

Birth Centre/low intervention care models: de-inventing the wheel?

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Introduction

In recent times it has become apparent that State Departments of Health have found themselves in a position of needing to provide maternity services for pregnant women against a background of major workforce changes. This leaves them with a significant dilemma. On the one hand, advances in medical care have delivered decreased rates of perinatal and maternal mortality (perinatal deaths decreased from 10.7/1000 in 1992 to 8.0/1000 live births in 2002ⁱ). On the other hand, these advances require a high level of workforce infrastructure to deliver the obstetric, midwifery, anaesthetic, operating theatre and neonatal care that delivers best possible outcomes. Increasingly, it is becoming difficult for Area Health Services to obtain the necessary workforce participants to deliver the best standard of care. How do they find staff to provide around the clock medical and operating theatre backup at every district hospital in metropolitan areas, let alone rural and remote locations?

Recent developments lead to the observation that some state Departments of Health have made a strategic decision to allow maternity units to remain open in the absence of conventional medical support, rather than reorganise maternity services to maximise the number of pregnant women's immediate access to high level care when and where it is most likely to be required.

Briefly, medically understaffed small maternity units will remain open, often responsible for delivery of around 200 babies per year. Antenatal risk assessment is used to allow women designated as low risk to book for delivery at the small unit, where on site specialist obstetric, anaesthetic and neonatal care is not available. Women will receive care from midwives, and should a risk factor emerge, they will be transferred to a centre where appropriate specialist support is available, usually at a centre 20-30 minutes travel time from the low level maternity unit. This is essentially the standalone birth centre model, which has been advocated for some time by experts who support the view that pregnancy is a normal process, and "medicalisation" of this process is only appropriate when an abnormality is detected. Such advocacy historically has been based on intuitive or ideological grounds, as there has not until recently a satisfactory evidence base upon which to determine whether a low intervention birth centre model is a safe alternative to conventional medically supervised hospital delivery units.

More recently, more data have been collected to begin to come to an evidenced based comparison of low intervention, midwifery led birth centre care with conventional obstetrician led delivery suite care. Are there significant differences?

The Argument

Any comparison needs to compare agreed end points. In general there are three major groups compared.

1. Perinatal and maternal mortality and morbidity indicators. These include standardised perinatal mortality rates, Apgar scores, need for resuscitation, need for admission to high level nursery for care and maternal mortality rates. Other indicators such as rates of post partum haemorrhage and neonatal seizures may also be used.
2. Intervention rates. These include caesarean section, instrumental vaginal delivery, perineal trauma, blood transfusion, length of hospital stay
3. Other quality indicators such as maternal satisfaction, breast feeding rates, rates of post partum depression.

The first end point group is usually emphasised by those who tend to support the medical model. They argue that though many aspects of care are important, mortality rates must always be the principal focus of maternity care delivery.

The second and third groups are usually emphasised by the low intervention model proponents, who argue that historically there have been inadequate data to suggest any significant difference

in mortality rates, and presume that the lack of such data supports a hypothesis that any differences are not significant. They point to evidence that intervention rates are lower in birth centre models of care, and that in the absence of other benefit, higher intervention is unnecessary, expensive and potentially harmful.

The Evidence

Historically, evidence used to support obstetric practice was based on expert opinion, and more rarely, observational studies. This would now be considered “low level” evidence, and has led to almost every aspect of maternity care being subject to more rigorous scrutiny. The gold standard of evidence comes from adequately powered prospective randomised controlled trials, so that the chance that the outcome is influenced by bias or chance is minimised (or in fact standardised to a predetermined level). In practice this means that the more frequently occurring end points (episiotomy rates, caesarean rates) have been fairly well evaluated. Rare end points (perinatal and maternal mortality rates) have not been subject to adequate randomised scrutiny, as there have never been trials with large enough numbers to provide adequate power to whatever studies have been performed. Analyses of these rarer outcomes rely on metanalysis of smaller trials, including non randomised trials which might be subject to bias. This leads to incomplete knowledge, but decisions may need to be made on the best available evidence when complete data are not available.

The Cochrane Review is accepted as the most comprehensive evidence base. In November 2004, it published a review of evidence comparing birth centre and conventional hospital careⁱⁱ. The review was based on the findings of 6 trials with 8677 women participating. Interestingly, no adequate trials of free standing birth centres were available, and the birth centres involved were on site at the comparison institution, with arguably more direct and timely access for planned transfers than would be possible at free standing birth centres. The authors’ conclusion was that birth centre care were associated with “modest” reductions in some medical interventions:

1. Lower episiotomy rates (but higher perineal lacerations so overall perineal trauma rate was not different)
2. Higher maternal satisfaction rates
3. Higher spontaneous vaginal delivery rates (for every 33 deliveries, there was one extra spontaneous delivery)
4. Higher breast feeding initiation and continuation to six to eight weeks (5% higher rates)

Interestingly, there was no significant difference in risk of caesarean delivery and only a slight increased risk of instrumental vaginal delivery (for every 80 births, there was one extra instrumental delivery) for conventional institutional care.

