was not evident, whereas an association with very early preterm births was significant (Epidemiology 2000;11:427–433). Passive smoking has been associated with other adverse outcomes, such as stillbirth (Acta Obstet Gynecol Scand 2010; 89(4):572–577) and childhood health outcomes (Pediatr Pulmonol 2012;47:666-673). The lack of distinction between spontaneous and medically indicated preterm birth in this current study is also of interest, although these disorders likely share many etiologic factors such as inflammation and vascular disorders—the so-called “great obstetrical syndromes” described by Roberto Romero and colleagues (Am J Obstet Gynecol 2011;204:193–201).

Clearly, smoking has adverse impacts on human health, both for smokers themselves and also for those exposed to secondhand smoke and, if considering the fetus, third-hand smoke. Efforts to decrease preterm birth rates have successfully targeted maternal smoking, and public health efforts to decrease smoking generally have also met with success. It is interesting how low the rate of smoking is in the pregnant women in this study, whereas the men have a much higher rate of smoking. It would be of some interest to study that behavior, and if there are lessons to be learned in encouraging pregnant women to quit smoking in other settings, or for the antismoking message to reach the Chinese men and in this way to decrease the rate of secondhand smoke exposure. The rate of preterm birth in San Francisco has decreased in recent years, and 1 theorized mechanism includes the strong public health efforts aimed at decreasing overall exposure to secondhand smoke. As we strategize means to decrease the still too-high rates of preterm birth, targeting passive smoke exposure would appear to be an effort worth pursuing for many reasons.—MEN

Long Working Hours and Pregnancy Complications: Women Physicians Survey in Japan

Masumi Takeuchi, Mahbubur Rahman, Aya Ishiguro, and Kyoko Nomura

Teikyo University Support Center for Women Physicians and Researchers, Tokyo, Japan (M.T., K.N.); Center for Interdisciplinary Research in Women’s Health, Department of Obstetrics and Gynecology, University of Texas Medical Branch, Galveston, TX (M.R.); and Department of Hygiene and Public Health, Teikyo University School of Medicine, Tokyo, Japan (A.I., K.N.)

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ABSTRACT

Because of the known occupational risk factors among health care workers, and despite laws limiting working hours, associations between working hours and pregnancy complications among female physicians have not been thoroughly examined. With the increase in women attending medical schools, pregnancy during residency or fellowship is not uncommon. This cross-sectional study was performed to investigate the association between number of hours worked and pregnancy complications in physicians.

A self-administered survey was completed by alumnae who graduated from 13 private medical schools in Japan to identify the barriers encountered by women as they tried to balance work and expected gender roles. Of 9544 alumnae contacted, 2029 provided consent, and 1684 returned the questionnaires. After exclusions for age 60 years or older, missing data, or multiple conceptions, 939 physicians were included in the analysis. Items investigated were age, medical specialty, age at the time of first pregnancy, current household income, weekly working hours during the first trimester of the first pregnancy, and complications during the first pregnancy. Self-reported pregnancy complications were categorized into threatened abortion (TA), preterm birth (PTB), abnormal labor and delivery, spontaneous miscarriage, gestational hypertension, and others. Threatened abortion was defined as vaginal bleeding in the first 22 weeks accompanied by a medical diagnosis of TA. Preterm birth was defined as delivery at less than 37 weeks’ gestation.
Threatened abortion and PTB were the primary outcomes. Analyses of weekly working hours during the first trimester by pregnancy complications, associations between the quartile of number of hours worked per week and pregnancy complications, and unadjusted and age-adjusted ORs of the effect of quartile of hours worked per week on TA and PTB were calculated, and 95% confidence intervals [CIs] were determined.

The mean age of the women was 44 ± 8 years, and mean age during the first pregnancy was 31 ± 4 years. The mean number of hours worked per week during the first trimester was 54 ± 22 hours. Of the 939 women, 394 (42%) reported at least 1 complication, most commonly TA in 93 (15%) and PTB in 71 (12%); 36 had both TA and PTB. Women who experienced TA or PTB had longer working weeks during pregnancy than those without complications (TA mean: 63 vs 50 h, \( P < 0.0001 \); PTB mean: 62 vs 50 h, \( P < 0.0001 \)). The mean number of hours worked by women with complications other than TA or PTB did not differ from the hours worked by those who had no complications. A total of 275 women (29.3%) worked 40 h/wk or less, 232 (24.7%) worked 41 to 50 h/wk, 247 (26.3%) worked 51 to 70 h/wk, and 185 (19.7%) worked 71 h/wk or more. The number of women experiencing TA or PTB increased as each quartile of hours worked per week increased. Compared with women who worked 40 h/wk or less, women working 71 h/wk or more had a 3-fold higher risk of TA (95% CI, 1.7–6.0) even after adjusting for specialty, maternal age, and household income. Compared with women who worked 40 h/wk or less, the chance of experiencing PTB was 2.5-fold higher (95% CI, 1.2–5.2) among women who worked 51 to 70 hours and 4.2-fold higher (95% CI, 1.9–9.2) among women who worked 71 hours or more even after adjustments.

