristics, according to estimated gestational age at entry into prenatal care

Characteristic	Weeks of gestation	
	≤12 (N=280)	>12 (N=253)
Mean age (in years)	16.0 (1.0)	15.7 (1.2)**
% black†	47.8	52.2
% white†	55.0	45.0
% Mexican American†	59.3	40.7
% other race/ethnicity†	33.3	66.7
Mean years of education completed	9.2 (1.3)	8.9 (1.3)**
% enrolled in school	70.9	69.4
% employed	19.5	9.2**
% with family income ≤ 100% of poverty	83.2	84.7
% with family income > 100% of poverty	16.8	15.3
% single, separated or divorced	87.6	86.4
% married or cohabiting	12.4	13.6
% with previous pregnancy	27.1	20.2
% with one or more previous births	7.9	13.4*
% with history of abortion	20.4	7.5**
% reporting unwanted pregnancy	29.7	37.7
% having any relationship with baby's father	95.0	80.9**
% living with mother	54.0	66.8**
% whose mother had first baby before age 18	40.9	40.2
% with >1 sexual partner in last 12 months	71.4	60.5**
% who used tobacco in last 30 days	10.4	7.9
% who used alcohol in last 30 days	13.7	5.0**
% who used marijuana in last 30 days	10.3	6.8
% who used other drugs in last 30 days	1.8	1.2
% with transportation problems	17.6	19.9

* $p < .05$. ** $p < .01$. †Percentages are the proportion of adolescents from within each racial or ethnic category.

Table 3. Mean gestational age (in weeks) at first prenatal care visit among adolescent women, by selected characteristics

Characteristic	Weeks
Parity**	
≥1	17.5
0	14.3
No. of abortions	
≥1	11.5
0	15.1
Employed**	
Yes	12.4
No	14.9
Relationship with baby's father**	
Yes	14.1
No	19.9
Living with mother*	
Yes	15.2
No	13.9
Pregnancy status**	
Unwanted	16.0
Wanted	13.9
No. of sexual partners in last 12 months**	
>1	14.0
1	15.9
Alcohol use in last 30 days**	
Yes	11.6
No	15.1
Marijuana use in last 30 days*	
Yes	12.3
No	14.9

*p≤.05. **p≤.01.

white (14.0 weeks), black (15.2 weeks) and Mexican-American (14.5 weeks) adolescents or among patients stratified by any other characteristic (not shown).

In the stepwise multiple logistic regression analysis, adolescents who were no longer in a relationship with their baby's father were 4.2 times as likely to enter prenatal care after 12 weeks' gestation as were those who reported continued contact (Table 4). Patients with no history of abortion were 3.2 times as likely to initiate care late as adolescents who had had an abortion, and those who had not used alcohol in the past 30 days were 2.7 times as likely as those who had used alcohol more recently to begin care late.

Unemployed adolescents were nearly twice as likely as employed teenagers to receive prenatal care after the first trimester. Compared with Mexican Americans, blacks were 1.9 times as likely and whites 1.7 times as likely to initiate care late. Adolescents with only one sex partner in the last 12 months were 1.6 times as likely to enter care late as were those with multiple partners. Young women with lower educational attainment were more likely to initiate prenatal care late than

were their more educated counterparts; for example, those who had completed eighth grade were 1.2 times more likely to access care late than were those who had completed at least ninth grade.

Patient's age and living arrangements, number of births and pregnancies, want- edness of the current pregnancy, school enrollment and recent marijuana use did not significantly improve the overall fit of the model. Two-way interaction terms were considered, but none were significantly associated with accessing care. The area under the Receiver Operating Characteristic curve (0.71) demonstrated that the model performed significantly better than chance.

Discussion

We found that nearly half of the adolescents in the study population initiated prenatal care in the second or third trimester of pregnancy. In contrast to research on pregnant adults,⁹ our data suggest that adolescents who entered prenatal care late were no more likely to have engaged in high-risk behaviors or to have had an abortion than were adolescents who accessed care in the first trimester. In fact, these factors were independently associated with early entry into care.

