

# Maternal Attitude toward Pregnancy and the Risk of Neonatal Death

## ABSTRACT

**Objectives.** Reduced options for fertility control over the past decade have increased the rates of unwanted pregnancy. We evaluated whether a woman's negative attitude toward her pregnancy increased the risk of perinatal mortality, in a large, prospective cohort study.

**Methods.** The association between attitude toward the pregnancy and perinatal mortality was evaluated in a longitudinal cohort study of 8823 married, pregnant patients enrolled from 1959 to 1966 in the Child Health and Development Studies.

**Results.** Women who reported during the first trimester of prenatal care that the pregnancy was unwanted were more than two times more likely to deliver infants who died within the first 28 days of life than were women reporting accepted pregnancies. A positive attitude toward pregnancy was not associated with fetal death or postneonatal death.

**Conclusions.** These data, collected when induced abortions were illegal, may have important implications for the 1990s. If maternal attitude toward the pregnancy is associated with neonatal mortality and abortion laws change such that access is restricted, infant mortality may increase because a greater proportion of births will be unwanted. (*Am J Public Health.* 1994; 84:411-414)

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## Introduction

In 1973, the year of the *Roe v Wade* Supreme Court decision (410 US 113) that made abortion legal in the United States, 14.3% of pregnancies were reported by respondents to the National Survey of Family Growth as unwanted at conception.<sup>1</sup> Almost 10 years later, in 1982, the percentage of pregnancies reported as unwanted at conception fell to almost one half the 1973 percentage (7.7%). However, during the late 1980s, when abortion remained legal but politically and legally challenged, the percentage of women reporting pregnancies as unwanted increased to 10.3%.<sup>1</sup> Given this trend toward increasing numbers of unwanted pregnancies, particularly if abortion becomes inaccessible in the United States, further attention must be given to the consequences of unwanted childbearing.

Being unwanted puts children at increased risk of a range of adverse health outcomes, including child abuse<sup>2</sup> and delayed cognitive and social-emotional development.<sup>3-5</sup> Women with unwanted pregnancies are less likely to seek early and adequate prenatal care<sup>6-8</sup> and may thus be at increased risk of delivering infants with adverse pregnancy outcomes. In a Finnish study, women reporting infants unwanted at birth were more likely to have infants of lower birthweights and higher rates of infant mortality.<sup>9</sup> Kafatos and Pantelakis reported that being illegitimate or unwanted was a risk factor for perinatal morbidity and mortality.<sup>10</sup>

No US-based study of pregnancy attitude and perinatal mortality has assessed attitude early in the pregnancy and followed women to delivery to ascertain pregnancy outcomes. This analysis of the Child Health and Developmental Studies cohort (recruited from 1959 to 1965) assessed attitude toward the pregnancy at the first prenatal care visit and followed these Kaiser Health Plan patients to delivery. The risk of fetal, neonatal, and postneonatal mortality associated with being unwanted was estimated while controlling for important confounders, including level of prenatal care.

**Methods**

The Child Health and Development Studies involved a prospective cohort of 20 754 pregnancies to women who were members of the Kaiser Health Plan in the East Bay Area of San Francisco between June 1959 and September 1966.<sup>11</sup> Women attending Kaiser clinics for confirmation of pregnancy were asked to participate. Pregnant women were then followed throughout their pregnancy while receiving prenatal care in Kaiser clinics. Those who changed care providers during the pregnancy or delivered at facilities other than Kaiser's were dropped from the follow-up. Subsets of children were followed for up to 15 years.

## Methods

During the pregnancy follow-up periods, information from several sources was collected. Women were to be interviewed early in their pregnancies to

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obtain information on their medical history; behavioral risk factors, including tobacco and alcohol intake; and sociodemographic factors. Also, the women and their husbands were asked about their attitude toward the pregnancy. Existing medical records were computerized and linked with the mother's personal interview, including the prenatal care record, and the mother's and infant's hospital records.

For the purposes of this analysis, women who were unmarried, who were interviewed after delivery, or who did not answer the question on attitude toward the pregnancy were excluded. In addition, to address the issue of nonindependence of pregnancy outcomes with the same mother, only one randomly selected pregnancy per woman was included in this analysis, leaving a total of 8823 eligible married women 20 to 50 years old.

