SPECIAL ARTICLE

OUTCOMES OF PREGNANCY IN A NATIONAL SAMPLE OF RESIDENT PHYSICIANS

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Abstract Background; Physically demanding, highly stressful work during pregnancy has been reported to cause a variety of adverse outcomes. It has been difficult, however, to separate the effects of work from those of socioeconomic status.

Methods. By means of a national questionnaire-based survey, we studied the outcomes of pregnancy during residency for 4412 women who graduated from medical school in 1985 and for the wives of 4236 of their male classmates' who served as controls.

Results. The rate of response to our survey was 87 percent (4412 of 5079) for the women residents and 85 percent (4236 of 4968) for the wives of the male residents. There were no significant differences in the proportion of pregnancies ending in miscarriage (13.8 percent for residents vs. 11.8 percent for their classmates' wives, P = 0.12), ectopic gestations (0.5 percent vs. 0.8 percent, P = 0.69), and stillbirths (0.2 percent vs.0.5 percent, P = 0.20). There were 989 women residents and 1238 residents' wives whose first pregnancy during residency resulted in the live birth of a singleton infant. Although during each trimester the women residents worked many more hours than the wives of the rmale residents; the frequency of preterm births (<37 weeks' gestation) was similar: 6.5 percent for residents and 6.0 percent for residents' wives (odds ratio= 1.1; 95 percent confidence interval, 0.7 to 1.5). Infants who were small for gestational age (with birth weights less than the 10th percentile for gestational age) were born to 5.3 percent of the residents and 5.8 percent of the residents' wives (odds ratio = 0.9, 95 percent confidence interval; 0.6 to 1.3). Adjustment for factors that differed. between the women residents and the wives of male residents resulted in odds ratios of 1.2 (95 percent confidenceinterval, 0.8 to 1.7) for preterm delivery and 0.9 (95 percent confidence interval: 0.6 to 1.3) for the delivery of an infant who was small for gestational age. However, the women residents more frequently reported having had preterm labor (11 percent vs. 6 percent), but not preterm delivery (6.5 percent vs. 6.0 percent); preeclampsia was also more common among the women residents (8.8 percent vs. 3.5 percent).

Conclusions. These results suggest that working long hours in a stressful occupation has little effect on the outcome of pregnancy in an otherwise healthy population of high socioeconomic status. (N Engl J Med 1990; 323: 1040-5-)

PHYSICALLY strenuous occupations have long been suspected of causing adverse pregnancy outcomes. Occupational factors such as long working hours, night work, and lengthy periods of standing have been associated with an increased risk of preterm delivery. Prolonged standing at work has also been associated with reduced intrauterine growth. A common criticism of these reports is that women with physically demanding occupations are likely to be of lower socioeconomic status than women with less demanding occupations. To address this issue; it is necessary to separate the effects of occupational physical stress and socioeconomic status.

Residency training provides a unique opportunity to make this separation. Medical residents are highly educated, yet they spend long hours during both day and night in work that includes prolonged standing and great emotional stress. Although residency occurs at an age when many women want to have children, most residency programs have no specific policies regarding maternity leave, and many pregnant residents perceive resentment of the pregnancy on the part of other house officers and faculty members.

It is commonly believed that pregnant residents are at high risk for a variety of adverse outcomes. Pregnant physicians have been reported to have an increased risk of preterm delivery,intrauterine growth retardation, placental abruption, and pregnancy induced hypertension. However, not one of

the previous studies of pregnancy among residents has used a broad sample-of residents and had a response rate sufficient to ensure the validitf of the results. The present study is the largest to date that has evaluated the outconies of pregnancy among women residents.

METHODS

We surveyed women physicians who graduated from medical school in 1985 (n = 5096) and a random sample of 5000 of the 12,306 male physicians who graduated in 1985. Names and addresses for the physicians were-obtained from the American Medical Association (AMA3 Physicians' Master File. Physicians were sent a questionnaire, along with a covering letter and a letter of endorsement from the American College of Obstetricians and Gynecologists. Male physicians were instructed to give the questionnaires to their wives for completion, or to complete the questionnaire themselves if giving it to their wives was not possible. Nonrespondents were sent a postcard reminder and subsequently received a second copy of the questionnaire. Those who still had not responded were then contacted by telephone, at which time the questionnaire was completed by professional interviewers if possible.

The questionnaire covered the outcome of each pregnancy, demographic information, and the woman's weight and height. The remainder of the questions concerned the first pregnancy that began during the residency (index pregnancy) and included items on the type of residency (or other work in the case of the wives), the number of hours worked, the amount of time off from work and the attitudes of the woman's colleagues toward the pregnancy. The analyses in the present report are based on these index pregnancies.

The outcomes of interest, reported by the respondents, were pre term delivery, defined as the delivery of a live-born infant before 3 weeks of gestation, and the delivery of an infant who was small for his or her gestational age, defined as a live-born infant with a birthweight less than the 10th percentile for gestational age. The association between the outcome of pregnancy and exposure status was expressed in terms of odds ratios and 95 percent confidence limits. A variety of factors known to influence the outcome of pregnancy were compared for women physicians and the wives of male physiclians by chi-square tests and t-tests, as appropriate. The odds ratio for adverse pregnancy outcomes according to exposure status were adjusted for age at delivery, parity, height, prepregnancy weight and race or ethnic group with use of multiple logistic regression.

RESULTS

The study population initially consisted of 5096 female and 5000 male physicians. Because of errors in the listing of sex in the AMA Master File, the final population we surveyed comprised 5094 women and 5002 men. Physicians who had died, did not enter residency, or had a mailing address outside the United States and its territories (15 women and 34 men) were regarded as ineligible, leaving 5079 women and 4968 men to whom we mailed questionnaires.

The overall rate of response to the survey was 86.1 percent. The response rate was 86.9 percent (4412 of 5079) for female physicians and 85.3 percent (4236 of 4968) for the wives of male physicians; 1.3 percent of the female and 1.5 percent of the male physicians declined to participate, and the remainder of those not included did not respond. Respondents who returned the mailed questionnaire were more likely than respondents contacted by telephone ever to have had a pregnancy. Among those who had been pregnant, however, the frequency of preterm delivery and delivery of an infant who was small for gestational age did not differ between postal and telephone respondents. Among male physicians' wives who had ever been pregnant (n = 2119), 231 were themselves either physicians or medical students. These wives were considered to have been exposed to the same conditions as the women residents and were therefore excluded from further analysis.

The outcomes of pregnancy in the two groups are shown in Table 1. There were 1293 residents and 1494 wives who became pregnant during residency; the final study population consisted of the 989 residents and 1239 spouses who gave birth to live-born singleton infants as a result of the first pregnancy that began during the residency. As shown in Table 1, there were no statistically significant differences between residents and residents' wives in terms of the proportion of pregnancies that ended in miscarriage (13.8 percent vs. 11.8 percent, respectively; P = 0.12), ectopic