

Bed rest/ Working Conditions and IUGR

Yeşim Bülbül Baytur, MD
Celal Bayar University School of Medicine
Department of Obstetrics and Gynecology

What is the cause of IUGR?

- Congenital infections
- Fetal uneuploidy
- Preeclampsia
- Maternal disorders
- Teratogens
- Placental insufficiency

Non-Pharmacological Treatment Options for IUGR

- Changes in working conditions
- Cessation of smoking
- Reducing daily stress
- Encourage bed rest

Is it really useful?

Women Workforce

- Women who have worked before pregnancy continue their employment during gestation.
- Women's working conditions and maternity rights is determined by law.
- Working conditions and maternity rights may change according to the country, culture and region.

Employment Rate

- 60 % in United States
- 32 % in Spain
- 76 % in Sweden
- 25 % in Turkey

Working Hours

- 40 hour per week in Europe.
- 9% of women work 48 hours or more per week in Europe

Maternity Rights

- Most industrialized countries support working women by providing job-protected paid maternity leave
- In Turkey women have a right to leave job eight weeks before birth.
- United States does not offer paid maternity leave.

The impact of the work and workplace hazards on pregnancy

In collaborations with their employers, working women may be able to make modifications in the workplace to restrict the number of hours of standing in one position without active movement, decrease the amount of weight lifted, and increase the frequency of short breaks.

Exposure of the hazardous material

- Chemicals
- Biologic and infectious agents
- Toxins
- Ionizing radiation

The effect of working conditions on IUGR

- A meta-analysis
- 29 observational studies were included.
- 125.535 patients
- Exposures: physically demanding work, prolonged standing, long work hours, shift work

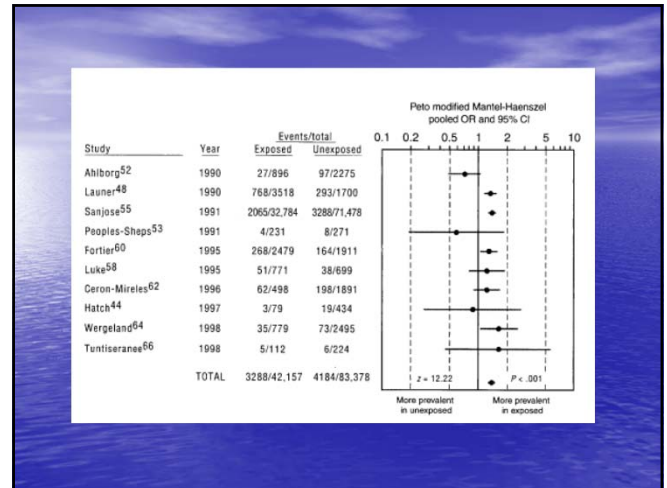
Mozurkewich et al. Working Conditions and Adverse Pregnancy Outcome. *Obstet Gynecol* 2000; 95: 623-36.

- Physically demanding work has been found significantly associated with SGA (OR.1.37, 95% CI: 1.30-1.44)

Table 3. The Association Between Physically Demanding Work and Adverse Outcome of Pregnancy

Outcomes and study design	No. studies	Total subjects analyzed (n)	Adverse outcome/exposed (n)	Adverse outcome/unexposed (n)	Pooled odds (95% CI)	Test of homogeneity of pooled effects, χ^2 (degrees of freedom) P*
Preterm birth						
Case control	4	8733	760/7170	298/1563	1.27 (1.04, 1.54)	6.68 (3) P < .10
Cross-sectional	7	13,308	311/4444	577/8864	1.23 (1.05, 1.44)	7.34 (6) NS
Prospective cohort	10	124,416	2135/38744	4500/85,672	1.22 (1.15, 1.29)	8.73 (9) NS
All designs	21	146,457	3206/50,358	5375/96,099	1.22 (1.16, 1.29)	22.91 (20) NS
SGA						
Case control	1	1470	51/771	38/699	1.23 (0.80, 1.89)	2.92 (3) NS
Cross-sectional	4	10,555	369/3987	443/6568	1.29 (1.10, 1.51)	NS
Prospective cohort	5	113,510	2868/37,399	3703/76,111	1.39 (1.31, 1.46)	12.03 (4) P < .025
All designs	10	125,535	3288/42,157	4184/83,378	1.37 (1.30, 1.44)	15.92 (9) P < .10
Hypertension or preeclampsia						
Case control	2	1950	129/838	207/1112	1.32 (1.01, 1.74)	1.73 (1) NS
Cross-sectional	2	3887	88/898	175/2989	2.01 (1.49, 2.73)	1.41 (1) NS
All designs	4	5837	217/1736	382/4101	1.60 (1.30, 1.96)	7.24 (3) P < .10

CI = confidence interval; NS = not significant; SGA = small for gestational age.
* P < .10 indicates significant between-study heterogeneity.