Attitude toward the pregnancy was classified on the basis of the woman's response to a question asked during the first trimester of pregnancy about her perception and that of her husband in regard to their pregnancy. If the woman indicated that either she or her husband was unhappy, resentful, or upset about the pregnancy or did not want the pregnancy or that the pregnancy was mistimed, the pregnancy was categorized as unwanted. If they indicated that they were happy about the pregnancy or stated that they wanted, accepted, or planned the pregnancy, the pregnancy was categorized as accepted. Women who reported that they or their husband had contradictory feelings about the pregnancy were not included in either group for this analysis. Changes in attitudes during pregnancy were not considered.

Information regarding fetal, neonatal, and postneonatal death was obtained from medical records and autopsy reports. A fetal death was defined as fetal loss prior to delivery and included stillbirths as well as recognized early pregnancy loss. A neonatal death was defined as a live-born baby who expired within 28 days of birth, while a postneonatal death was defined to include live-born infants dying after the 28th day of life but prior to 1 year of age.<sup>12</sup> The specific cause of death was not noted.

Information on the following risk factors was available from data collected for this cohort of women: maternal and paternal age, race, educational attainment, religion, family income, parity,

interpregnancy interval, maternal and paternal smoking and drinking exposure, infant birthweight, and the presence of a congenital anomaly in the infant. These data were used to identify factors that may confound the relationship between being unwanted and infant mortality (fetal, neonatal, and postneonatal mortality). Factors associated with attitude toward the pregnancy were first described by comparing the proportion of those reporting an unwanted pregnancy with the selected risk factors and the proportion of those reporting an accepted pregnancy. Similarly, risk factors for neonatal mortality were assessed by comparing the proportion of those experiencing neonatal mortality with the selected risk factors and the proportion among live-born and surviving infants. Factors associated with both attitude toward the pregnancy and neonatal mortality (confounders)<sup>13</sup> were included in logistic regression models estimating the risk of infant death associated with being unwanted.

## Results

Of the 8823 married, pregnant Kaiser patients enrolled in the study and included in this analysis, 1274 (14.4%) reported that the pregnancy was unwanted when asked during the first trimester. Several factors were associated with reporting the pregnancy as unwanted vs wanted. In comparison with women reporting the pregnancy as accepted, women reporting that the pregnancy was unwanted were 2.9 times more likely (95% confidence interval [CI] = 2.2, 3.7) to be 40 years of age or older, twice as likely (95% CI = 1.7, 2.3) to have husbands with less than a high school education, and 3.7 times more likely (95% CI = 3.1, 4.4) to have had four or more children. Women reporting an unwanted pregnancy were 40% more likely (odds ratio [OR] = 1.4, 95% CI = 1.3, 1.6) to be non-White and 20% more likely (OR = 1.2, 95% CI = 1.0, 1.4) to be smokers. Reporting an unwanted pregnancy was not associated with the infant having had any congenital anomaly (OR = 1.0, 95% CI = 0.7, 1.4), with having a short interpregnancy interval among parous women (OR = 0.9, 95% CI = 0.8, 1.1), or with low infant birthweight (OR = 1.1, 95% CI = 0.9, 1.4). In addition, maternal education, paternal age, and paternal race were not independently associated with attitude toward the pregnancy

(when controlling for paternal education, maternal age, and race).

Although information was collected on other potential confounders, sufficiently large numbers of missing values precluded the use of family income (10% missing), religion (30% missing), and maternal and paternal alcohol consumption (15% missing).

Of the cohort of 8823 live births, 83 infants (0.9%) died within the first 28 days of life (neonatal deaths) and 57 (0.6%) died after the first 28 days but prior to 1 year of age (postneonatal deaths). Three hundred thirty-one fetal deaths (3.8%) were observed in this cohort of pregnancies. Risk of neonatal death increased with decreasing educational level of the husband (OR = 1.9 for less than a high school education, 95% CI = 0.9, 3.7) and with increasing parity (OR = 2.4 for parity of four or more, 95% CI = 1.2, 4.5). As expected, low birthweight (<2500 g) was strongly associated with neonatal death (OR = 39.6, 95% CI = 29.6, 52.9), as was having any congenital anomaly (OR = 10.7, 95% CI = 7.2, 15.9). Women 40 years of age or older appeared to be at a slightly reduced risk of having a child who died prior to 28 days, but the confidence interval for this estimate was wide (OR = 0.4, 95% CI = 0.02, 2.58). Maternal race, interpregnancy interval, and smoking during pregnancy were not consistently associated with neonatal death. Also, maternal education, paternal age, and paternal race were not independently associated with neonatal death.

