The Influence of Socioeconomic Status on Incidence of Low Birth Weight

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IN RECENT DECADES, the maturity of the infant at birth has attracted attention for its critical role as a determinant in outcome of pregnancy. It is now generally recognized that birth weight is only one indicator of developmental maturity and that gestational age also is critically significant. Nevertheless, in most studies the criterion of birth weight continues to be relied on for its comparative usefulness in the collection of data on a mass scale because it is subject to less error than other measures of maturity. Improvement has been noted in data concerning gestational age but it still is believed to be less accurately reported (*1*). Generally, infants weighing 2,500 grams or less at birth are considered to be immature (*2*), but in some of the recent literature the phrase "low birth weight" has replaced "premature" as the preferred designation applied to this group (*3,4*).

While there are admitted difficulties in using birth weight alone, the contrast between infants weighing 2,500 grams or less (immature) and those weighing more than 2,500 grams (mature) is usually distinctive beyond question. A nationwide study of the cohort of infants born alive in the United States in 1960, for example, indicated that neonatal mortality among low birth weight infants was more than 30 times as high as that among infants of mature weight (*5*). An increasingly common theme running through much of the literature is the recognition of socioeconomic status as one of the most important variables affecting low birth weight.

Because of current attention given this variable in studies of the outcome of pregnancy as well as those viewing fertility patterns in general, major efforts at the national level were directed toward the inclusion of an item relating to education (highest grade of regular school completed) of the parents on the certificates of birth and fetal deaths. Father's occupation and industry had appeared on these certificates for many years, but the information was of limited use because of inherent difficulties in classification (*6*).

In 1968, 36 States revised their birth certificates and included in the new forms an item on educational attainment as recommended by the standard certificate of live birth prepared by the National Center for Health Statistics (*7*). The information available from this source can be of substantial value in breaking down the experiences of pregnancy into a so-called socioeconomic component, one distinct from the alternative medical and demographic components. The socioeconomic component can be expected to shape the life style. Hendricks (*8*) has observed that the limitation of the entire maternal life condition among the less

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favored groups is the adverse factor passed on to the product of conception. The etiological factors are interrelated in a complex manner.

Objective

Many investigators studying prematurity have not taken into account the differences between study and control groups in maternal characteristics, social class, or even race (*9*). Still another problem has existed in the determination and comparability of social class levels. Different investigators have used different criteria and, not surprisingly, have reported contradictory results. Hendricks (*8*), for example, concluded that "observed differences in reproductive efficiency are predominantly socioeconomic rather than ethnic," based on the class dichotomy between private and staff (clinic) patients in a large hospital. Wiener and Milton (*10*), on the other hand, estimating socioeconomic status by grading census tract area of residence according to three levels based on median rental, found socioeconomic status among the variables having a relatively low, though significant, relationship to birth weight, one that was "for predictive purposes negligible compared to race and trimester of prenatal care."

It would seem that the time has come, now that most birth certificates in the nation record a measure of socioeconomic status (education of parents), to test many earlier findings relating to the low birth weight infant. The generally accepted view that marked differences in rates of reproductive wastage exist at present among socioeconomic groups (*11*) can now be explored to some degree. Moreover, if socioeconomic status represents the predominant influence on outcome of pregnancy, then which of the several demographic characteristics of mothers, as well as such variables as type of medical and obstetrical care received, that in the past have been demonstrated to be associated in positive or negative ways with prematurity of the newborn can still be considered valid indicators in their own right?

In other words, when socioeconomic status can be controlled statistically, what is the remaining effect contributed by those other factors that usually are presumed to exert significant influence on the determination of the birth weight—variables such as age of mother and birth order? Independent testing of these items may reveal answers to the following questions:

1. Is the adverse experience of higher birth order infants due to the fact of higher parity or to the preponderance in origin of these babies among families of low socioeconomic levels?

2. Is medical care, such as early prenatal care or private prenatal care, the real benefactor of the infant, or has the distribution of mothers receiving care been selected in such a way that the participants are weighted in favor of families of more favorable socioeconomic status?

In this paper relatively simple model analyses are made of the low birth weight differentials that can demonstrate the relationship between socioeconomic status, as defined by education of mother, and other medical and maternal variables.