However a worrying finding was that there was a trend to higher perinatal mortality, with an 85% higher risk of perinatal mortality overall. This figure just failed to reach a level of statistical significance (95% Confidence interval 0.99-3.38), but led the authors to conclude that caregivers and clients “should be vigilant for signs of complications”. This figure was based on a sample size of 8677 women, which may have been insufficient to detect a smaller but significant increased relative risk of perinatal mortality. Put another way, it was as likely that the study showed a threefold increase in perinatal mortality as it showed equal mortality). Numbers were insufficient to comment on maternal mortality rates (with maternal mortality at around 10/100,000 one would need a sample of around 1.5 million women to detect a 50% difference in maternal mortality rates).

Interestingly, one subgroup of carers was found to be associated with a statistically significant increased risk of perinatal mortality. Where birth centre care was continually provided by a midwife who did not also work in the conventional labour ward as well, there was a more than two fold increased risk of a baby dying (RR 2.38, CI 1.05-5.41).

The authors observed “*the trend toward higher rates of perinatal mortality... raises important*

questions. A focus on normality may have a negative impact on carers and childbearing women to detect, act upon and/or receive assistance with complications”

This isn't the first time evidence based on randomisation has led to concerns regarding safety of birth centre care. One of the studies forming part of the Cochrane review, the Stockholm studyⁱⁱⁱ of 1860 women found a similarly worrying trend to increased perinatal mortality and morbidity in the birth centre group (odds ratio 4.0, 95%CI 0.8-39.2). Again, statistical significance was not achieved because of relatively low numbers, and this prompted the authors to conduct a 10 year retrospective cohort study which reviewed outcomes of 3256 births in the birth centre with 180,380 births for women meeting the same inclusion criteria for the birth centre but electing to give birth in the conventional delivery suite. Overall perinatal mortality rates for the whole pregnancy were 50% higher in the birth centre group, falling just short of statistical significance (95% CI 0.9-2.4). For primigravidae, relative risk of perinatal death was 2.2 (95%CI 1.3-3.9). There was a statistically significant 4 fold overall increased risk of a baby dying during labour in the birth centre group overall, and a sevenfold increased risk of dying in labour for babies of first time mothers in the birth centre group^{iv}.

Of further interest is the high rate of transfer of women randomized to birth centre care to conventional care during pregnancy or labour revealed in the Cochrane review. Of the 5363 women planning to give birth in birth centres, only 2859 did so (53%) with the remainder requiring transfer to conventional care for emergence of defined risk factors during pregnancy or in labour. This is not surprising as studies show that antenatal risk assessment has low positive and negative predictive value. 70% of women who develop complications in pregnancy have no risk factors on initial assessment^v.

In summary, there is now good quality evidence of higher risk of perinatal death in birth centres, with only modest reductions in some medical interventions. Maternal satisfaction rates are measurably higher, but this is not surprising, as one to one midwife care is the norm in birth centres, whereas it is extremely rare in busy, relatively understaffed labour wards. Significantly, and contrary to often repeated claims about birth centre care, reductions in instrumental and caesarean delivery are minimal (for every 100 deliveries, there are 3 extra spontaneous vaginal deliveries in the birth centre group).

The evidence suggests that the benefits of the low intervention emphasis of birth centre care are small, with risk of worse perinatal outcomes. The best summary of the issue at hand was penned in a summary of a review of the Stockholm trial.

“The real challenge is to develop a birth-center philosophy within a tertiary care obstetric service. In such a setting, low-risk patients can be cared for by midwives or physicians with family support and a minimum of obstetric intervention, while the ability to intervene with sophisticated maternal-fetal monitoring and operative delivery is immediately available.”^{vi}

Advances in obstetric and neonatal care have achieved historically low levels of perinatal loss in Australia which are the envy of the rest of the world. This has come at the cost of increasing medical intervention, but it is counterintuitive to believe that improvements in perinatal outcome will result from fewer interventions. The challenge for our systems of care is to offer evidenced based care to minimise maternal and perinatal mortality and morbidity whilst increasing maternal satisfaction and utilizing the health dollar wisely.

ⁱ Australian Bureau of Statistics. Deaths, Australia, 2001 and 2002 Catalogue no 3302.0 and 3303.0. Canberra ABS 2002 and 2003

ⁱⁱ Hodnett ED, Downe S, Edwards N, Walsh D. Home-like versus conventional institutional settings for birth (review) 2005 The Cochrane collaboration. John Wiley & Sons.

ⁱⁱⁱ Waldenstrom U, Nilsson CA, Winblad B. The Stockholm birth centre trial: maternal and infant outcome. *British Journal of Obstetrics and Gynaecology* 1997;104:410-8

^{iv} Gottvall K, Grunewald C, Waldenstrom U. Safety of birth centre care: perinatal mortality over a 10 year period. *British Journal of Obstetrics and Gynaecology* 2004;111:71-8

^v Berglund A, Lindmark G. The usefulness of initial risk assessment as a predictor of pregnancy complications and premature delivery. *Acta Obstetrica et Gynecologica* 1999; 78:871-6

^{vi} Editorial, *Obstetrical and Gynaecological survey* 1998;53:12-3