Table 1 presents the number and percentage of unwanted and accepted pregnancies by the following pregnancy outcome categories: fetal death, neonatal death, postneonatal death, and live-born infants surviving beyond 1 year of age (n = 8740). Crude and adjusted relative risk estimates for pregnancy attitude and the perinatal mortality outcomes obtained from multiple logistic regression are also presented in Table 1. Only neonatal death was significantly associated with being unwanted. Women reporting, during the first trimester of prenatal care, that the pregnancy was not wanted were 2.4 times more likely (95% CI = 1.5, 4.0) to deliver infants who died within the first 28 days of life. The crude relative risk estimate for this relationship was 2.7 (95% CI = 1.8, 4.2). Women reporting their pregnancy as unwanted were no more likely to have the pregnancy end in a

fetal death (adjusted OR = 1.1, 95% CI = 0.9, 1.5) than were women accepting their pregnancies. Postneonatal death was not associated with attitude toward the pregnancy; the adjusted relative risk estimate was 0.9 (95% CI = 0.5, 1.9).

## Discussion

Parents (either the mother or father) perceiving their pregnancy as unwanted had a greater than twofold increased risk of delivering a child who died within the first 28 days of life. Attitude toward the pregnancy was not associated with an increased risk of fetal death or with an increased risk of postneonatal mortality.

Few studies have directly addressed the relationship between pregnancy attitude and infant mortality,<sup>9,10</sup> and none have assessed attitude early in the pregnancy and followed women to determine subsequent pregnancy outcomes. Kafatos and Pantelakis<sup>10</sup> did find a significant association between illegitimacy and perinatal mortality, while Myrman<sup>9</sup> found that being unwanted increased the risk of low birthweight but not perinatal mortality.

Women enrolled in the Child Health and Development Studies were a select group with unique characteristics that placed them at a reduced risk of adverse pregnancy outcomes. Since all women received early prenatal care, lack of access to such care cannot explain the observed relationship between attitude toward the pregnancy and neonatal mortality. All women in this cohort were married and were either employed or married to men whose employment guaranteed the Kaiser Health Plan. Therefore, the proportion of women who reported unwanted pregnancies in this cohort was probably lower than in a general population of pregnant women. In comparison with a population having less access to prenatal care, this cohort was at reduced risk of adverse pregnancy outcomes, including neonatal mortality.

In the 1990s, relative to the 1960s when these data were collected, significant improvements in survival rates for high-risk, primarily low-birthweight infants have been achieved. In the data reported here, being unwanted was not associated with low birthweight (OR = 1.1); thus, the observed association between attitude toward the pregnancy and infant mortality should still be applicable for pregnancies in the 1990s.

**TABLE 1—Relative Risks for the Relationship between Maternal Attitude toward the Pregnancy and Perinatal and Infant Death**

	Unwanted Pregnancy		Accepted Pregnancy		Crude RR (95% CI)	Adjusted RR <sup>a</sup> (95% CI)
	No.	%	No.	%		
Fetal death	62	4.6	269	3.4	1.4 (1.0, 1.8)	1.1 (0.9, 1.5)
Death within 1–27 d	25	1.9	57	0.7	2.7 (1.8, 4.3)	2.4 (1.5, 4.0)
Death after 28 d	7	0.5	50	0.6	0.8 (0.4, 1.9)	0.9 (0.5, 1.9)
Live birth	1248	92.9	7492	95.2	1.0 Reference	1.0 Reference

Note. RR = relative risk; CI = confidence interval.

<sup>a</sup>Adjusted for gravida's age, race, and parity and husband's education.

Our finding of no association between attitude toward the pregnancy and postneonatal mortality is somewhat puzzling. However, because the cause of death was not coded, we cannot, for example, look at the relationship between pregnancy attitude and intentional injury, nor can we correlate time of death with its cause by pregnancy attitude. Since this is one of the first studies to report an increased risk of neonatal death associated with being unwanted, additional cohort studies should be conducted in an attempt to replicate these findings.

The definition of an unwanted pregnancy used in this analysis differed from those used in other surveys<sup>14</sup> and may be less biased because women were asked about their feelings regarding the pregnancy at least 6 months prior to delivery. In addition, the question addressed both the woman's and her husband's perceptions of the pregnancy (illegitimate births were not included). Finally, women were allowed a range of responses to this question characterizing their feeling about the pregnancy; pregnancy attitude was not asked as part of the question but was included as a response option.

