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The Association of Marital Status with Low Birthweight North Carolina, 1994-1995

by

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Abstract

The percentage of births to unmarried women has increased substantially over the past several decades. Unmarried status continues to be a risk marker for poor birth outcomes. This study uses data from the 1994 and 1995 North Carolina resident live birth certificates to examine the association of marital status with low birthweight.

After analyses, it was found that unmarried mothers are more likely to be young, have low education, smoke during pregnancy, be of minority race, and start prenatal care late. Within almost every risk factor category, unmarried mothers have a higher percentage low birthweight. For example, at less than nine years of education, unmarried mothers had a low birthweight percentage of 12.3 compared to 7.9 for married mothers of the same educational level.

Overall, unmarried mothers are almost two times as likely to have a low-weight birth. After statistically controlling for other risk factors associated with marital status, unmarried mothers were found to be 30 percent more likely to have a low-weight birth than married mothers. Absence of the father's name on the birth certificate was associated with a substantially higher risk of low birthweight for both married and unmarried mothers, perhaps because this indicates less social and economic support. The results of this study suggest that unmarried women should be targeted for prevention programs, due to their high-risk status.



Introduction

In North Carolina in 1940, the percentage of births to unmarried women was 8.1, compared to 31.4 in 1995. This increase was the largest between the years 1980 and 1990, when the percentage increased from 19.0 to 29.4. Since 1940 blacks have had a much larger percentage of births to unmarried women than whites, although the gap is narrowing. These data from the North Carolina live birth certificate show that, in 1940, the black to white ratio of the percentage of births to unmarried women was 7 to 1, as compared to 4 to 1 in 1995. Unwed motherhood is growing fastest among white women and among women in the 20 and older age groups, which is a nationwide trend.¹ North Carolina teenagers ages 13-19 accounted for 60 percent of all births to unmarried women in 1970, compared to 36 percent in 1995. This decrease is due mainly to the steep rise in out-of-wedlock births to older women.

These trends are of concern because of the association of unmarried status with an increased incidence of low birthweight.² A low birthweight infant is one who is born weighing less than 2500 grams (5 pounds, 8 ounces or less), regardless of the period of gestation. Low birthweight infants are at an increased risk of infant mortality, and birthweight is the best available predictor of healthy development.³ Low birthweight infants are predisposed to frequent illness, deficits in motor coordination, childhood handicap, and poor health.⁴ Socioeconomic status, ethnicity, genetic makeup, smoking, maternal age, and obstetric history are risk factors associated with low birthweight.⁵ The percentage of low birthweight infants in 1995 was 8.7, up from 8.4 in 1990 and 7.9 in 1985. North Carolina's low birthweight rate is among the highest in the nation.³

Marital status has been shown to correlate with intendedness of birth, economic status of the mother, and social support for the mother – factors that may influence the health of the mother and infant.⁵ The objective of this study is to determine if marital status is a predictor of low birthweight while

adjusting for other associated risk factors for low birthweight. The risk factors are:

- minority race^{1,6};
- maternal age under 18¹;
- maternal age greater than 34¹;
- maternal education less than high school⁷;
- late (after 1st trimester) or no prenatal care¹;
- maternal smoking⁸; and
- father's name not listed on the birth certificate⁹.

Methods

The data used to analyze the effect of marital status on low birthweight was obtained from the North Carolina live birth certificates. The first stage of analysis was to examine the characteristics of births by marital status for 1994-95. Married and unmarried mothers were compared on several risk factors – age, educational attainment, race, prenatal care, smoking, and the presence of the father's name on the birth certificate. One study has suggested that presence of the father's name on the birth certificate is an indicator of paternal involvement and support.¹⁰ The percentage of low birthweight infants by these risk factors was then compared for married and unmarried women.

