The Risk of Prematurity and Small-for-Gestational-Age Birth in Mexico City: The Effects of Working Conditions and Antenatal Leave

ABSTRACT

Objectives. This study examined the effect of working conditions, occupational stress, and antenatal leave on risk of small-for-gestational-age and premature births in Mexico City.

Methods. Over a 3-month period, 2663 (96.2%) of 2767 women who gave birth at three major hospitals and worked at least 3 months during pregnancy were interviewed shortly after delivery. After the exclusion of multiple gestations and birth defects, 261 (10.0%) small-for-gestational-age and 288 (11.0%) preterm births were identified.

Results. For small-for-gestational-age births, working more than 50 hours a week (odds ratio [OR] = 1.59), standing more than 7 hours a day (OR = 1.40), and no antenatal leave (OR = 1.55) were associated with an increased risk. Women with no antenatal leave were also much more likely to give birth prematurely (OR = 3.04).

Conclusions. In this study, arduous working conditions and lack of antenatal leave benefits were found to increase the risk of poor birth outcome in Mexican women. Enforcement of existing antenatal leave laws and provision of comparable benefits for the uninsured may reduce the incidence of small-for-gestational-age births and prematurity. (*Am J Public Health.* 1996;86:825–831)

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Introduction

The importance of maternal work as a potentially modifiable risk factor for prematurity and intrauterine growth retardation has been pointed out by a number of authors,[1–4] and Kramer has argued that effects of maternal employment should be a research priority in both developing and developed countries.[3] Few studies have examined the role of work and working conditions on birth outcome in the nonagricultural labor force in developing countries[4,5] despite the recent movement of women into the industrial work force. In Mexico, women, as a percentage of the economically active population, have increased from 13.6% in 1950[6] to 31.4% in 1990.[7] This female work force is composed primarily of young women aged 25 to 39; thus, increasing numbers of women are likely to be working while pregnant.

Evidence from developed countries consistently suggests that long work hours, heavy lifting and other physically arduous work, and prolonged standing are associated with increased risk of low birthweight and preterm delivery, although the level at which work hours and standing increase risk varies.[1,8–14] Specific maternity benefits such as changing job tasks, reducing work hours, and increased sick leave also have been shown to have a beneficial effect on gestational age.[11] In contrast, studies that examine the impact of occupational stress on birth outcome have yielded inconsistent results. In France[1] and the United States,[14] a strong association has been reported between high occupational fatigue and prematurity. However, studies of occupational strain tend not to support an association between job stress and birth outcome. Among young US women, high-strain jobs increased the risk of preterm delivery and low birthweight only among those who did not wish to continue working, although the effect in this subgroup was quite pronounced (odds ratio [OR] = 8.1).[15] In Denmark, commercial and clerical workers with high job strain had an increased risk of giving birth to full-term low-birthweight babies, but not to premature or small-for-gestational-age babies.[16]

In this paper, we examine the effect of physical working conditions, occupational stress, and antenatal leave benefits on the risk of prematurity and small-for-gestational-age birth among a population sample of working mothers in Mexico City. A major aim of the study was to evaluate whether occupational factors found to be important indicators of risk in developed countries presented similar risks in this urban, developing-country population.

Materials and Methods

The study population consisted of all pregnant women who gave birth at one of three major hospitals in Mexico City during a 3-month period in 1992 and who had worked at least 3 months during pregnancy. In Mexico City, where 97% of births occur in a hospital, 89% of births occur in the hospitals of the Instituto Mexicano del Seguro Social (IMSS), the Instituto de Seguridad Social al Servicio

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de los Trabajadores del Estado (ISSSTE), and the Secretaria de Salud (SSA).[17] IMSS, ISSSTE, and SSA are three separate health systems that provide medical care to private sector employees, government employees, and the unemployed and uninsured, respectively. We selected one major hospital with more than 3000 deliveries annually from each of these three institutions. The IMSS and ISSSTE hospitals are referral hospitals, but also function as primary care facilities. All study procedures were approved by the Commission of Investigation of the National Institute of Public Health of Mexico.