Method

The group selected for detailed analysis consisted of all births occurring in Maryland in 1968 except for approximately 2,600 nonresident deliveries. The original source of all data were the certificates of live births recorded with the Maryland State Department of Health (now the Maryland Department of Health and Mental Hygiene) and the Baltimore City Department of Health. The number of live infants born in Maryland to Maryland residents totaled 57,383. Of this number 43,074 were white, and 14,309 were nonwhite. These births were analyzed by such classifications reported on the birth certificates as age of mother, order of birth, and mother's level of education.

The educational attainment of the mother was chosen for analysis because it was better reported than the educational attainment of the father. No information was given concerning education for 1.1 percent of all mothers and 5.4 percent of all fathers. A possible bias could have occurred in using data concerning the fathers because about two-thirds of the certificates for which data on their education were lacking were for illegitimate births. Moreover, many studies have given evidence of the high correlation existing between the mother's educational level and the family's social class.

A 5 percent sample of the 1960 census, which may be viewed as the largest study group for which such information has been collected, showed that among white once-married women (15 to 49 years old) in intact marriages, 54 percent of those with at least 1 year of college had husbands employed in professional or managerial positions. By comparison, the husbands of only 8 percent of a corresponding group of women with less than 9 years of schooling

were in these high-status occupations.

Similarly, census data showed a close positive relationship between the level of education of married women and their family income (*12*). Approximately the same pattern was exhibited in a sample survey of white married women with births in the United States in 1963. The median income of families in which wives were college graduates was more than twice that for families in which wives had only an elementary education (*13*).

Data for white and nonwhite births were studied separately because the low birth weight maximum at 2,500 grams is not as appropriate for measuring prematurity among nonwhites as among whites. Erhardt and associates (*14*), in a study of more than 600,000 deliveries in New York City, concluded that "neither birth weight nor gestation alone can adequately be used to measure maturity at delivery in both [white and nonwhite] populations using the same standard." The divergence between the two ethnic groups in relative proportions of low birth weight infants has been ascribed to basic differences in the population regarding birth weight-gestation structures. Henderson and Kay (*15*), analyzing underprivileged classes of both races in Baltimore, concurred. They attributed the differences to the shorter gestation and stated: "It is our opinion that American Negro women have biologically shorter pregnancies than American white women."

Results

The inverse relationship between social class and low birth weight prevailing in many major studies was readily apparent from the Maryland data.

Although the aggregate of all live infants born to white women that were of low birth weight was 7.3 percent in the Maryland study group—almost identical with the U.S. average of 7.1 percent in 1968—among mothers who were college graduates only 4.4 percent of the newborn were immature. On the other hand, 10.7 percent of the infants born to white women with less than 10 years of schooling weighed 2,500 grams or less.

Among nonwhites, a similar but not so dramatically clear pattern prevailed. Compared with the low birth weight average of 15.2 percent for all Maryland nonwhite births, the children of college graduate mothers fared most favorably; only 11.4 percent weighed 2,500 grams or less. The group having mothers with less than 10 years of schooling fared least favorably; 16.7 percent were immature.

The fact that nonwhite women who were college graduates had a higher proportion of low birth weight infants than the white women with the most minimal educational level seems to indicate that differences in social class as measured by educational attainment cannot explain the vast divergence in the percentage distribution between whites and nonwhites.

A natural question is: To what extent do apparent divergences in the low weight percentages by educational achievement groups reflect differences in the age distributions of mothers in the separate categories? Obviously, the college graduates will virtually exclude women under 20 years old. At the same time, the high school nongraduates will include many teenagers who have not had the opportunity to complete their education or who have found it necessary to leave school because of pregnancy.

With only two minor exceptions, when age categories are held constant, the percentage of births in the low weight category shows quite substantial declines among white women as educational attainment level advances (table 1). At ages 25 to 29, the low birth weight percentage of 6.3 among white infants of all parental classes is lower than for infants born to mothers at younger or older ages. Yet even within this age group, women who had less than 10 years of formal schooling were twice as likely as college graduates to have low birth weight infants.

A similar excess among the lower educational group was evident in every other age group. Differences by educational level clearly exceeded those by age. The greatest intraclass age differentiation in the percentage of low birth weight infants occurred among women who were high school graduates. The low birth weight percentage of 10.4 for mothers under 18 years old was 68 percent above the 6.2 percent for mothers 25 to 29 years old.