In the next stage of the analysis, logistic regression was used to estimate the unadjusted and adjusted odds ratios for low birthweight using the following variables as predictors: minority race, maternal age less than 18, maternal age greater than 34, low maternal education, late initiation of prenatal care, maternal smoking, and unmarried status. The unadjusted odds ratio is the separate or "crude" effect of each risk factor in the model. The adjusted odds ratio shows which risk factors independently predict low birthweight, after controlling for all other risk factors in the model. An odds ratio greater than 1 implies an increased risk for that factor.

The last stage of analysis was to perform logistic regression for the married and unmarried women separately. This stage parallels the analysis described above, in which unadjusted and adjusted

odds ratios were analyzed for the two groups. This analysis was performed to see if the same risk factors are predictive of low birthweight for married and unmarried women.

Results

Table 1 shows, by marital status, the percentage distribution of 1994-95 live births across categories of age, education, race, prenatal care, smoking, and presence of father's name on the birth certificate. Figure 1 shows that married mothers were more likely than unmarried mothers to be white, older

than 20, and non-smokers. They were also more likely to have a high school education or greater, begin their prenatal care in the first trimester, and have the father's name listed on the birth certificate.

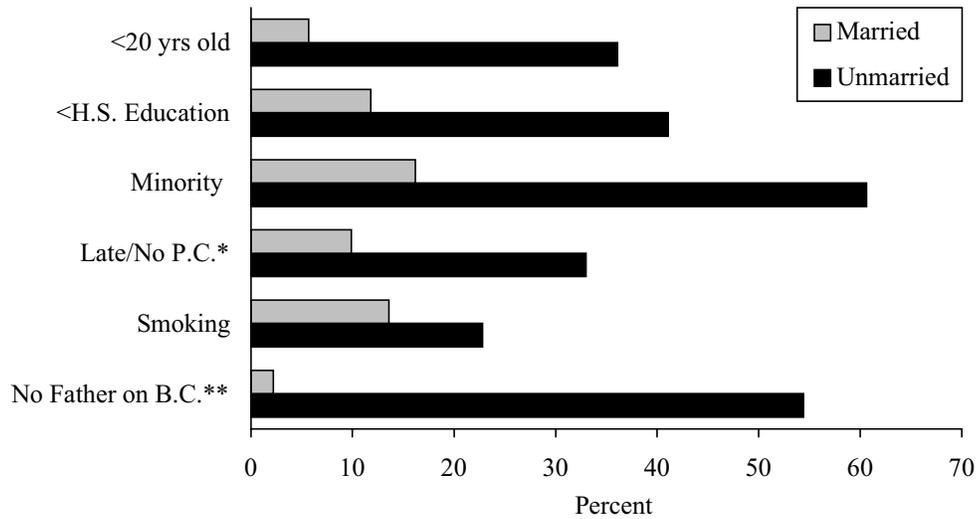
In comparison, births to unmarried mothers had a higher percentage who were young, minority, smokers, and less educated. In addition, the father's name was not listed on over half of their birth certificates. Although the majority of unmarried mothers began prenatal care in the first trimester, they had a much higher percentage receiving late or no prenatal care than married mothers.

Table 1
Percentage Distribution of Births Across Selected Characteristics for
Married and Unmarried Women:
1994-95 North Carolina Resident Live Births

	Total	Married	Unmarried
Maternal Age			
<18	6.3	1.3	17.0
18-19	9.1	4.4	19.1
20-29	55.0	56.3	52.2
30-34	20.6	26.5	8.0
35+	9.0	11.5	3.7
Maternal Education			
<9	3.9	2.6	6.9
9-11	17.1	9.2	34.2
12	35.9	33.6	40.8
13-15	22.4	25.9	14.7
16+	20.6	28.6	3.2
Maternal Race			
White	69.7	83.8	39.4
Black	27.0	12.9	57.4
Am. Indian	1.5	1.0	2.5
Other	1.8	2.3	0.7
Prenatal Care			
1st trimester	82.3	89.8	66.3
late/no care	17.2	9.9	33.0
Maternal Smoking			
yes	16.5	13.6	22.8
no	83.4	86.3	77.0
Father Listed on B.C.*			
yes	81.3	97.8	45.6
no	18.7	2.2	54.4