During the study period, 9549 deliveries occurred in the three hospitals, representing approximately 15% of all hospital deliveries in Mexico City.[17] Each morning all women who had given birth in the previous 24 hours were screened to ascertain whether they had worked during pregnancy. A total of 2767 mothers had been employed at least 3 months during pregnancy; 2663 (96.2%) of these women were interviewed in the hospital before being discharged and after giving informed consent. The remaining 104 women (3.8%), all of whom gave birth at IMSS, either refused to participate or were discharged before they could be reached for an interview. Interviewers were not aware of the birth outcome. Medical records were subsequently abstracted to obtain information on birthweight, gestational age, multiple gestations, birth defects, and medical conditions during pregnancy. Mothers who had multiple gestations (n = 33) or who gave birth to infants with major congenital birth defects (n = 7) were excluded from the study; this left a total of 2623 eligible women.

Birth Outcomes

Small for gestational age was defined as being at or below the 10th percentile of weight for a given gestational age based on weight-for-gestational-age distributions in Mexican infants.[18] Gestational age was calculated according to the date of the last menstrual period. Preterm births were defined as births occurring before 37 complete weeks of gestation. A total of 261 (10.0%) small-for-gestational-age births and 288 (11.0%) preterm births occurred in the study population. Fifty-two births were both premature and small for gestational age.

Occupational Exposures

Information about each woman's work experience during pregnancy was elicited retrospectively by means of a structured 15- to 20-minute interview that included questions about her principal occupation (her answer was coded according to the Mexican Classification of Occupations[19]), the number of jobs held, the length of her workweek, the hours spent standing, her use of industrial machines and chemicals, and her physical exertion and the workplace temperature during pregnancy. Additional questions inquired about changes in job tasks or work area, reduction in work hours, and her right to and use of prenatal leave benefits. Mexican labor law[20] entitles women to 6 weeks' antenatal and 6 weeks' postpartum leave. However, for some occupations such as domestic work and for temporary workers, the right to maternity benefits depends upon the employer's goodwill.

Occupational stress was measured with Karasek's occupational strain scale,[21] which defines high-strain jobs as jobs with a high level of demand but little control over the work process. Women who scored above the median for demands and below the median for control were considered to have high-strain jobs. In addition, an index of occupational fatigue similar to that proposed by Mamelle et al. was constructed; it included five dimensions: posture, work on industrial machines, physical exertion, mental stress, and environmental stressors.[1,22]

Confounders

The interview also obtained information on potential confounders, including sociodemographic characteristics, reproductive history, smoking history, self-reported height and pregestational weight, prenatal care utilization, and social support. The hospital of birth and years of education were used as measures of socioeconomic status. The use of SSA hospitals is an indicator of low socioeconomic status, as is Medicaid in the United States. Two measures of social support were whether the woman had a confidant and whether she had someone whom she could ask for financial help in an emergency. The level of self-esteem was measured using the 10-item self-esteem scale included in the National Institute for Occupational Safety and Health General Job Stress Questionnaire. Women who scored below the median were defined as having low self-esteem. On the basis of information in the medical record, a variable was also constructed to indicate whether a woman had had any of the following conditions during pregnancy: pre-eclampsia, diabetes or gestational diabetes, chronic kidney disease, or hypertension.

Analysis

Two sets of analyses were conducted, one to examine risk factors for small-for-gestational-age births and one to examine risk factors for prematurity. Information on gestational age was missing for 194 (7.4%) births and on birthweight for 12 (0.5%) births. Thus the small-for-gestational-age analysis is based on 2417 births and the prematurity analysis is based on 2429 births. Frequency distributions were calculated for each covariate, and the association between each pair of independent variables was examined using chi-squares, *t* tests, and correlations as appropriate. Since the complete population was included in the study sample, we can directly estimate risk. Therefore, in the unadjusted analyses, relative risks and 95% confidence intervals were calculated for each occupational variable and for potential confounders, as the relative risk estimates are more conservative than the odds ratio approximation of the relative risks. Multiple logistic regression was then used to estimate the effect of working conditions, occupational stress, and antenatal leave benefits on the risk of prematurity and of small-for-gestational-age births adjusted for potential confounders.