Comparison of mothers having the least education (less than 10 years) with college graduate mothers showed that even those in the most favorable overall age category (25–29 years) had borne infants of low birth weight proportionately exceeding that borne by college women by more than 120 percent. Moreover, among mothers 35 years of age and over, often considered a high risk group, the percentage of low birth weight infants among college graduate women (5.4) was substantially below that experienced by women who were high

school graduates at the most favorable ages (25–29 years).

Among nonwhite women, the same general pattern of highest proportions of immature births to the youngest mothers (mothers under 18 years old) and higher than average proportions of births to the oldest mothers (35 years and over), as had been noted for whites, was apparent. The differences, however, were not as marked. Since the differences by level of education were not as sharp, the details in table 1 do not exhibit the generally consistent transitions shown by the breakdown for white mothers.

Birth order, like age of mother, is a variable that traditionally has been correlated with immaturity. First-order births generally exhibit a higher percentage of low birth weight infants than do second-order births. The Maryland data for white births reflected this phenomenon. Births of fifth and higher order included a relatively high proportion of infants weighing 2,500 grams or less. At every parity, great differences existed between the mother's educational attainment and the percentage of low birth weight deliveries (table 2). The proportions show an inverse relationship. The pattern for first births was almost the same as for sixth and higher order births. Births in both categories to high school nongraduates are twice as likely to produce low weight infants as those to women who are college graduates.

The differences shown for the various parities within educational classes tended to be much smaller than the intraparity differences by years of schooling. Among the nonwhite population, the association between birth order and percentage of infants weighing 2,500 grams or less was not as great as among whites. The intra-educational classes do not fit into a clear-cut pattern (table 2).

One hypothesis among the many that have attempted to explain why infants fare better the higher the socioeconomic level of the parents is that the better educated women are more likely to have early exposure to prenatal care. The early exposure to prenatal care, it is argued, is the important component in the socioeconomically determined life style that influences the outcome of pregnancy. To measure, as far as permitted by the limited information given on the birth certificate, the prenatal care history of each educational group will shed some light on the influence, if any, of this factor.

Among the white population, when trimester of exposure to prenatal care was held constant, the previously exhibited differen-

Table 1. Percentage of babies weighing 2,500 grams or less at birth, by mothers' age, level of education, and race, Maryland, 1968

Race and age (years)	Number of births	All births	Level of education					
			Less than 10 years	High school, 10–11 years	High school, 12 years	College, 1–3 years	College, 4 years	Not stated
Number of white births			4,758	7,761	19,880	5,675	4,591	409
Number of nonwhite births			3,114	4,669	5,013	763	507	243
Total white [1]	43,074	7.3	10.7	8.8	6.8	6.0	4.4	8.8
Under 18	1,810	10.8	13.6	9.2	10.4	[2]	[2]	[2]
18–19	4,445	8.5	10.7	10.0	7.4	5.2	[2]	[2]
20–24	16,063	7.0	9.2	8.6	6.7	5.7	3.8	9.7
25–29	12,353	6.3	9.7	8.0	6.2	5.4	4.4	[2]
30–34	5,344	7.4	10.8	7.9	6.8	8.5	4.7	[2]
35 and over	3,048	9.0	12.4	10.3	8.9	6.2	5.4	[2]
Total nonwhite [1]	14,309	15.2	16.7	15.5	14.3	13.6	11.4	23.5
Under 18	2,506	18.4	19.9	16.8	19.4	[2]	[2]	[2]
18–19	2,495	15.3	17.8	13.7	15.5	[2]	[2]	[2]
20–24	4,462	14.0	12.6	15.8	12.8	15.4	13.3	[2]
25–29	2,460	14.7	14.2	15.4	16.0	8.8	11.3	[2]
30–34	1,419	13.9	13.8	15.2	12.8	[2]	9.1	[2]
35 and over	960	15.7	17.9	14.9	15.2	[2]	13.6	[2]

[1] Age of mother not reported for 11 white and 7 nonwhite births.
[2] Not calculated if base was fewer than 100 live births.
NOTE: Includes all resident live births occurring in Maryland.

tials by educational group diminished very little (table 3). Whether a college graduate mother began prenatal care in the first trimester of pregnancy or not, her child had only about half the chance of registering a low birth weight than did the child of a high school nongraduate. Thus educational level remains the critical variable, not early prenatal care. Nevertheless, within each educational group except the college graduates, mothers who received prenatal care during the first trimester of pregnancy were less likely to have low birth weight infants than mothers whose care did not commence until the second or third trimester or who received no care