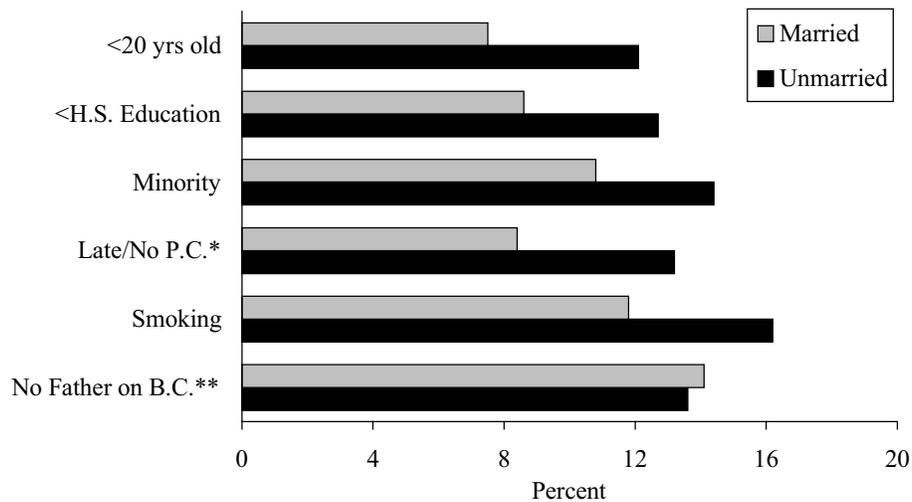
*Father's name listed on the North Carolina live birth certificate

Figure 1. Percentage of Births with Selected Risk Factors, by Marital Status (1994-95 North Carolina Resident Live Births)



*Late or no prenatal care
 **Father's name not listed on the North Carolina live birth certificate

Figure 2. Percentage Low Birthweight by Marital Status for Selected Risk Factors (1994-95 North Carolina Resident Live Births)



*Late or no prenatal care
 **Father's name not listed on the North Carolina live birth certificate

Table 2
Percentage Low Birthweight for Selected Risk Factor Categories for
Married and Unmarried Women:
1994-95 North Carolina Resident Live Births

	Total	Married	Unmarried
<i>Married</i>			
yes	7.0	—	—
no	12.4	—	—
<i>Maternal Age</i>			
<18	11.6	7.9	12.2
18-19	10.5	7.4	12.0
20-29	8.1	6.6	11.5
30-34	8.0	6.9	15.8
35+	10.0	8.6	19.9
<i>Maternal Education</i>			
<9	10.4	7.9	12.3
9-11	11.4	8.9	12.8
12	9.3	7.7	12.2
13-15	7.7	6.6	11.7
16+	6.2	5.8	12.9
<i>Maternal Race</i>			
White	6.8	6.3	9.2
Black	13.7	11.7	14.7
Am. Indian	9.3	7.9	10.5
Other	7.1	6.8	8.9
<i>Prenatal Care</i>			
1st trimester	8.1	6.8	11.9
late/no care	11.3	8.4	13.2
<i>Maternal Smoking</i>			
yes	13.7	11.8	16.2
no	7.7	6.2	11.2
<i>Father Listed on B.C. *</i>			
yes	7.5	6.8	10.9
no	13.7	14.1	13.6

*Father's name listed on the North Carolina live birth certificate

Table 2 displays the percentage of low-weight births, by marital status, for the same risk factors described above. Figure 2 shows that unmarried women have a higher percentage of low birthweight for almost every risk factor category. Comparison of unmarried mothers and married mothers, each with less than 9 years of education, gives an example of this (see Table 2). Unmarried mothers with low education had 12.3 percent low birthweight infants compared to 7.9 percent for married mothers.

