

Research report

# Impact of maternal psychological distress on fetal weight, prematurity and intrauterine growth retardation

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## Abstract

**Background:** There are conflicting results regarding the association of maternal antenatal distress with preterm birth and low birth weight. This study investigated the association between maternal distress and intrauterine growth abnormality, low birth weight and preterm birth.

**Methods:** Three mutually exclusive and homogeneous groups of pregnant women (with actual psychiatric disorder, with maternal psychological distress, and healthy comparisons) underwent fetal ultrasound examinations, uterine and umbilical artery Doppler velocimetry. Infant weight was measured and information collected on obstetrical features and sociodemographic factors.

**Results:** No differences emerged among the three groups of pregnant women in any ultrasound variables. Antenatal maternal psychiatric disorders and antenatal distress were not associated with an increased risk of preterm birth. Infants of women with psychiatric disorders had lower birth weight and higher percentage of birth weight below the 10th centile for gestational age (30%) than infants of healthy mothers (5%).

**Limitations:** These findings are preliminary and warrant further investigation in larger-scale study; they are limited by the heterogeneity of psychiatric diagnoses.

**Conclusions:** Maternal psychiatric disorders are associated with a lower birth weight, but the effect is unlikely to be due to abnormal utero-placental or feto-placental vascularisation. Further studies should investigate other possible causes of lower birth weight associated with maternal psychiatric disorders.

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**Keywords:** Pregnancy; Maternal psychological distress; Low birth weight; Preterm birth; Intrauterine growth retardation; Maternal psychiatric disorders

## 1. Introduction

The impact on neonatal outcome of a maternal distress or of a maternal psychiatric disorder has been investigated for many years. Published studies have yielded mixed results (Halbreich, 2005; Field et al., 2006). Preterm birth

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and low birth weight have been associated with maternal antenatal stress or with maternal psychiatric disorders during pregnancy by a number of studies (Copper et al., 1996; Paarlberg et al., 1999; Sable and Wilkinson, 2000; Rahman et al., 2004; Patel and Prince, 2006; Rahman et al., 2007; Rogal et al., 2007); however, other investigations have reported that antenatal psychological distress does not influence fetal growth (Hedegaard et al., 1996; Andersson et al., 2004; Berle et al., 2005; Suri et al., 2007). Three main reasons may explain these contradictory results. First, most of the studies have been retrospective with a possible bias in the direction of the hypothesis: mothers who have small babies might recognize their pregnancies to be more stressful in retrospective chart review. Second, some prospective studies are limited by the use of a non-random design to compare mothers with antenatal psychiatric disorders with controls. Third, only few studies have controlled the association for confounding variables: although obstetrical variables are often considered, there's a lack in considering some risk factors for prematurity and low birth weight that are highly associated with psychiatric disorders (drug treatment, smoking, alcohol and drugs abuse, comorbid eating disorders).

To our knowledge, no study has ever been performed to investigate fetal growth during pregnancy, as assessed in utero by serial ultrasound examinations, comparing mothers with psychiatric disorders and/or exposed to stressful life events with controls.

Therefore, the aim of this prospective study was to investigate the association between maternal mood and anxiety disorders or maternal psychological distress and intrauterine growth abnormality, low birth weight or preterm birth.

## 2. Methods

### 2.1. Population

Subjects were recruited from all consecutive women attending two antenatal clinics (a district antenatal service of Turin and the Department of Maternal-Fetal Medicine Unit of the University of Turin) from February 2002 to July 2005. Informed consent was obtained from all participants, and the study was approved by the Regional Ethical Committee (Regione Piemonte, Italy).

Inclusion criteria for the study recruitment were: maternal age of at least 18 years, pregnancy within the 20th week of gestational age and Italian origin. Exclusion general criteria for the study recruitment were: 1) presence of any maternal medical illness, 2) drug treatment with any agent which may interfere with fetal growth and/or with pregnancy length, 3) fetal chromosomal and/or

structural malformations, 4) severe cigarette smokers ( $\geq 10$  cigarettes/day).

All women recruited for the study were interviewed with a structured interview between the 18 and 20th week for the psychiatric diagnosis (Mini International Neuropsychiatric Interview Plus—MINI-Plus) (Sheehan et al., 1998); all women selected for the investigation underwent a following clinical psychiatric interview to ascertain finally the presence/absence of any psychiatric diagnosis. Moreover they underwent a semistructured interview with a format that covered the following areas:

1. Demographic data;
2. Parity (nulliparous vs multiparous)
3. Smoking (no. of cigarettes/day) and alcohol consumption (fluid oz of absolute alcohol/day);
4. Stressful life events assessment according to the list by Paykel et al. (1971). Women were asked whether they had experienced a stressful life event during pregnancy or within the year prior to pregnancy and the raters had to decide whether the event would fit any of the 61 items on the list by Paykel et al. The weighted score connected with each event, obtained through a calibration study, was considered for this investigation: according to the literature, a subject was considered to have experienced a severe event when any of the top 20 events on the Paykel's list had occurred.

In addition, the 17-item Hamilton Rating Scale for Depression and the Hamilton Rating Scale for Anxiety were included in the assessment of all subjects (Hamilton, 1959, 1960).

Moreover, the maternal body mass index [weight (kg)/height (m)<sup>2</sup>] was assessed at intake.

### 2.2. Interviewers and raters

All psychiatric interviews were conducted in person by two psychologist (P. S. and M. G.), each with at least 5 years of postgraduate clinical experience. The interrater reliability of DSM-IV diagnoses was good ( $k=0.89$ , 95% confidence interval= $0.81-0.97$ ). The interrater reliability between the two raters for the occurrence of events was over 0.80 ( $k$  coefficient). In 10 depressed subjects, scores obtained by the two raters of both Hamilton Rating Scales correlated above 0.90.

### 2.3. Study group identification

To distinguish between the effects of psychopathology (depressive and anxiety disorders) and the effects of psychological distress (stressful life events), we

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