All possible interactions were evaluated individually, and significant interactions were included in final regression models. Although smoking is an important risk factor for low birthweight, only 5% of the women reported smoking during pregnancy. As smoking was not associated with either outcome in these data (results not shown), it is not considered further here. Similarly, the occupational fatigue scale of Mamelle et al[1] was not associated with either outcome (results not shown); thus, only the two components that have been independently related to birth outcome, standing and physical exertion, are presented here. The study had a power of 80% ($\alpha = 0.05$) to detect a relative risk of 1.5 across the observed range of exposure prevalences.

Results

Of the 2623 eligible births, 70.7% occurred at the IMSS hospital, 9.8% at the ISSSTE hospital, and 19.6% at the SSA hospital. Table 1 presents data on the sociodemographic characteristics, reproductive history, and medical risk factors of the study population. Most women

TABLE 1—Distribution of Sociodemographic, Reproductive, and Medical Risk Factors for 2623 Working Mothers in Mexico City, 1992

	No.	%
Hospital		
SSA	513	19.6
IMSS	1854	70.7
ISSSTE	256	9.8
Age		
<20	290	11.1
20–34	2109	80.4
>34	224	8.5
Education, y		
<4	187	7.1
4–12	2034	77.5
>12	390	14.9
Data missing	12	0.5
Marital status		
Married	2144	81.7
Single	473	18.0
Data missing	6	0.2
Parity		
1	1154	44.0
2–3	1133	43.2
>3	334	12.7
Data missing	2	0.1
History of low birthweight		
No	2480	94.5
Yes	143	5.5
History of miscarriages/ stillbirth		
No	2126	81.1
Yes	491	18.7
Data missing	6	0.2
Maternal height		
≥151 cm	1642	62.6
<151 cm	687	26.2
Data missing	294	11.2
Pregestational weight		
≥55 kg	1114	42.5
<55 kg	1171	44.6
Data missing	338	12.9
Medical condition during pregnancy		
No	2021	77.0
Yes	602	23.0
Prenatal care		
Yes	2522	96.1
No	97	3.7
Data missing	4	0.2

TABLE 2—Relative Risk of Small-for-Gestational-Age Births among 2417 Births to Working Mothers in Mexico City, by Working Conditions, Occupational Stressors, and Antenatal Leave, 1992

		Small for Gestational Age		Relative Risk (95% Confidence Interval)
	n	No.	%	
Occupation				
Professional	389	27	6.9	. . .
Industry	362	33	9.1	1.31 (0.81, 2.14)
Clerical	851	87	10.2	1.47 (0.97, 2.23)
Commerce	314	42	13.4	1.93 (1.22, 3.05)
Services	501	72	14.4	2.07 (1.36, 3.16)
Conflicts at work				
No	2159	224	10.4	
Yes	232	37	15.9	1.54 (1.12, 2.12)
High job strain				
No	1784	185	10.4	
Yes	525	67	12.8	1.23 (0.95, 1.60)
Weekly working hours				
3–25	233	15	6.4	0.63 (0.38, 1.06)
26–40	1127	115	10.2	. . .
41–50	687	70	10.2	1.00 (0.75, 1.32)
>50	369	61	16.5	1.62 (1.22, 2.16)
Hours standing				
≤7	1927	191	9.9	
>7	461	68	14.8	1.49 (1.15, 1.93)
Job requires physical effort				
No	1891	198	10.5	
Yes	498	62	12.4	1.19 (0.91, 1.55)
Job status				
Permanent	1454	155	10.7	
Other	959	106	11.1	1.04 (0.82, 1.31)
Decrease in work hours				
No	2160	228	10.6	. . .
Yes, 30–60 min.	138	15	10.9	1.03 (0.63, 1.69)
Yes, >60 min.	108	15	13.9	1.32 (0.81, 2.14)
Changed work station				
No	1648	176	10.7	
Yes	764	85	11.1	1.04 (0.82, 1.33)
Took sick leave				
No	1403	144	10.3	
Yes	1006	117	11.6	1.13 (0.90, 1.43)
Antenatal leave benefits				
Yes	1599	149	9.3	
No	812	111	13.7	1.47 (1.16, 1.85)
Weeks of antenatal leave taken				
<3	451	48	10.6	1.26 (0.88, 1.81)
4–6	748	63	8.4	. . .
>6	263	25	9.5	1.13 (0.73, 1.75)