Table 2. Percentage of babies weighing 2,500 grams or less at birth, by birth order and mothers' level of education and race, Maryland, 1968

Race and birth order	Number of births	All births	Level of education					
			Less than 10 years	High school, 10–11 years	High school, 12 years	College, 1–3 years	College, 4 years	Not stated
Total white [1]	43,074	7.3	10.7	8.8	6.8	6.0	4.4	8.8
1st	16,184	7.0	10.4	9.2	6.7	5.5	4.7	11.3
2d	11,965	6.7	10.4	7.8	6.7	6.0	3.8	6.9
3d	6,883	7.4	9.7	8.9	7.3	5.2	4.7	(2)
4th	3,918	7.8	11.8	8.9	6.5	7.7	4.3	(2)
5th	2,024	9.3	11.7	9.7	7.7	11.2	6.2	(2)
6th and higher	2,075	9.3	11.4	10.0	8.1	8.2	4.2	(2)
Total nonwhite [1]	14,309	15.2	16.7	15.5	14.3	13.6	11.4	23.5
1st	5,241	15.6	19.5	16.0	14.1	11.4	12.8	(2)
2d	3,141	15.4	18.9	14.8	14.9	14.4	7.9	(2)
3d	1,979	13.1	11.0	15.1	12.2	14.8	(2)	(2)
4th	1,246	15.9	17.4	14.9	13.6	(2)	(2)	(2)
5th	854	15.9	13.7	15.6	18.5	(2)	(2)	(2)
6th and higher	1,836	15.3	14.8	16.0	15.6	(2)	(2)	(2)

[1] Birth order not reported for 25 white and 12 nonwhite births.
[2] Not calculated if base was fewer than 100 live births.
NOTE: Includes all resident live births occurring in Maryland.

Table 3. Percentage of babies weighing 2,500 grams or less at birth, by mothers' exposure to early prenatal care, level of education, and race, Maryland, 1968

Race and trimester of pregnancy at exposure to prenatal care	Number of births	All births	Level of education					
			Less than 10 years	High school, 10–11 years	High school, 12 years	College, 1–3 years	College, 4 years	Not stated
Total white	43,074	7.3	10.7	8.8	6.8	6.0	4.4	8.8
First	32,299	6.6	9.2	8.1	6.5	5.7	4.4	9.4
After first	9,674	9.0	12.5	9.2	7.9	7.1	4.2	8.2
Second or third	9,287	8.3	11.8	8.6	7.2	6.8	4.3	6.6
No prenatal care	387	24.5	22.8	22.3	30.6	(1)	(1)	(1)
Not stated	1,101	11.7	11.9	18.2	9.4	(1)	(1)	(1)
Total nonwhite	14,309	15.2	16.7	15.5	14.3	13.6	11.4	23.5
First	6,021	13.7	14.9	14.8	12.7	11.2	11.6	(1)
After first	7,707	16.1	17.5	15.5	15.6	15.8	11.2	20.5
Second or third	7,173	14.7	16.3	13.7	14.4	15.2	11.4	17.8
No prenatal care	534	34.8	32.8	36.9	34.9	(1)	(1)	(1)
Not stated	581	20.5	19.9	21.2	18.4	(1)	(1)	(1)

[1] Not calculated if base was fewer than 100 live births.
NOTE: Includes all resident live births occurring in Maryland.

at all. It would be difficult to judge whether prenatal care or the general attitude inducing predisposition to early care was the vital factor in this outcome.

Among nonwhite women, the relative differences between the two groups (early care and late or no care) were similar to those for whites with regard to low weight births. Again, however, no difference in immaturity was observed by level of care among children born to mothers who were college graduates.

The source of antenatal care is yet another variable that has been related to the incidence of immaturity (*16*). Women who receive care from a private physician may obtain services of a different quality from those provided through public sources. However, as a confounding factor, the women who received care from clinics were known to be heavily weighted by lower socioeconomic groups. Is the different background then the causal variable in the observed difference in incidence of low birth weight babies rather than the specific source of the prenatal care? Because Maryland is the only State in which the birth certificate provides information on the specific source of prenatal care, our data, fortunately, can be used in seeking an answer to this complex question.