Alcohol use during pregnancy may serve as a catalyst for early entry into prenatal care among some adolescents; prior research has demonstrated that alcohol abuse increases health care utilization among nonpregnant adolescents and adults.¹⁰ In addition, adolescents with a history of multiple sex partners may have perceived a greater need for prenatal care because they are more likely than their less sexually experienced peers to have had a sexually transmitted disease,¹¹ and therefore are more likely to have been exposed to the health care system.

Likewise, adolescents who have had a prior miscarriage or elective abortion may perceive a greater need for medical supervision than adolescents who have not had this experience. In contrast, young mothers who have successfully carried a pregnancy to term may believe they already know how to care for themselves throughout their pregnancy, and therefore may not seek care in a timely manner.

After controlling for other factors, we found that Mexican American adolescents were significantly more likely than either white or black teenagers to enter care in the first trimester of pregnancy. In contrast, previous studies of pregnant adults have reported similar¹² or higher¹³ rates of late or no prenatal care among minor-

ity women compared with white women. In this study, statistical controls may have eliminated apparent differences in the timing of entry into care among black and white adolescents. The majority of Mexican American adolescents in our sample live in a region served by an institution with a long history of minority and indigent patient care. This may have reduced fear of deportation or lack of health insurance as barriers to prenatal care. However, it is difficult to explain why Mexican Americans entered care earlier than did black or white adolescents. Perhaps factors not directly measured in this study, such as beliefs about prenatal care, may explain the differential use of prenatal care observed across racial and ethnic groups.

As in previous research with adolescents and adults, teenagers in this study who were no longer in a relationship with their baby's father were more likely than others to initiate prenatal care after the first trimester,¹⁴ suggesting that continued contact with the baby's father may provide needed resources and emotional support that enable some adolescents to enter prenatal care in a timely manner.

Unlike previous research, our patients did not cite financial status¹⁵ or problems with transportation as significant barriers to accessing prenatal care. However, they were more likely to enter care late if they were unemployed. Many of our patients initiated prenatal care with the knowledge that they would be eligible for Medicaid, or they underwent screening at their first prenatal visit. Thus, by the time they completed our assessment, any perceived financial obstacles may have been eliminated. However, adolescents who failed to obtain any prenatal care were not represented in this sample; for these teenagers, transportation and financial problems may continue to represent significant barriers to gaining access to needed health services.

Interestingly, adolescents who were liv-

Table 4. Adjusted odds ratios (and 95% confidence intervals) of factors associated with late entry into prenatal care among adolescent women

Factor	Adjusted odds ratio
No relationship with baby's father	4.2 (2.0, 8.6)
No prior abortion	3.2 (1.7, 6.0)
No alcohol use in last 30 days	2.7 (1.3, 5.7)
Unemployed	1.9 (1.1, 3.5)
Black†	1.9 (1.2, 3.2)
White†	1.7 (1.1, 3.0)
One sex partner in last 12 months‡	1.6 (1.1, 2.4)
Years of education completed§	1.2 (1.04, 1.4)

†Compared with Mexican Americans. ‡Compared with multiple sex partners. §Education is a continuous variable; it was reverse coded so that higher values denote less education completed.

ing with their mothers were no more likely to access care in the first trimester than were adolescents with other living arrangements. In fact, our results suggest that adolescents who lived with their mother were at increased risk for late entry into care. Although the adolescent's own mother tends to be an important source of emotional, material and informational support throughout pregnancy,¹⁶ prior research indicates that fears of disclosing pregnancy to others, particularly parents, may delay some young people's access to care.¹⁷ Patients in our study may have sought prenatal care late as a result of efforts to conceal their pregnancy from their mother.