(70%) had at least some secondary school, and the median age of the mothers was 25. As would be expected in a working population, many women were primaparas (44%) and only 3.7% had had no prenatal care. Only a small proportion of the women were without social support.

The occupations of the women in the sample varied widely with 35% engaged in office work, 22% in service occupations, 16% professionals, 15% employed in industry, and 13% in retail. Participants tended to work long hours, with 16% working more than 50 hours per week. The median number of hours spent standing was 4 whereas 20% stood 8 or more hours each workday. One fifth of the population held jobs that required physical effort whereas only 10% reported conflicts at work. Changes in work activity during pregnancy were common, with 31% reporting a change in their workstation, 10% a reduction in work hours, and 42% use of sick leave. However, only 64% of the study population had antenatal leave benefits.

Small for Gestational Age

Table 2 presents unadjusted relative risks for small-for-gestational-age births

TABLE 3—Adjusted Odds Ratios for the Association between Small-for-Gestational-Age Birth and Working Conditions, Occupational Stress, and Antenatal Leave, Mexico City, 1992

	n	Odds Ratio[a]	95% Confidence Interval
Conflicts at work, by hospital	2382		
No, ISSSTE, IMSS		...	
Yes, ISSTE, IMSS		1.22	0.74, 2.01
No, SSA		1.64	0.79, 3.43
Yes, SSA		4.93	2.09, 11.66
Weekly work hours	2406		
<26		0.68	0.39, 1.18
26–50		...	
>50		1.59	1.14, 2.22
Stands >7 hours a day	2379	1.40	1.03, 1.91
No antenatal leave benefits	2402	1.55	1.12, 2.14

[a]Adjusted for age, education, parity, history of low-birthweight births, medical conditions during pregnancy, and hospital.

by working conditions, occupational stress, and antenatal leave variables. Compared with professional women, women employed in commerce and the service sector had double the risk of a small-for-gestational-age birth. As expected, both long workweeks (relative risk [RR] = 1.62 for working more than 50 hours as compared with 26 to 40 hours) and long periods of standing (RR = 1.49 for standing more than 7 hours) also increased the risk of a small-for-gestational-age birth. Except for work conflicts, which were associated with a 50% increase in risk, none of the measures of occupational stress—including occupational strain, jobs that required physical effort, or job stability—influenced the risk of a small-for-gestational-age birth. Changes in work activity and sick leave had no appreciable impact. However, mothers who had no antenatal leave benefits had a 50% higher risk of having a small-for-gestational-age birth.

Previously identified sociodemographic, reproductive history, and medical risk factors had the expected relationship with small-for-gestational-age births. Mothers delivering at the public assistance hospital and at IMSS were more than twice as likely to have a small-for-gestational-age birth as those delivering at ISSSTE (RR = 2.83; 95% CI = 1.51, 5.32 and RR = 2.52; 95% CI = 1.39, 4.55 respectively). Women with less than 4 years of education had more than double the risk (RR = 2.73; 95% CI = 1.60, 4.69) while women with 4 to 12 years of education also had an elevated risk (RR = 1.88; 95% CI = 1.24, 2.84) compared with women who had completed high school. Single mothers, primiparas, multiparas, women of short stature or low prepregnancy weight, women who had had medical problems during pregnancy or a previous low-birthweight infant, and older mothers had slightly elevated risks while those who lacked prenatal care did not. Having no financial help in an emergency (RR = 1.53; 95% CI = 1.16, 2.01) and low self-esteem (RR = 1.45; 95% CI = 1.15, 1.82) increased a woman's risk of a small-for-gestational-age birth about 50%.