Not unexpectedly, table 4 shows that among both white and nonwhite women those who received private care were less likely to give birth to low weight infants than those who received antenatal care from hospital clinics or health department clinics. However, the relative differences in the percentages—an excess of 53 percent between the low birth weight share among white women who attended the health department clinics (10.1 percent) and those who were seen by private physicians (6.6 percent) and smaller differentials among nonwhites—were much less than the range within each care source observed by socioeconomic class. Among white women who had prenatal care, the immaturity rate still varied markedly by educational level after controlling for their source of care. For example, the rate of immaturity among children of women with less than 10 years of schooling who saw a private physician (9.2 percent) was more than twice that of the newborn of college graduate women (4.4 percent).

While the preponderant influence of mothers' education emerges in table 4, the source of care also is seen to exert some influence on immaturity. Except among college graduate women, white mothers who visited private physicians had a lower incidence of immature babies than did those with the same educational attainment who attended clinics. It cannot therefore be concluded that the efficacy of a given type of care is responsible. (We have already seen that women who received private care but were in the lowest educational category had twice the proportion of

Table 4. Percentage of babies weighing 2,500 grams or less at birth, by mothers' source of prenatal care, level of education, and race, Maryland, 1968

Race and source of prenatal care	Number of births	All births	Level of education					
			Less than 10 years	High school, 10–11 years	High school, 12 years	College, 1–3 years	College, 4 years	Not stated
Total white	43,074	7.3	10.7	8.8	6.8	6.0	4.4	8.8
Private physician only	32,309	6.6	9.2	7.8	6.4	6.1	4.4	8.9
Hospital clinic only	8,199	8.4	11.3	9.4	8.0	5.2	4.4	(1)
Health department clinic only	1,373	10.1	12.9	9.8	7.3	(1)	(1)	(1)
Other sources, including multiple	265	6.4	(1)	(1)	(1)	(1)	(1)	(1)
No care	472	22.5	22.0	23.3	23.4	(1)	(1)	(1)
Not stated	456	8.6	(1)	(1)	6.2	(1)	(1)	(1)
Total nonwhite	14,309	15.2	16.7	15.5	14.3	13.6	11.4	23.5
Private physician only	3,263	12.3	14.8	11.9	11.7	13.2	11.2	(1)
Hospital clinic only	7,253	15.3	16.3	15.4	14.4	12.5	(1)	(1)
Health department clinic only	2,829	14.7	15.6	14.0	14.8	(1)	(1)	(1)
Other sources, including multiple	137	16.1	(1)	(1)	(1)	(1)	(1)	(1)
No care	604	31.0	32.7	32.8	28.1	(1)	(1)	(1)
Not stated	223	15.3	(1)	(1)	(1)	(1)	(1)	(1)

[1] Not calculated if base was fewer than 100 live births.
NOTE: Includes all resident live births occurring in Maryland.

Table 5. Percentage of babies weighing 2,500 grams or less at birth, by mothers' exposure to early prenatal care, source of prenatal care, and race, Maryland, 1968

Race and trimester of pregnancy at exposure to prenatal care	Number of births	Total births	Source of prenatal care					
			Private physician only	Hospital clinic only	Health department clinic only	Other sources, including multiple	No care	Not stated
Total white	43,074	7.3	6.6	8.4	10.1	6.4	24.8	10.5
First	32,299	6.6	6.3	8.2	9.4	3.2	.....	10.6
After first	9,759	9.1	7.8	8.5	9.9	6.6	24.8	(2)
Second or third	9,287	8.3	7.8	8.5	9.9	6.6	.....	(2)
No prenatal care [1]	472	24.8	.....				24.8	.....
Not stated [1]	1,016	10.5	10.0	10.1	(2)	(2)	.....	7.7
Total nonwhite	14,309	15.2	12.3	15.3	14.7	16.1	32.0	19.3
First	6,021	13.7	12.2	14.6	14.0	(2)	.....	(2)
After first	7,777	16.0	12.7	15.1	14.6	(2)	32.0	(2)
Second or third	7,173	14.7	12.7	15.1	14.6	(2)	.....	(2)
No prenatal care [1]	604	32.0	.....				32.0	.....
Not stated [1]	511	21.9	10.8	29.3	(2)	(2)	.....	(2)

[1] Figures differ from those in table 3 since inconsistencies in response to questions on source of care and timing of care have been adjusted.
[2] Not calculated if base was fewer than 100 live births.
NOTE: Includes all resident live births occurring in Maryland.

immature infants as those in the highest educational category.)