What is the pathophysiology ?

- Sympathetic nervous system mediated ergonomic stressors
- The release of prostoglandins into the maternal circulation
- Increase in catecholamines due to stress
- Decrease placental perfusion due to catecholamines

The relationship between occupational conditions and SGA

- Having a SGA baby was significantly associated with both an irregular or shift work schedule alone, night work, standing posture, lifting loads and noise, moderate-active or high job strain with low social support.

Can we improve conditions?

- The elimination of these occupational conditions by preventive measures (change in working conditions or preventive withdrawal) taken early before 24 weeks of gestation, brought worker's risk close to those women who were not exposed to these conditions at the beginning of pregnancy.

Croteau A et al. Work Activity in Pregnancy, Preventive Measures, and The Risk of Delivering Small-for-Gestational-Age Infant. Am J Public Health 2006;96(5): 1-5.

Bad working conditions in the first trimester

Suboptimal environment in the first trimester or poor social factors in early pregnancy could limit fetal growth in later pregnancy.

A workweek of 32 hours or more and high job strain are significantly associated with low birth weight.

Reducing job strain and working hours in the initial stages of pregnancy may be beneficial among women with stressful jobs.

Vrijotte TGM et al. First-trimester working conditions and birthweight: a prospective cohort study. Am J Public Health 2009; 99: 1409-1416

TABLE 4—Effects of Weekly Working Hours in Combination With Job Strain and Physical Workload on Birthweight and Small-for-Gestational-Age (SGA) Births: Amsterdam Born Children and their Development Study, Amsterdam, Netherlands, 2003–2004

	No.	Birthweight			SGA Births		
		Unadjusted, β (SE)	Model 1 ^a , β (SE)	Model 2 ^b , β (SE)	Unadjusted, OR (95% CI)	Model 1 ^c , OR (95% CI)	Model 2 ^d , OR (95% CI)
Job strain level							
		0–31 h/wk					
Low (Ref)	730	0	0	0	1.0	1.0	1.0
Moderate	635	-29 (36)	-31 (22)	-33 (22)	1.3 (0.8, 1.9)	1.3 (0.8, 1.9)	1.3 (0.8, 1.9)
High	359	-18 (49)	-15 (42)	-18 (42)	1.1 (0.6, 2.2)	1.0 (0.5, 1.9)	1.0 (0.5, 2.0)
		>32 h/wk					
Low	1417	-75*** (22)	-77* (20)	-82* (20)	1.0 (0.7, 1.3)	1.0 (0.6, 1.4)	1.1 (0.6, 1.4)
Moderate	1379	-36*** (25)	-40** (20)	-42* (20)	1.2 (0.8, 1.6)	1.2 (0.8, 1.7)	1.2 (0.8, 1.7)
High	327	-139*** (28)	-139*** (24)	-150*** (25)	2.3 (1.5, 3.6)	2.1 (1.3, 3.2)	2.0 (1.2, 3.2)
Physical workload							
		0–31 h/wk					
Low (Ref)	832	0	0	0	1.0	1.0	1.0
Moderate	609	-44* (37)	-25 (30)	-25 (30)	1.3 (0.8, 1.8)	1.2 (0.8, 1.7)	1.1 (0.6, 1.6)
High	305	-20 (38)	-30 (30)	-30 (34)	1.0 (0.6, 1.7)	0.9 (0.5, 1.5)	0.8 (0.4, 1.4)
		>32 h/wk					
Low	1793	-84*** (22)	-74 (18)	-79 (20)	0.9 (0.7, 1.2)	0.9 (0.7, 1.2)	0.9 (0.7, 1.2)
Moderate	945	-135*** (24)	-64** (22)	-51* (22)	1.4 (1.0, 1.9)	1.3 (0.8, 1.9)	1.2 (0.8, 1.7)
High	206	-232*** (26)	-127*** (21)	-119*** (21)	2.1 (1.4, 3.2)	1.8 (1.1, 2.7)	1.5 (1.0, 2.3)

Note. OR = odds ratio; CI = confidence interval. Results are for employed women only. Sample sizes differ slightly as a result of missing values. The unstandardized parameter estimate (β) represents the change in birthweight relative to the reference group. ORs in which the lower value is greater than 1 are significant. The residuals of the final linear regression models were normally distributed, and variances were homogeneous. Causation of fetal growth showed no evidence of lack of fit ($P = .17$, for all logistic models). SGA analyses did not include parity, pregnancy duration, or infant gender given that, by definition, small size for gestational age encompasses the information. ^aAdjusted for parity, infant gender, pregnancy duration (linear and quadratic), and maternal age, height, and preexisting hypertension and diabetes. ^bAdjusted for maternal age, height, and preexisting hypertension and diabetes. ^cAdjusted for the same variables as in the SGA model 1 as well as for marital status, educational level, ethnicity, smoking, alcohol use, prepregnancy body mass index (linear and quadratic), and parenting stress. ^d $P < .05$, ** $P < .01$, *** $P < .001$.