Table 3 presents adjusted odds ratios for working conditions, occupational stress, and antenatal leave. Working more than 50 hours a week, standing more than 7 hours a day, and having no antenatal leave each remained a significant predictor of the risk of having a small-for-gestational-age infant even after adjustment for sociodemographic and medical risk factors. Conflicts at work remained a predictor of risk only among women who delivered at the SSA hospital; however, the risk in these women was increased almost fivefold. The risk associated with no financial help in an emergency was confined to primiparous women (OR = 3.59; 95% CI = 2.24, 5.76).

Preterm Delivery

Table 4 presents unadjusted relative risks for prematurity by working conditions, occupational stress, and antenatal leave variables. Occupation, working conditions, and job stress were not associated with risk of prematurity. However, the availability of antenatal leave had a striking impact: women who did not have antenatal leave benefits were almost three times more likely to deliver prematurely. Having used less than a month of antenatal leave was also strongly associated with prematurity (OR = 6.3); however, mothers delivering prematurely have less opportunity to use antenatal leave.

Births to mothers delivering at IMSS were somewhat less likely to be premature than births to mothers at other hospitals (RR = 0.71; 95% CI = 0.51, 0.98). Older maternal age (RR = 1.95; 95% CI = 1.45, 2.61), high parity (RR = 1.48; 95% CI = 1.09, 2.00), and having had no prenatal care (RR = 2.49; 95% CI = 1.67, 3.70) were associated with an increased risk as was no financial help in an emergency (RR = 1.54; 95% CI = 1.20, 1.99).

Table 5 presents the final adjusted model for factors associated with risk of preterm birth. Having no antenatal leave benefits remained the strongest predictor of prematurity risk. After an adjustment for potential confounders, women with no antenatal leave had a threefold increase in risk. Change in workstation and use of sick leave were moderately associated with prematurity risk. As was true for small-for-gestational-age births, the interaction between parity and social support suggests that the risk associated with lack of emergency financial help is limited to primiparous women (OR = 1.58; 95% CI = 1.01, 2.48).

Discussion

This study examined the association between working conditions, occupational stress, and antenatal leave benefits and the risk of having a small-for-gestational-age or premature birth among Mexican women living in Mexico City. The results are generally consistent with those from studies from developed countries but differ in some important details. A long workweek and standing increased the risk for small-for-gestational-age births but did not influence the risk of prematurity. This increase in risk of small-for-gestational-age births was observed only in women working more than 50 hours per week or standing more than 7 hours per day. Scales used to assess occupational stress in industrialized countries, including the fatigue scale of Mamelle et al. and Karasek's strain scale, were not useful indicators of perinatal risk in this population. Conflicts at work were associated with small-for-gestational-age births but only among poor women delivering at the public assistance hospital. The finding

most relevant for public health intervention was the threefold increase in risk for prematurity and 50% increase in risk of a small-for-gestational-age birth among women who lacked prenatal leave benefits.

The frequency of small-for-gestational-age births and of prematurity in this population was 10.0% and 11.0%, respectively. A 1984 study of perinatal outcome in 25 hospitals in Mexico City reported frequencies of 9.6% for low birthweight and of 10.0% for prematurity.[23] The proportion of working mothers in our sample was 29.0% as compared with 26.8% of all births in 1991,[17] and their occupational profile resembled that of the economically active female population in Mexico City.[24]

This frequency of poor birth outcome is significantly higher than that reported in studies from developed countries.[25,26] The occupational profile also differs substantially. Our relatively small proportion of industrial workers and high proportion of service and retail workers, including a substantial number of domestic workers, may account for some of the differences between our findings and those of previous studies.[3,8–13] The scale of occupational fatigue of Mamelle et al. which had no impact on risk of prematurity or small-for-gestational-age births in our population, is based on stressors common to heavy industry[1,22] and may require adaptation for use in a developing country when a large proportion of women work in clerical, service, and retail occupations.