According to Table 2, both married and unmarried mothers had a higher percentage of low birthweight infants when the father's name was not present on the birth certificate. The percentage of low-weight births for the father's name recorded on the live birth certificate was 6.8 for married and 10.9 for unmarried women, compared to 14.1 and 13.6, respectively, with father's name not listed on the birth certificate.

Table 3 shows the unadjusted and adjusted odds ratios for low birthweight infants in 1995. Only a single year of data was used for regression analysis since very small differences can be statistically significant when using very large populations. Table 3 shows that, after simultaneously controlling for the other risk factors, marital status remains a significant predictor of low birthweight. According to the adjusted odds ratio, being unmarried independently increases the risk of having a low birthweight infant by 30 percent. Looking at the unadjusted odds ratio, unmarried mothers had an 87 percent higher chance of delivering a low birthweight infant than did married mothers. These results suggest that the crude effect of unmarried status on low birthweight is due partly to its association with the other risk factors. Marital status also has an independent effect on low birthweight not explained by the other measured factors. Although unmarried status is a predictor of low birthweight, smoking

and minority race are stronger predictors. All the odds ratios for other risk factors, except the adjusted odds ratio for maternal age less than 18, are also statistically significant.

Tables 4 and 5 show the separate analyses for married mothers and unmarried mothers. They reveal which factors are most predictive of low birthweight within the two groups. The unadjusted odds ratios for low birthweight are similar for both marital status groups, except that young maternal age is not predictive for unmarried mothers. The adjusted odds ratios, controlling for all risk factors, show minority race, maternal age less than 18 or greater than 34, and maternal smoking to be strong predictors of low birthweight for married mothers. The main predictors of low birthweight for unmarried mothers were minority race, maternal age greater than 35, and maternal smoking.

Table 3
Unadjusted and Adjusted Odds Ratios for Low Birthweight and
95% Confidence Intervals (CI)
1995 North Carolina Resident Live Births

	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
<i>Marital Status</i>		
Not Married	1.87(1.79-1.96)	1.30(1.23-1.38)
Married	1.00	1.00
<i>Maternal Age</i>		
<18 Years	1.43(1.32-1.55)	1.04(0.95-1.14)
18-34	1.00	1.00
>34	1.22(1.14-1.31)	1.42(1.32-1.53)
<i>Maternal Education</i>		
<12 Years	1.43(1.36-1.50)	1.09(1.03-1.16)
12 or >	1.00	1.00
<i>Maternal Race</i>		
Minority	2.07(1.98-2.17)	1.92(1.83-2.02)
White	1.00	1.00
<i>Month Prenatal Care Began</i>		
No Care/Late (month 4-9)	1.45(1.38-1.53)	1.07(1.01-1.13)
1st Trimester	1.00	1.00
<i>Maternal Smoking</i>		
Yes	1.90(1.80-2.00)	1.93(1.83-2.04)
No	1.00	1.00

Table 4
Unadjusted and Adjusted Odds Ratios for Low Birthweight and
95% Confidence Intervals (CI)
1995 North Carolina Resident Live Births to Married Mothers

	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
<i>Maternal Age</i>		
<18 Years	1.34(1.07-1.68)	1.27(1.00-1.61)
18-34	1.00	1.00
>34	1.32(1.21-1.43)	1.36(1.25-1.48)
<i>Maternal Education</i>		
<12 Years	1.31(1.20-1.42)	1.09(1.00-1.20)
12 or >	1.00	1.00
<i>Maternal Race</i>		
Minority	1.81(1.69-1.94)	1.89(1.76-2.03)
White	1.00	1.00
<i>Month Prenatal Care Began</i>		
No Care/Late (month 4-9)	1.31(1.20-1.44)	1.09(0.99-1.20)
1st Trimester	1.00	1.00
<i>Maternal Smoking</i>		
Yes	2.03(1.89-2.18)	2.09(1.94-2.26)
No	1.00	1.00

