

Strategies to reduce incidence of low birth weight babies in Sheffield (Appendix 1)

Introduction

The maternal health strategy for Sheffield has set a target to reduce the incidence of low birth weight with local targets of no ward having more than 10% of births weighing less than 2.5Kg. According to data from the Office of National Statistics, (ONS,2004), some wards within Sheffield have higher than average rates of low birth weight and areas requiring special attention include Burngreave, Brightside, Southey Green and Park wards. The maternal health strategy suggests that effective interventions that can contribute to higher birth weight include smoking cessation, improved maternal nutrition and action on wider determinants of health.

To be able to understand the complex issue and implications of being born 'smaller' than expected and before embarking on intervention strategies it may be worthwhile discussing the subject further.

Definitions

The ONS produce statistical information regarding low birth weight rates from across the country. Low birth weight (LBW) alone, without information about gestation, ethnicity and maternal height and weight, is relatively meaningless and is an increasingly out dated term in obstetric and neonatal practice. The term LBW refers to an infant born below 2.5Kg regardless of his / her gestation. A more appropriate term is small for gestational age (SGA) which refers to a fetus that has failed to achieve a specific biometric or estimated weight threshold by a specific gestational age. Various thresholds are used, but the commonly used threshold is the tenth centile for abdominal circumference and estimated birth weight.

SGA fetuses are a heterogeneous group comprising fetuses that have failed to achieve their growth potential (Intra Uterine Growth Restriction, IUGR) and fetuses that are constitutionally small and have reached their full growth potential. Fetal compromise is associated with an impairment of the fetoplacental circulation; such impairments can lead to intra uterine growth restriction, the infant being born small for gestational age and of low birth weight. These infants are at greater risk of stillbirth, birth hypoxia, neonatal complications impaired neurological development, diabetes and hypertension in adult life (Brodzki and Marsal, 2000).

Birth Weight Achievement

The determinants of birth weight are multifactorial, reflecting the balance reached between the natural growth potential of the fetus and its environment, the latter being controlled by placental and maternal factors.

Failure to achieve optimal birth weight therefore is influenced by,

- Maternal
 - Maternal infection
 - Chronic maternal disease
 - Low maternal prepregnancy weight
 - Poor maternal nutrition
 - Maternal smoking
 - Maternal caffeine consumption
 - Excessive physical activity
- Fetal
 - Fetal abnormality
 - Intrauterine infection
- Placental
 - Placental maladaptation
 - Reduced placental blood flow
 - Reduced maternal blood flow
- Social
 - Lower social class
 - Single mothers
 - Teenage pregnancy
 - Deficient antenatal care

Fetal growth is a complex, multifactorial phenomenon, influenced by the maternal and uterine environments. While placental pathology may be the primary aetiological factor, multiple social factors are associated with poor fetal growth and thus presumably the quality of placentation. These include being a single mother, teenage pregnancy, low maternal weight, maternal malnutrition, increased caffeine intake, smoking and chronic maternal ill health.

Primary prevention can be aimed at whole populations, or focussed on perceived 'high risk' groups such as those with a past history of IUGR. Evidence from the 'Helping us grow, project (Piper et al, 1996) which targeted women with 'high risk' factors for IUGR with enhanced antenatal care and dietary supplements suggests that there was no significant reduction in the incidence of preterm births or of very low birth weight infants. Other randomised controlled trials have examined different methods of intervention (e.g. dietary supplementation, smoking reduction, pharmaceutical interventions with aspirin) for high risk groups. Unfortunately, these interventions have for the most part, failed to show any significant effects on overall short term perinatal outcome (Gulmezoglu et al, 1997).

Effective Interventions

Dietary supplementation

Maternal pre-pregnancy weight appears to be the fundamental influence on achieving optimal fetal growth; maternal nutritional supplementation during pregnancy may be beneficial in preventing the development of IUGR but only in those women with severely deficient diet.

There is evidence that maternal malnutrition during the first trimester adversely affects placental structure and ultimately birth weight (Luke, 1994) and that severe calorific restriction (below 1500 Kcal per day) can lead to a 9% reduction in birth weight (Stein and Susser, 1975). Diets low in protein and B vitamins appear to correlate with low birth weight.

Recommendations for practice

- Provide opportunities pre-conceptual counselling for optimal nutrition to high risk, disadvantaged women.
- Midwives to perform a nutritional risk assessment as part of normal antenatal care, identifying women who would benefit from additional dietary advice regarding increased protein, vitamin B and calorific intake.

Drug effects

Smoking has been shown to decrease fetal weight by approximately 200 grams per pack of cigarettes smoked per day (Conter et al, 1995). High caffeine intake (>300mg / day: equivalent to 3 cups of coffee or 7 cups of tea per day) is also associated with a significantly higher proportion of growth restricted babies. Illicit drug use and alcohol consumption during pregnancy also adversely effect a fetuses growth.

Recommendations for practice

- Early identification of women at risk due to drug misuse
- Early referral to smoking cessation services, assessing woman's readiness to accept help through out her pregnancy.
- Provide advice on risks for substance misuse and make appropriate referrals.

Antenatal screening

Antenatal screening that can predict fetal compromise and prevent adverse perinatal outcomes forms the basis of antenatal care (Enkin et al, 2000). Identifying fetal compromise during the antenatal period is at times difficult. Significant numbers of infants are born small for gestational age that have not been suspected or detected through the antenatal period. Stillbirths, birth hypoxia and asphyxia occur unexpectedly and in many cases occur in women who are in the low risk category. This is of particular concern as it suggests that our current risk assessment strategies have failed to identify the 'at risk' fetus.

The midwife provides the majority of the pregnant woman's antenatal care within the community environment. During the antenatal period effective midwifery care aims to detect a compromised fetus and evoke a timely referral to the obstetrician to ensure appropriate investigations, interventions and optimum place and time of birth are planned.

The midwife will employ traditional methods for detecting the compromised fetus during her antenatal examination of the pregnant woman. Part of her physical examination will include an abdominal palpation where she assesses fetal size and growth, fetal movements and liquor volume, auscultation of the fetal heart rate and measurement of the symphysis-fundal height with a tape measure. Plotting these

measurements on a customised fundal height chart has been shown to improve antenatal detection of growth restricted babies (Gardosi et al, 1999). Currently no standardised or customised symphysis-fundal height charts are in use.

Recommendations for practice

- Accurate estimation of gestation (achieved by early dating scan)
- Continuity of antenatal care provider (review model of service provision)
- Audit antenatal detection of IUGR (currently underway)
- Implement use of customised fundal height chart (West Midlands Perinatal Institute [wmpi] growth charts)
- Use 10th centile as threshold for both EFW and AC (review ultrasound growth charts)
- Benchmark obstetric practice at Jessop Wing against RCOG (2002) guidelines for the management of SGA

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