Adolescents who initiated prenatal care late are typically younger and less educated than those who enter care in the first trimester.¹⁸ However, our analyses revealed that age was not independently associated with late entry into care. Rather, correlates of younger age, including lower educational attainment, unemployment and sexual inexperience, are the more important predictors of delayed access. For example, adolescents who entered care in the first trimester were, on average, in the ninth grade. Many of these teenagers attended the local high school, which provides on-site pregnancy testing and prenatal care referrals. Those who initiated prenatal care in the second or third trimester were typically in the eighth grade, and the middle schools in the area do not offer these services on site.

Several limitations of this study bear mentioning. All patients received some type of prenatal care and attended an adolescent-oriented maternity clinic. Entry into care among adolescents has been earlier and rates of attendance higher in special youth-centered clinics than in traditional adult-oriented centers.¹⁹ Patterns of risk factors may be quite different for adolescents who fail to obtain care altogether or for those who attend more traditional prenatal clinics.

Furthermore, we did not query patients about their specific reasons for initiating prenatal care. We might have been able to clarify our results if we had known when patients first recognized they were pregnant, as well as their health beliefs about pregnancy and about the importance of prenatal care. Finally, because patients were interviewed at their first prenatal visit only, and because many of them did not deliver at our institution, we were unable to evaluate whether early access to care helped to reduce or eliminate maternal risk behaviors; reductions in substance use or multiple sex partners, for example, might have led to healthier infant out-

comes. Further longitudinal research is needed to explore the impact of prenatal care on maternal health risk behaviors and neonatal outcomes.

This study has several important implications for the development of interventions to increase adolescents' early access to prenatal care. Since pregnant adolescents may deny or hide their pregnancy and often have had limited exposure to reproductive health services, the need for early entry into prenatal care should be communicated whenever adolescents come in contact with the health care system. Schools need to disseminate this information, as they have greater and more frequent access to adolescents. Health education courses should be offered in the middle grades, when many younger adolescents first become sexually active, and should include information on the consequences of late or inadequate care. Communities could assist by providing educational programs or public service announcements on radio and TV stations viewed by young people.

In addition, the availability of emotional support (such as patient counseling or young mothers' support groups) and services (such as late afternoon clinic hours once or twice a week that are devoted to adolescent patients) may help meet these young people's additional needs. Finally, high-risk behaviors associated with late access to prenatal care among adults, including multiple sex partners and substance use, were more prevalent among adolescents who accessed care in the first trimester. Thus, providers of obstetric care must continue to screen all adolescents for these behaviors and not assume that early entry into care is associated with an overall healthy lifestyle.

References

1. G. R. Alexander and C. C. Korenbrot, "The Role of Prenatal Care in Preventing Low Birth Weight," *The Future of Children*, 5:103-120, 1995; J. M. Piper, E. F. Mitchel and W. A. Ray, "Evaluation of a Program for Prenatal Care Case Management," *Family Planning Perspectives*, 28:65-68, 1996; C. Chazotte, J. Youchah and M. C. Freda, "Cocaine Using During Pregnancy and Low Birth Weight: The Impact of Prenatal Care and Drug Treatment," *Seminars in Perinatology*, 19:293-300, 1995; and T. Raine, S. Powell and M. A. Krohn, "The Risk of Repeating Low Birth Weight and the Role of Prenatal Care," *Obstetrics and Gynecology*, 84:485-489, 1994.
2. D. L. Morris et al., "Comparison of Adolescent Pregnancy Outcomes by Prenatal Care Source," *Journal of Reproductive Medicine*, 38:375-380, 1993; V. A. Perkocha et al., "The Efficacy of Two Comprehensive Perinatal Programs on Reducing Adverse Perinatal Outcomes," *American Journal of Preventive Medicine*, 11:21-29, 1995; and T. O. Scholl, M. L. Hediger and D. H. Belsky, "Prenatal Care and Maternal Health During Adolescent Pregnancy: A Review and Meta-analysis," *Journal of Adolescent Health*, 15:444-456, 1994.