The number of hours worked per week during the first trimester was associated with complications such as TA and PTB. Few professional guidelines include limits on the number of hours worked. Future research could contribute to legal or professional regulations governing the number of hours pregnant physicians can work by investigating whether long working hours cause TA or PTB.

**EDITORIAL COMMENT**

(The association of physical activity with PTB is increasingly recognized as complex. With the high rates of PTB that are documented worldwide and increasing numbers of women who work during pregnancy, it is important to better understand how we should be advising pregnant women regarding exercise, work, and physical activity generally. It has been thought to be intuitive and logical that less physical activity, and more rest, would decrease rates of stress and be beneficial in decreasing rates of prematurity. However, increasing amounts of data indicate that in fact the converse may be true—women who exercise during pregnancy appear to be at lower risk for PTB when compared with their sedentary peers, and women put on bed rest for obstetric complications appear to be at higher risk of early delivery. However, there are clearly many confounders, and in the absence of a randomized trial, it is difficult to sort out the various factors that may be contributing to these observations.

This abstracted article from Japan adds to the literature, although certainly does not settle the debate. The authors surveyed physicians who had given birth, and specifically assessed the number of hours worked per week in the first trimester, and the rate of a number of pregnancy complications including TA (defined as bleeding before 22 weeks’ gestation), PTB, gestational hypertension, abruption, and others. They found that the rates of TA and PTB both increased with increasing numbers of hours worked, in a dose-response fashion, whereas other complications were generally not associated with hours worked. The women who worked more than 71 hours a week had a risk of PTB that was over 4 times greater than the women who worked less than 40 h/wk. Women who worked longer hours also had higher rates of TA, which occurred 3 times more commonly in women who worked more than 71 hours compared with women who worked 40 hours or less. Unfortunately, the authors do not report on the overlap of those 2 groups and whether the women with TAs were the same women who went on to have PTB. It is also of some interest and worth noting that they specifically included just work hours in the first trimester, not later in pregnancy.

Maternal activity restriction is one of the most widely used interventions in obstetrics, recommended by most obstetricians for a variety of indications. A substantial percentage of pregnant women are placed on activity restriction, including being taken off work, sometime during their pregnancy for problems such as vaginal bleeding, fetal growth restriction, and
hypothesis. However, probably the most widely used indications include bleeding in pregnancy and for prevention of PTB, either because of preterm contractions or sonographic detection of a shortened cervix. A recent study of women with a sonographic short cervix found that nearly 40% of women with a shortened cervix were placed on some form of activity restriction, either pelvic rest, decreasing work hours, or a decrease in non–work-related physical activity; most prescribed all 3 (Obstet Gynecol 2013;121:1181–1186). Interestingly, those women who were placed on activity restriction had a 2.5 times higher rate of premature delivery, even when controlling for those factors associated with higher risk of PTB (such as a shorter cervix, a cervical funnel, or intra-amniotic debris).

Studies have reported varied results specifically regarding work and PTB. Some, like this study, have found an increased risk with long work hours, or shift work (Am J Obstet Gynecol 1995;173:849–862), others have found no association (N Engl J Med 1990;323(15):1040–1045), and still others have found that work seems to be protective (Obstet Gynecol 2005;106:1279–1288). Some investigators have also found a decreased risk of PTB in women who participated in vigorous physical activity (Matern Child Health J 2012;16(5):1031–1044). Clearly, these associations are not clear, and it is likely there are many other confounders that impact PTB in women who do or do not work long hours. It may be that in some cases, the association may be primarily due to stress rather than the work hours directly. Given the importance of PTB—and of work for many families—these associations are critically important to work out. Rigorous investigation is very difficult but also very important, and more attention needs to be focused on lifestyle, lifestyle interventions, and obstetric risks. In studies such as that reported here, the hours worked were obtained solely through patient report. As the authors themselves acknowledge, it is possible that there is selection bias in that women with a poor pregnancy outcome may have had a tendency to want to assign blame and to attribute their PTB to poor working conditions or to exaggerate their hours worked given the poor outcome. In contrast, the dose-response relationship, with increasing odds of PTB associated with increasing hours worked, provides some plausibility for this association. Nevertheless, in the meantime, it does not seem reasonable to ask women to stop work, with all the attendant downstream adverse effects they may have, without more and better data.—MEN)