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Factors Influencing Early Prenatal Enrollment in the WIC Program

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Synopsis

Women's access to prenatal nutrition services was explored using a nationally representative sample of pregnant participants in the Special Supplemental Food Program for Women, Infants, and Children (WIC) in 1984. The probability was examined of the participant entering the program during her first trimester, rather than the second or third trimester. Other research has suggested that length of participation in the program during pregnancy is associated with increased birth weight.

The data were adjusted for various personal and local operational factors, such as prior WIC participation, race, age, income, household size, WIC priority level, availability of prenatal or other health services, targeted outreach policies, years of local operation, and local agency size.

Previous participation in the WIC Program was the only factor significantly associated with early enrollment (adjusted odds ratio 2.1). Race was marginally significant. Neither the presence of local policies of outreach targeted to pregnant women, nor colocation of WIC services with prenatal or other health services, showed significant effects on early enrollment.

THE RATE OF LOW BIRTH WEIGHT and other adverse birth outcomes has strengthened interest in improving the accessibility of prenatal services to low-income and minority women and in improving early initiation of services.

One of the primary providers of prenatal services

in the United States today is the Special Supplemental Food Program for Women, Infants, and Children, better known as the WIC Program. Among all women giving birth in the United States in 1984, about one-fifth to one-quarter participated in the WIC Program. The group contained a significantly higher proportion of low-income and minority women at high risk of poor pregnancy outcome than the general population.

In late 1984, about 385,000 pregnant women per month received WIC benefits, along with 2.7 million other women, infants, and young children. Designed as an adjunct to traditional medical and public health services, the WIC Program provides free nutritious foods, nutrition education, and access to health services to low-income pregnant, lactating, and postpartum women, infants, and children younger than 5 years.

Prior research suggests that participation in WIC during pregnancy is associated with higher birth weights, reduced fetal deaths, and reduced Medicaid expenses (*1–4*). Some research indicates that the effects are stronger among groups at greater risk (for example, black or teenage women). The analysis by Kotelchuck and his associates suggests that the longer a pregnant woman receives services, that is, the earlier she starts WIC, the heavier the baby (*1*).

The purpose of the analysis was to explore factors associated with early prenatal enrollment in WIC. A related policy objective of the WIC Program is to increase the share of the total caseload made up by pregnant women, the group for whom services are believed to be the most important. About one-eighth of all WIC participants in a given month are pregnant. Increasing the share of prenatal women depends on enrolling more pregnant women and enrolling them earlier, so that they are in the program longer.

Methods

The study data derived from the Study of WIC Participant and Program Characteristics (*5*), which abstracted data from participants' clinic records in late 1984 and asked local and State staff about program operations. The sample was nationally representative, and essentially it constituted a cross-sectional snapshot of the program in the conterminous United States in late 1984. State and local WIC agencies were sampled with probability of selection proportionate to agency size. Two WIC clinic sites were selected per local program if a local agency had more than one clinic site; the first was the headquarters and the second was randomly selected from remaining sites. At each local agency six pregnant women's records were selected. To avoid distortion and undue weighting of the variances associated with each case, unweighted data were used in the following analyses.

Participant and agency data were merged by clinic identification codes to yield both personal and programmatic data about each woman. In total, the data included 1,181 pregnant women, selected from 356 clinics in 208 local WIC programs in 28 States. Because of missing data, especially regarding income and poverty status or gestational age, the effective sample size in the full multivariate analyses was reduced to 751. Income data were unavailable for about a quarter (27.1 percent) of the women, and information on gestational age at WIC enrollment was missing for about 6.5 percent; data on other variables were virtually complete. Those for whom income and poverty data were missing were compared to those for whom data were present, using *t*-tests for gestational age at entry, age at certification, and household size; there were no significant differences. Similarly, those for whom gestational age information was available and those for whom it was not were compared for income poverty status, age, and household size and no differences were found. Thus, there was no perceptible bias attributable to missing data.

In general, WIC records did not contain dates of conception, but they did have estimated dates of delivery (EDD). In this study, an average gestational term of 270 days was assumed and the gestational age at enrollment in WIC was computed based on the time between 270 days prior to the EDD and the time of WIC certification. It seems likely that EDD, and thus gestational age, generally were based on the last reported menstrual period. The study was designed to reduce the effect of errors in estimating gestational age by grouping the women into two broad categories, enrollment in the program in early pregnancy (less than or equal to 13 weeks) and late enrollment (second or third trimester entry).