It may be that within each specified educational category, the more economically advantaged are more likely to seek private physicians and the less economically advantaged to attend clinics. If this is true, the higher income, with its concomitants in standard of living, may be more properly considered the agent producing the differences shown by care sources than the specific medical facility. We cannot substantiate this supposition from the data at hand; however, we can look into another related question: What is the effect of source of prenatal care when data are controlled for early exposure to medical care?

Data in table 5 show that white women who had late or no prenatal care had a 38 percent relative excess of low weight babies as compared with women who had early care (9.1 percent weighing 2,500 grams or less as compared with 6.6 percent). However, when women in specific source groups were identified, the differentials were much reduced. To some extent the statistics indicating the beneficial effect of early care reflect the distributions associated with source of care, which in turn is associated with social status. Only a 24 percent excess in immature infants separated the women in the private care group who did not begin prenatal visits during the first trimester of pregnancy from the early care group, and much smaller differences prevailed among comparable groups who attended clinics. Among nonwhite mothers, the apparent difference between first trimester care and later trimester care almost disappears when source-of-care groups (table 5) are examined individually.

Discussion

Data presented here, as well as in many prior studies, reveal that social class differentiations (as determined by education of mother) currently are related to variation in the outcome of pregnancy, with the more deprived groups subject to the least favorable prognosis. Some studies suggest that an explanation for the high incidence of immaturity in the United States as compared with the advanced European countries may be that in these countries medical care is more freely available to all social classes, and maternal allowances ease the financial burdens of the working pregnant women (*4, 17*). Nevertheless, Baird (*18*) has shown that even in a European city where all social classes were believed to receive "a good and uniform standard of obstetric care" the incidence of low birth weight among infants born to upper class women was only about half that among children of the lower classes.

Baird's explanation—the poor environment that women experienced in their growing years impaired their reproductive efficiency—would seem to ac-

count equally well for the pattern in Maryland. The socioeconomic deprivation of the disadvantaged, or low education group, is associated with a complex of factors including poor nutrition, maternal fatigue, and small maternal stature (*19*). Education itself has been called a common denominator among the factors interrelated in the maternal biological and environmental background; that is, education reflects the preparation of persons for responsible parenthood (*8*). Poor education is associated with a poor understanding of health requirements. A higher level of education is associated with higher intelligence, better health care judgment, and increased self-discipline, including ability to follow a physician's orders.

The close connection between the early reporting of women for prenatal care and their education can make correlations between care and low birth weight misleading unless the data are carefully broken down into statistically controlled components. When the effect of class level is removed, the independent role played by the timing of prenatal care relative to the incidence of low weight births appears to be minor. Terris and Gold (*9*) demonstrated this in a recent study. Modern medical care, though important, cannot fully benefit the deprived groups lacking the motivation or education to benefit from it. As Hendricks (*8*) has pointed out: "Improvement of socioeconomic status is the *sine qua non* for improving reproductive efficiency."

The education-specific controls may mask a range of income levels within each classification, which in turn may influence the care variable. Hence, while the type of medical care received seems to influence to some extent the outcome of pregnancy, one cannot be certain from the limited information available whether socioeconomic factors, or perhaps motivational factors associated with education, are more causative than the care itself.

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The relationship between the proportion of low birth weight infants and the educational attainment of the mothers—which was viewed as a major indicator of the parents' socioeconomic status—was analyzed. The independent role of other variables also was studied. The data for 43,074 white newborn and 14,309 nonwhite newborn were obtained from the 1968 live birth certificates in use in Maryland.

The proportions of low weight births were found to vary inversely with the educational level of the mothers. Wide differences in these proportions remained even after controlling for maternal age, birth order, source of prenatal care, and timing of prenatal care.

While 7.3 percent of all live infants born to white mothers weighed 2,500 grams or less, the low weight proportions by educational attainment ranged from 10.7 percent among women with less than 10 years of schooling to 4.4 percent for college graduate women. Among nonwhites, the differences were similar in direction but not as sharp. The differences by educational level were not much reduced within specific age or birth order classes. Similarly, regardless of source or duration of prenatal care, the better educated women had a lower incidence of low birth weight infants. Educational level thus appears to play a more salient role in determining birth weight than any one of the other factors studied.

When educational level was statistically controlled, differences in the low weight proportions continued to appear by maternal age and parity, but these were not particularly strong. Differences also were shown reflecting the nature and timing of prenatal care when level of education was held constant.