Occupational Factors and Fetal Growth According to Trimesters

- Small head circumference was more common in babies born to women who worked for more than 40 hours per week.
- There is an increased risk of small head circumference in relation to standing and walking for more than 4 hours per day during the first two trimester.

Bonzini M et al. Occupational physical activities, working hours and outcome of pregnancy: findings from the Southampton Women's Survey. Occup Environ Med 2009; 66(10): 685-90.

Healthy Worker Effect

- More educated
- Desired pregnancy
- Married
- Non smoker
- Higher income
- Beginning prenatal care earlier

Non-healthy worker effect

- Initiated care late in pregnancy
- Attended fewer visits
- More C-section
- More LBW infants.

EI-Gilany AH et al. Maternal employment and maternity care in Al-Hassa, Saudi Arabia. Eur J Contracept Reprod Health Care 2008; 13(3): 304-12.

Does Adverse Outcome really depends on working conditions?

The influence of work related psychosocial strain on the risk of SGA seems to be small in countries with highly developed social support systems.

Henriksen TB et al. The relation between psychosocial job strain and preterm delivery and low birth weight for gestational age. Int J Epidemiol 1994; 23(4): 764-74.

Bed rest

Although prescribing restricted activity to women having a fetus with IUGR remains a common practice among obstetrical care providers, it has not been proven the benefit of bed rest in IUGR .

Among the disadvantages of bed rest are increased risks of thrombosis, bone demineralization, stress and weight loss .

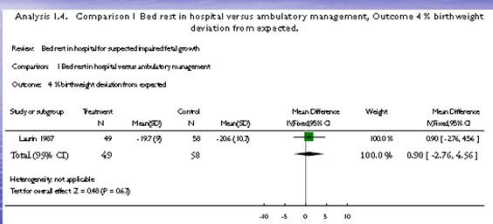
Compliance to the bed rest

On the other hand, patient's compliance to the treatment is not good enough in outpatient management, whereas bed rest in the hospital is very costly. It was shown that one third of pregnant women did not comply with the recommended bed rest

Meta-Analysis

- Say and colleagues assessed the effects of bed rest in hospital for women with suspected impaired fetal growth.
- Only one study involving 107 women at risk for IUGR who were randomized to either ambulation or bed rest was included in the review .

Say et al. Bed rest in hospital for suspected impaired fetal growth (systematic review). Cochrane Pregnancy and Childbirth Group. Cochrane Database Syst Rev.2009,CD000034.



Bed rest may be useful

- They conducted a retrospective cohort study including 36.140 pregnancies. 677 women were hospitalized prescribed bed rest for indications other than hypertension and IUGR such as preterm labor (71%), preterm premature rupture of membranes (18%), an incompetent cervix (8%).
- Among all women, bed rest was associated a significant reduced risk of developing preeclampsia (0.27, 0.16- 0.48) and IUGR (0.38, 0.18- 0.84).

Abenhaim HA et al. Evaluating the role of bedrest on the prevention of hypertensive diseases of pregnancy and growth restriction. Hypertension Pregnancy 2008;27: 197-205.

Conclusions

- Working during pregnancy is not harmful to the fetus in terms of IUGR.
- However, heavy workload, occupations requires prolonged periods of standing and long working hours and stress may increase the risk of having a fetus with IUGR.
- Physicians should be prudent about hazardous and toxic materials and counseling of the women about risks on the workplace should be made before pregnancy.
- Every women must have a right for paid maternity leave and pregnant workers whose working conditions present a danger to the women or the fetus must have a legal right to change the conditions of her job or paid leave with a guarantee having her job back after her pregnancy.
- Although prescribing restricted activity to women having a fetus with IUGR remains a common practice among obstetrical care providers, it has not been proven the benefit of bed rest in IUGR. Moreover, it may be harmful.
- It was needed more randomized controlled trial to reach a certain conclusion about the relationship between working conditions/bed rest and IUGR.

Thank You