Our findings also contrast with those of Denman,[5] who found that women working in the maquiladora industry (i.e., assembly plants along the US-Mexico border) were at increased risk of having a low-birthweight baby compared with women in the service and retail sectors. We found the frequency of small-for-gestational-age births to be highest among service and retail workers. However, the frequency of low birthweight is much lower in northern Mexico than in Mexico City,[5] and the proportion of women working in industry is higher.[27]

In France[1] and the United States,[14,27] an increased risk for prematurity was found among working women who spent more than 3 hours standing, whereas we found no association between standing and prematurity. Others[28] reported no association between standing and low birthweight whereas here standing more than 7 hours a day or working more than 50 hours a week was moderately associated with having a small-for-gestational age birth. These results support the hypothesis of Barnes et al.[2] that standing posture and physical activity in addition to low nutrient intake may affect intrauterine growth.

The negative findings regarding the role of high occupational strain are consistent with those of Brandt and Nielsen,[16] who found no association between high strain and birth outcome. Homer et al.[15] reported an association between high strain and preterm, low-birthweight babies but only among a specific subset of women. We observed no interactions between occupational strain and other covariates. However our finding that work conflicts increased risk only in the poorest subgroup is consistent with the findings of Homer et al. that high strain increased risk only in women who did not wish to continue working but presumably could not afford to quit.[15] Karasek's scale[21,28] was originally developed to measure the

TABLE 4—Relative Risk of Prematurity among 2429 Births to Working Mothers in Mexico City, by Working Conditions, Occupational Stressors, and Antenatal Leave, 1992

	n	Preterm Birth No.	Preterm Birth %	Relative Risk (95% Confidence Interval)
Occupation				
Professional	392	53	13.5	. . .
Industry	362	35	9.7	0.72 (0.48, 1.07)
Clerk	854	95	11.1	0.82 (0.60, 1.13)
Commerce	314	43	13.7	1.01 (0.70, 1.47)
Services	507	62	12.2	0.90 (0.64, 1.27)
Conflicts at work				
No	2169	256	11.8	
Yes	234	30	12.8	1.09 (0.76, 1.55)
High job strain				
No	1792	204	11.4	
Yes	528	70	13.3	1.16 (0.90, 1.50)
Weekly working hours				
3–25	235	22	9.4	0.78 (0.51, 1.19)
26–40	1131	136	12.0	. . .
41–50	691	76	11.0	0.91 (0.70, 1.19)
>50	371	54	14.6	1.21 (0.90, 1.62)
Hours standing				
≤7	1937	223	11.5	
>7	463	62	13.4	1.16 (0.89, 1.51)
Job requires physical effort				
No	1897	214	11.3	
Yes	504	71	14.1	1.25 (0.97, 1.60)
Job status				
Permanent	1460	166	11.4	
Other	965	122	12.6	1.11 (0.89, 1.38)
Decrease in work hours				
No	2169	260	12.0	. . .
Yes, 30–60 min	139	10	7.2	0.60 (0.33, 1.10)
Yes, >60 min	109	16	14.7	1.22 (0.77, 1.95)
Changed work station				
No	1656	185	11.2	
Yes	768	103	13.4	1.20 (0.96, 1.50)
Took sick leave				
No	1406	125	8.9	
Yes	1015	162	16.0	1.80 (1.44, 2.23)
Antenatal leave benefits				
Yes	1604	116	7.2	
No	819	171	20.9	2.89 (2.32, 3.60)
Weeks of antenatal leave taken				
<3	455	76	16.7	6.26 (3.88, 10.09)
4–6	749	20	2.7	. . .
>6	263	9	3.4	1.28 (0.59, 2.78)