Categorizing the variable should have reduced some of the noise attributable to poor dating of conception and reduced problems associated with a slightly skewed distribution of gestational age at WIC entry. However, categorizing the variable resulted in sacrificing some of the statistical information in the dependent variable which might have been derived by treating the variable as continuous. Four cases were deleted from the sample because of

extreme values of gestational age (two with no gestational age and two with gestational age more than 42 weeks at entry); these were viewed as likely to be errors in the agency records.

Results

Overall, 31.6 percent of the pregnant women in the sample entered WIC in the first 13 weeks of pregnancy, 51.8 percent in the second 13 weeks, and 16.6 percent in the final trimester, calculated using unweighted data. Weighted data, which better represent the population, showed similar participation (29.6 percent in the first trimester, 54.4 percent in the second, and 15.0 percent in the third).

Personal characteristics and local clinic operational factors were selected for analysis because of the expected relationship to early enrollment, as well as availability in the data base. The hypothesis was that early enrollment depends, first, on individual traits of the pregnant woman and, second, on specific policies or traits of local WIC clinics.

Personal traits examined were race, participation in WIC during a prior pregnancy, income as a percent of the Federal poverty level (adjusted for household size), household size, age at WIC entry, and high WIC priority level. It was expected that being black, poor, or young would be associated with delayed entry, owing to the many barriers faced by minority, low-income and teenaged women. Factors relating to prior pregnancies were expected to play a role. Prior WIC participation should accelerate entry, as should large household size, a proxy for higher parity. Prior participation in WIC meant that the women were in WIC during prior pregnancies. Not only would such women know about the program and how to obtain services, but they might still be receiving WIC services for their infants or children at the time of the current pregnancy.

In the WIC Program, applicants are given priority levels based on severity of nutritional risk. A high priority indicates that a medical, anthropometric, or biochemical risk is present, such as low prepregnancy weight, anemia, or history of poor pregnancy outcome. A low priority indicates that the participant appears to have a poor dietary pattern, but no other risk is evident. We expected that higher WIC priority levels would be associated with earlier entry, since high priority women would be admitted to the program early. Further, physicians caring for high risk mothers may be more likely to initiate early referrals to WIC.

'Prior participation in WIC was strongly associated with early enrollment. Thus, any effort to get a pregnant woman to WIC, even late, improves the likelihood of her early enrollment for her next pregnancy.'

Local agency traits examined were availability of prenatal or other health services at the same site, presence of special outreach policies for pregnant women, number of years of local WIC operations, and local agency size (the average number of WIC participants). The data were based on responses of local agency directors and were coded for all women in those agencies. Availability of prenatal or other health services at the same WIC site (that is, colocation) was expected to accelerate enrollment because it would facilitate coordination and referrals from other health services, such as obstetrical, family planning, or other prenatal care. Agencies with special outreach policies to pregnant women were expected to tend to have early enrollments. The older and larger agencies were expected to show early enrollments because of their greater experience or overall resources, and the fact that the community would be more aware of the services.

Certain variables were not included in the data base and were not available for analysis. Not included were marital status, education, and Medicaid and insurance status of the woman. However, it seems likely that race and income should be highly correlated with these social traits. Other variables were considered, but rejected because almost all cases had the trait, so that they contributed no explanatory power. For example, some type of child care and some type of outreach were almost always available for local agencies. There were no measures of the effectiveness of outreach, apart from the presence of such policies.