3. National Center for Health Statistics, *Monthly Vital Statistics Report*, Vol. 36, No. 4, supplement, July 17, 1987.
4. P. S. Cartwright et al., "Teenagers' Perceptions of Barriers to Prenatal Care," *Southern Medical Journal*, 86:737-741, 1993; and S. B. Kinsman and G. B. Slap, "Barriers to Adolescent Prenatal Care," *Journal of Adolescent Health*, 13:146-154, 1992.
5. M. D. Kogan, M. Kotelchuck and S. Johnson, "Racial Differences in Late Prenatal Care Visits," *Journal of Perinatology*, 13:14-21, 1993; and D. Kalmuss and K. Fennelly, "Barriers to Prenatal Care Among Low-Income Women in New York City," *Family Planning Perspectives*, 22:215-231, 1990.
6. D. Kalmuss and K. Fennelly, 1990, op. cit. (see reference 5).
7. P. S. Cartwright et al., 1993, op. cit. (see reference 4); and S. B. Kinsman and G. B. Slap, 1992, op. cit. (see reference 4).
8. W. S. Browner, T. B. Newman and S. R. Cummings, "Designing a New Study: III. Diagnostic Tests," in S. B. Hulley and S. R. Cummings, eds., *Designing Clinical Research, An Epidemiologic Approach*, Williams & Wilkins, Baltimore, 1988.
9. D. Kalmuss and K. Fennelly, 1990, op. cit. (see reference 5).
10. P. J. Leaf et al., "Factors Affecting the Utilization of Specialty and General Medical Mental Health Services," *Medical Care*, 26:9-26, 1988; and V. I. Rickert et al., "The Effects of Mental Health Factors on Ambulatory Care Use by Rural Teens," *Journal of Rural Health*, 12:160-168, 1996.
11. K. P. Erickson and K. F. Trocki, "Behavioral Risk Factors for Sexually Transmitted Diseases in American Households," *Social Science and Medicine*, 34:843-853, 1992.
12. J. Melnikow et al., "Characteristics of Inner-City Women Giving Birth with Little or no Prenatal Care: A Case-Control Study," *Journal of Family Practice*, 32:283-288, 1991; and R. E. Zambrana, C. Dunkel-Schetter and S. Scrimshaw, "Factors Which Influence Use of Prenatal Care in Low-Income Racial-Ethnic Women in Los Angeles County," *Journal of Community Health*, 16:283-295, 1991.
13. M. D. Kogan, M. Kotelchuck and S. Johnson, 1993, op. cit. (see reference 5); and D. Kalmuss and K. Fennelly, 1990, op. cit. (see reference 5).
14. C. M. Wiemann et al., "Prevalence and Correlates of Psychopathology in Pregnant Adolescents," *Journal of Adolescent Health*, 18:35-43, 1996; and R. E. Zambrana, C. Dunkel-Schetter and S. Scrimshaw, 1991, op. cit. (see reference 12).
15. P. S. Cartwright et al., 1993, op. cit. (see reference 4); and S. B. Kinsman and G. B. Slap, 1992, op. cit. (see reference 4).
16. S. Panzarine, "Stressors, Coping, and Social Supports of Adolescent Mothers," *Journal of Adolescent Health*, 7:153-161, 1986; and F. F. Furstenberg Jr., "Teenage Parenthood and Family Support," *Dimensions: Lives of Families*, 9:49-54, 1980.
17. C. L. Young et al., "Adolescent Third Trimester Enrollment in Prenatal Care," *Journal of Adolescent Health*, 10:393-397, 1989.
18. D. J. Petersen and G. R. Alexander, "Seasonal Variation in Adolescent Conceptions, Induced Abortions, and Late Initiation of Prenatal Care," *Public Health Reports*, 107:701-706, 1992; and M. L. Blankston et al., "Health Behavior and Outcomes in Sequential Pregnancies of Black and White Adolescents," *Journal of the American Medical Association*, 269:1401-1403, 1993.
19. S. B. Kinsman and G. B. Slap, 1992, op. cit. (see reference 4).