TABLE 5—Final Logistic Regression Model (n = 2356 Births): Adjusted Odds Ratios for Risk of Preterm Birth, Mexico City, 1992

	Odds Ratio	95% Confidence Interval
Age > 34 years	2.23	1.51, 3.29
Had help in an emergency, by parity		
Yes, multiparous	. . .	. . .
Yes, primiparous	0.81	0.60, 1.09
No, multiparous	0.83	0.54, 1.29
No, primiparous	1.58	1.01, 2.48
Medical condition during pregnancy	1.07	0.79, 1.44
No prenatal care	1.84	1.03, 3.27
Changed work station	1.40	1.07, 1.83
Had episodes of sick leave	1.55	1.20, 2.02
Had antenatal leave benefits	3.04	2.31, 3.99

effect of occupational strain on cardiovascular outcome among male workers in an industrialized society. The difficulties in applying this construct to women has been discussed previously.[28] In our study, both the demand and the control components of the scale demonstrated little variance. Thus, the instrument may not be a valid measure of strain in this population. However, given previous negative findings,[15,16] our data also support the conclusion that occupational strain does not have a global impact on birth outcome. A recent randomized clinical trial[29] found no global impact of a social support intervention on birth outcome.

The strong association between the lack of antenatal maternity leave benefits and the risk of both prematurity and small-for-gestational-age births that persisted even after adjustment for other sociodemographic and medical risk factors is striking. In Spain, Alegre et al.[30] found that infants of women who had taken 6 weeks of prepartum maternity leave had a higher mean birthweight than infants of women who took no prepartum leave. Briend[31] reported that longer prenatal leave reduced the proportion of neonatal deaths. In this study the right to prenatal leave may be a marker of access to other leave benefits such as vacation, additional paid leave, or the right to take unpaid leave. In any case, these findings confirm the importance of adequate antenatal leave in reducing the risk of poor birth outcomes.[12,14,30,31]

Mamelle et al. also reported that when pregnant workers were offered additional sick leave, they had more than a twofold reduction in the risk of prematurity[11] whereas in our study workers who took sick leave or changed their workstations had an increased risk of prematurity. Thus, although changes in work practices and the taking of sick leave identify a subgroup of women with problem pregnancies, these practices are not currently functioning as prevention strategies for these women.

Several potential limitations of this study must also be considered. Since work exposures were obtained retrospectively, recall bias may have occurred. Only women who had worked at least 3 months during pregnancy were included; thus women who stopped work in the first trimester because of health problems and healthy women with sufficient resources to stop working early in pregnancy were excluded. Also, since this was a population-based analysis, premature births were included in the nondiseased population for the analysis of small-for-gestational-age births and vice versa. To the extent that small-for-gestational-age births and prematurity have a common etiology, inclusion of unhealthy birth outcomes in the comparison population would tend to underestimate the true effect of exposure.

Finally, the possibility of Type I error must be considered as 13 principal work-exposure variables are evaluated for each outcome. Adjusting the α to 0.01, which would only partially account for multiple comparisons, would have required 1000 additional births in the sample. Demographic and reproductive history variables have the expected effects on perinatal outcome, which provides evidence of data quality; however, conclusions regarding causality ultimately will depend on the consistency of findings across studies.

In conclusion, this study is one of the first studies of specific occupational risks for small-for-gestational-age and premature births among women engaged in nonagricultural work in a developing country. As the proportion of women who are economically active grows and as the sectorial distribution of the female work force changes, additional investigation into occupational risk factors for adverse pregnancy outcome will be needed in developing countries. These data suggest that length of the workday and posture may be more critical than occupational stressors. The striking association between lack of antenatal leave benefits and poor pregnancy outcome suggests that the enforcement of existing labor law in Mexico and the implementation of comparable paid antenatal leave benefits for uninsured women could help reduce the incidence of small-for-gestational-age births and prematurity both in Mexico and in countries, such as the United States, where antenatal leave is not commonly available. □

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