Most of the differences in date of enrollment of pregnant women resulted from when women applied for WIC, rather than from delays in entry because of the caseload of staff workers, or slow administrative processing. More than four-fifths (83 percent) of women were certified on the date of application, and 95 percent within 15 days of application, which is required for priority I pregnant women under WIC regulations. The relatively infrequent long delays occurred because of the time

Table 1. *T*-test results for women enrolling in WIC early (first trimester), compared with late (second or third trimesters), in 1984 (mean values or proportions)

Characteristic	Enrolled early	Enrolled late	P
Gestational age at WIC entry, in weeks	9.6	21.5	.0001
Race:			
Percent black	23.0	35.2	.0001
Percent white	60.3	44.1	.0001
Percent previously on WIC during pregnancy	26.1	15.2	.0001
Percent in high WIC priority level	87.1	90.5	NS
Age in years at entry	23.8	23.0	.02
Income as a percent of poverty level	78.1	74.1	NS
Average number of persons in household	3.5	3.3	NS
Percent in prenatal services at clinic	56.6	53.4	NS
Percent in other health services at clinic, but not prenatal	18.7	19.7	NS
Percent enrolled in a clinic with a local policy of outreach targeted to pregnant women	59.8	59.1	NS
Years of local operation of clinic	7.6	7.5	NS
Number of WIC participants per month in local agency	4074.5	4858.6	.04

NOTE: Usual sample sizes were 348 early enrollment and 755 late enrollment, except when missing cases diminished the sample sizes.
NS indicates not statistically significant.

required to obtain laboratory or other medical data, lack of income or other personal data, the caseload of the staff workers, or the unavailability of appointment times at the clinic for a short period.

Simple bivariate comparisons for women who enrolled early rather than late in the pregnancy are shown in table 1. The early group entered WIC about 2 1/2 months into gestation on average, and the late group entered 3 months later. Of the independent variables, four showed significant differences at the 0.05 level in bivariate analyses, race, previous participation in WIC during pregnancy, age at WIC entry, and local agency size. The purpose of the multiple logistic regression analysis was to see if any of these bivariate differences were spurious and mediated by another variable, or whether any of the nonsignificant variables had been suppressed.

The adjusted odds ratios of first trimester entry are shown in table 2. After controlling for the effects of all the variables in the model, only one was significant at the 0.05 level, previous participation in WIC during pregnancy. Women with prior participation in WIC were twice as likely to enter WIC in the first trimester (adjusted odds ratio 2.1, *P* less than .001). Prior participation probably involves some misclassification. If a woman's record did not say she had participated before, she was coded as not having participated previously. It seems likely that some women did participate earlier, but the information had been left out of the records. This probably caused small, if any, bias, since it probably was related to good rather than poor record-keeping practices of the WIC agency, rather than early or late enrollment by the woman.

The effects of black and white race were marginally significant, with white women being about 50 percent more likely to participate early ($P = .06$), and black women being about 40 percent less likely ($P = .07$). High WIC priority, age at WIC entry, and local agency size were not significant in the multivariate model. Although highly significant ($P = .0006$), the logistic model was not very strong (R approximation = .105) and failed to account for most of the variation. The model was unable to explain most of the variation in early entry into WIC.

In addition to the logistic regression model presented, the model was run as an ordinary least squares regression, with gestational age at entry in weeks as the dependent variable. The results were essentially the same, that is, only prior WIC participation was significant. The robustness of the results to the type of model indicates the strength of this finding. In the ordinary least squares model, the regression coefficient indicated that prior WIC participation advanced enrollment in the current pregnancy by an average of 3 weeks.

Discussion

Women who had participated in WIC previously had several advantages that may help explain their earlier enrollment. First, they knew of the WIC Program and its uses. Despite its substantial size today, many women who have not used it may not be familiar with WIC. Second, they knew where the local WIC clinic was and how to join the program. Third, they may have been receiving WIC benefits for an infant or child from a prior pregnancy. Fourth, they had the general advantage of maternal experience, which could lead them to expect and want services earlier.

The findings that only one factor is significantly related to early prenatal enrollment, prior partici-

pation, limits the usefulness of the study. Had the data base included non-WIC participants, it would have been possible to look at factors associated with more general nonparticipation.

That race was marginally significant as a risk factor for late enrollment is not surprising and is consistent with other research showing that black women enter general prenatal care later than white women (*6–8*). Since this study was controlled for income, the finding appears to be a phenomenon separate from income and, presumably, financial access to health care. Further, since WIC is well known as a free program, it is not clear that low income is a barrier. Similarly, age differences were controlled for and are not the likely explanation. The racial differences are not readily explained. They are important to program policy, however, because black women have more low weight births than whites.