Table 5
Unadjusted and Adjusted Odds Ratios for Low Birthweight and
95% Confidence Intervals (CI)
1995 North Carolina Resident Live Births to Unmarried Mothers

	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
<i>Maternal Age</i>		
<18 Years	0.97(0.89-1.07)	1.01(0.91-1.12)
18-34	1.00	1.00
>34	1.81(1.57-2.09)	1.71(1.48-1.99)
<i>Maternal Education</i>		
<12 Years	1.04(0.97-1.11)	1.09(1.01-1.18)
12 or >	1.00	1.00
<i>Maternal Race</i>		
Minority	1.68(1.56-1.80)	1.93(1.79-2.08)
White	1.00	1.00
<i>Month Prenatal Care Began</i>		
No Care/Late (month 4-9)	1.12(1.04-1.20)	1.05(0.97-1.12)
1st Trimester	1.00	1.00
<i>Maternal Smoking</i>		
Yes	1.49(1.39-1.61)	1.74(1.61-1.89)
No	1.00	1.00

Discussion

Births to unmarried women are sometimes considered “illegitimate” because the legal family structure of marriage in which to raise the child is not in place at the time of birth.² Low birthweight is a problem in all population groups. Reducing low birthweight will help to lower infant mortality, adverse health effects, and developmental problems.⁹ Over 12 percent of the births to unmarried women were low birthweight in 1994-95, compared to 7.0 percent for married women. Unmarried women and their babies continue to be at higher risk.

The data presented here shows the father’s name recorded on the birth certificate as a risk variable. The absence of the father’s name on the birth certificate suggests a lack of paternal support.¹⁰ Married mothers without the father’s name on the birth certificate have a higher rate of low-weight births than unmarried mothers without the father’s name on the birth certificate. This appears to be a high-risk group who may have special needs. The lower risk of low birthweight with the father’s name recorded on the birth certificate for both married and unmarried mothers could be attributed to the beneficial impact of the father’s involvement with the family.¹⁰

Without the support of the father, the mother could suffer emotionally as well as financially. Unmarried women in the United States are typically of lower economic status, many living below the poverty level.¹ Being unmarried is also associated with other risks factors such as inadequate maternal weight gain and inadequate diet and nutrition intake.⁵

The results of this study show a higher risk of low birthweight for unmarried women, after controlling for the other risk factors that were measured. The extent to which this excess risk is associated with marital status per se versus its association with other risk factors not measured here is unknown.

Comparing Tables 4 and 5, maternal age less than 18 is not a risk for unmarried mothers, yet it is for married mothers. Bennett et al. compared unmarried and married teenage mothers in a study on infant mortality. They cited studies demonstrating that married teens are more likely not to live with their families, which can decrease social and economic support, are less likely to remain in school, and are more likely to have another child before age 20.¹¹ Bennett states that marital status is often used as a substitute for socioeconomic status, yet its association with poor birth outcomes has many other dimensions as well.³

The effect of change of marital status on risk of low birthweight was studied by Holt, et al.² This study determined the relative risk of having a low birthweight infant for the 2nd birth by women who were either married at the first birth and single at the second, married at both births, or single at the first birth and married at the second. A change from married to single status was associated with a 30 to 40 percent increase in risk of low birthweight relative to remaining married. A change from single to married status was associated with a 20 to 30 percent reduction in risk of low birthweight relative to remaining single.

An infant born of low birthweight is at higher risk for health complications later in life. Studies suggest that unmarried status is associated with low birthweight.^{1,2,10} Holt et al. advise that public health policy and programs which are directed at high-risk mothers and infants should be aware of the increased risks and needs of the unmarried child-bearing women. Pregnancy provides an opportunity for increased contact with the health care system. The awareness and knowledge needed to improve health behavior may be increased by programs directed towards educating unmarried woman on smoking, nutrition and diet, elimination of drug use, stress control, early prenatal care, social support, and financial management.

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