During the time that women were enrolled in this study (1959 to 1966), abortion was illegal and contraception was not widely available. In light of current political challenges to abortion and family planning, these data may have a particularly important message. If access to abortion and family planning is limited or eliminated, the proportion of women delivering unwanted infants will increase dramatically. If pregnancy attitude is linked to neonatal death and the proportion of unwanted infants increases, then rates of infant mortality may also increase. Since the women

included in the analysis were primarily middle income and received early prenatal care and were thus at reduced risk of adverse pregnancy outcomes, the impact of being unwanted on infant mortality may be underestimated. Thus, if these results are applied to women without prenatal care, the magnitude of the effect of attitude toward the pregnancy on infant mortality may be greater.

Pragmatically, reducing the proportion of infants born unwanted is a public health issue that we know how to and have had success in addressing. Public health interventions (family planning and abortion services) do exist to increase the proportion of wanted births and, thus, improve a range of infant health outcomes. □

## References

- Williams LB. Determinants of unintended childbearing among ever-married women in the United States: 1973–1988. *Fam Plann Perspect.* 1991;23:212–222.
- Zuravin SJ. Unplanned childbearing and family size: their relationship to child neglect and abuse. *Fam Plann Perspect.* 1991;23:155–161.
- Baldwin W, Cain VS. The children of teenage parents. *Fam Plann Perspect.* 1980;12:34–40.
- Matejcek Z. The Prague cohort through age nine. In: David HP, Dytrych Z, Matejcek Z, Schuller V, eds. *Born Unwanted*. New York, NY: Springer; 1988: 53–86.
- David HP. Additional studies from Sweden. In: David HP, Dytrych Z, Matejcek Z, Schuller V, eds. *Born Unwanted*. New York, NY: Springer; 1988:46–52.
- Lia-Hoagberg B, Rode P, Skovholt C, et al. Barriers and motivators to prenatal care among low-income women. *Soc Sci Med.* 1990;30:487–495.
- Sable MR, Stockbauer JW, Schramm WF, Land GH. Differentiating the barriers to adequate prenatal care in Missouri, 1987–1988. *Public Health Rep.* 1990;105: 549–555.
- Weller RH, Eberstein IW, Bailey M.

- Pregnancy wantedness and maternal behavior during pregnancy. *Demography*. 1987;24:407-412.
9. Myhrman A. The Northern Finland cohort, 1966-82: a follow-up study of children unwanted at birth. In: David HP, Dytrych Z, Matejcek Z, Schuller V, eds. *Born Unwanted*. New York, NY: Springer; 1988:103-110.
  10. Kafatos AG, Pantelakis SN. Factors related to perinatal morbidity and mortality. *Paediatrician*. 1982;11:27-44.
  11. Yerushalmy J. Biostatistical methods in investigations of child health. *Am J Dis Child*. 1967;114:470-476.
  12. Bakketeig LA, Hoffman HJ, Titmuss Oakley AR. Perinatal mortality. In: Bracken MB, ed. *Perinatal Epidemiology*. New York, NY: Oxford University Press; 1984:99-151.
  13. Mausner JS, Bahn AK, Kramer S. *Epidemiology: An Introductory Text*. Philadelphia, Pa: WB Saunders; 1985.
  14. Klerman LV, Jekel JF. Unwanted pregnancy. In: Bracken MB, ed. *Perinatal Epidemiology*. New York, NY: Oxford University Press; 1984:283-299.

## Women's Health Conference to Be Held in May

The American Psychological Association will hold a conference entitled "Psychosocial and Behavioral Factors in Women's Health: Creating an Agenda for the 21st Century" May 12 through May 14, 1994, at the Capitol Hill Hyatt Regency Hotel, Washington, DC. There will be a preconference awards reception on Capitol Hill on the evening of May 11, 1994, to honor legislators and other key figures in women's health. The goal of the conference is to highlight the importance of psychosocial and behavioral factors in women's health research and the implications for treatment, prevention, and health policy.

Major foci will include theoretical models/frameworks for conceptualizing women's health; issues in research methodology, measurement, and evaluation; new research on psychosocial and behavioral factors in women's health; implications of psychological factors in treatment, health

policy, and interventions; and special issues of underserved populations (e.g., ethnic minorities, the poor, women with disabilities, lesbians, and older women). Content areas of interest will include sociocultural influences on health; behavioral and psychosocial risk factors; behavioral and psychosocial factors in health promotion; and coping, resilience, health, and illness.

Registration fees for professionals are \$225 (preregistration [received by April 8, 1994]) or \$275 (late and on-site registration). Fees for students are \$95 (preregistration [received by April 8, 1994]) or \$125 (late and on-site registration).

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