National vital statistics show that 75 percent of American women start prenatal care in the first 3 months (78 percent for whites and 59 percent for blacks) (*9*). WIC services tend to start later than general prenatal care, with a third beginning in the first trimester, half in the second, and a sixth in the third. This is quite similar to the pattern reported for State and local public prenatal clinics (*10*). The later entry into WIC or public prenatal care clinics (rather than general prenatal care) partly may be because of differences between general and low-income service populations. Further, low-income women may be first seen by one provider, then referred to public clinics and WIC for followup care.

The only available research on factors associated with early WIC entry was conducted by Haddad and Willis in Massachusetts using 1978 data (*11*). Testing for similar agency and personal characteristics, not including prior WIC participation, Haddad and Willis only found higher parity and more years of WIC local operation associated with earlier entry. The more recent study examined household size, a reasonable proxy for parity, and did not find it significantly correlated with early entry, but rather with prior WIC participation. Years of local operation was not a significant factor in the more recent study; this may be because of a greater diversity of local operations in the national study than in the Massachusetts study, or because 6 years later most agencies have plenty of operational experience and are well along on the learning curve.

From a policy perspective, the important question is what can be done to increase the rate of early enrollment in the WIC Program by pregnant women? We cannot readily change the women's baseline characteristics. There have recently been various policy recommendations and, in one instance, legislation, to improve services to pregnant women in WIC, such as increasing early enrollment. The National Academy of Sciences, Institute of Medicine, recommended including WIC as part of a comprehensive strategy to provide services to high risk women (*12*). A guide to WIC–Maternal Child Health Services coordination advised generally improved coordination and, to the extent possible, colocation of WIC and other health services (*13*). In the study reported here, colocation of WIC with general prenatal or other health services did not contribute to earlier enrollment in WIC. We did not test the converse hypothesis that colocation may contribute to earlier or more frequent general prenatal care. Coordination of WIC with health services (and other social services) should have helped clients obtain access to better care, but colocation of services was not a necessary component in this assessment. Being at the same site is not a guarantee of prompt and accessible services, nor is separate location an inherent barrier.

Recent amendments to WIC legislation require States to develop plans for outreach to pregnant women to encourage early enrollment (*14*). No advantage was found among agencies which reported having special outreach policies for pregnant women. The presence of a policy does not assure that the policy is effective; there was no measurement of the strength or effectiveness of outreach policies. It is conceivable that a strong general

Table 2. Adjusted odds ratios for WIC entry in the first trimester for 751 women

Characteristic	*Adjusted odds ratio*	*95 percent confidence interval*
Previously on WIC in pregnancy	2.08	1.40–3.10
White	1.52	.99–2.34
Black	.64	.39–1.03
High WIC priority level	.66	.40–1.07
If obtaining prenatal care at clinic	1.16	.78–1.74
If obtaining other health services, but not prenatal, at clinic	.76	.48–1.21
If local clinic has a policy of outreach to pregnant women	.98	.71–1.36

NOTE: The multiple logistic regression controlled for age at WIC entry, household size, income as a percent of poverty, years of local WIC operation, and local agency participation levels. None of these was statistically significant.

'Perhaps local agencies can use women who were previous or current participants in WIC as ambassadors to the community, helping to bring their awareness of the WIC Program to other women.'

outreach program to women, infants, and children may be more effective than a weak policy targeted to pregnant women. Perhaps among the many social, personal, and economic forces which direct a woman to enroll early or late, outreach policies have only slight influence.

Prior participation in WIC was strongly associated with early enrollment. Thus, any effort to get a pregnant woman to WIC, even late, improves the likelihood of her early enrollment for her next pregnancy. Perhaps local agencies can use women who were previous or current participants in WIC as ambassadors to the community, helping to bring their awareness of the WIC Program to other women.

The recent Institute of Medicine report on prenatal care (*8*) recommends improved coordination of prenatal medical care, with WIC services to improve access. In fact, a North Carolina study found that WIC participation greatly increased the odds of adequate prenatal care (*15*). Thus, improving early prenatal entry for WIC may faciliate earlier prenatal medical care for needy women.

There is room for improvement in getting women to WIC services earlier. Future research, specifically oriented to ascertaining women's attitudes and local operational factors, can provide better operational guidance than this study. In the meantime, State and local WIC Program administrators can and should continue to use their ingenuity and knowledge of their communities in seeking to encourage earlier WIC enrollment.

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