

# BIRTH CENTRE OR LABOUR WARD? A COMPARISON OF THE CLINICAL OUTCOMES OF LOW-RISK WOMEN IN A NSW HOSPITAL

*Caroline Homer, CM, MN, is a Senior Research Midwife at the Midwifery Practice and Research Centre, Sydney, Australia*

*Gregory Davis, MD, FRANZCOG, is a Staff Specialist in the Department of Women's Health, St George Hospital, Sydney, Australia*

*Peter Petocz, PhD, is a Senior Lecturer in the School of Mathematical Sciences, University of Technology, Sydney, Australia*

*Lesley Barclay, CM, PhD, is a Professor in the Midwifery Practice and Research Centre, Sydney and the Family Health Research Unit, South Eastern Sydney Area Health Service and the Faculty of Nursing, University of Technology, Sydney, Australia*

*Deborah Matha, CM, RN, is a Midwifery Unit Manager in the Department of Women's Health, St George Hospital, Sydney, Australia*

*Michael Chapman, MD, FRANZCOG, is Professor in the Department of Women's Health, St George Hospital, Sydney and the University of New South Wales, Sydney, Australia*

Accepted for publication January, 2000

## ACKNOWLEDGMENTS

This study was partially funded by an internal grant from the Faculty of Nursing, Midwifery and Health, University of Technology, Sydney. Thank you to Maralyn Rowley from Victoria University, Wellington, New Zealand, for her advice on an early study proposal and the data collection tool. Thanks also to the staff of the Clinical Information Department at St George Hospital for assistance with collecting the medical records and selecting the labour ward group.

**KEYWORDS:** birth centres, caesarean section, low-risk

## ABSTRACT

A number of birth centres were established in New South Wales as a result of the Shearman Report (NSW Health Department 1989). The objective of this study was to compare the obstetric outcomes, primarily caesarean section rates, of low-risk women presenting in spontaneous labour to the birth centre with those attending the hospital's conventional labour ward. The study showed that there was no significant difference in the caesarean section rate between the groups (3.5% in the birth centre and 4.3% in the labour ward). We suggest that the site of birthing does not affect clinical outcomes for low-risk women at this hospital. These results are relevant to contemporary clinical practice as they question the basis upon which birth centres have been popularised, that is, the medicalisation of birth in conventional labour wards increases intervention rates.

## INTRODUCTION

The Shearman Report on Obstetric Services in New South Wales (NSW Health Department 1989) recommended the establishment of low-risk, 'home-like' delivery areas, or birth centres, where women could receive continuity of care from midwives through their pregnancy, labour and delivery. This, plus consumer activism from women's groups, led to the development of a number of birth centres in New South Wales. The recent Australian Federal Government's Report into Childbirth Procedures was also very supportive of birth centres and recommended the continuation and expansion of birth centre services in the public health system (Senate Community Affairs Reference Committee 1999).

The philosophy behind a birth centre is to provide low-risk pregnant women with care in a non-clinical environment with as little intervention as possible in the normal progress of labour. In Australia however, most women of low-risk status give birth in hospital labour wards. In 1995, only 3.2 % of NSW births occurred in birth centres (Taylor and Pym 1996). As a result, more salaried midwives work in hospital labour wards compared to birth centres.

Excellent obstetric and neonatal outcomes have previously been reported in women delivering in birth centres with low intervention rates (Stern et al 1992), equivalent neonatal results (Biro and Lumley 1991) and increased maternal satisfaction when compared with routine maternity care in hospital-based labour wards

(Waldenström and Nilsson 1997; Waldenström and Nilsson 1993). The last reported Australian comparative study of a birth centre and labour ward was conducted in 1986 and reported that the obstetric outcomes for women admitted to the birth centre were generally better than for those admitted to the labour ward, although these differences were not statistically significant (Martins et al 1987).

This paper reports on a retrospective cohort study conducted at St George Hospital, where the outcomes of women going into spontaneous labour in the birth centre were compared with those of similar women who presented to the labour ward. The clinical endpoints were rates of caesarean section and assisted vaginal delivery.

## Setting

Approximately 2500 births occur each year, either in the birth centre or labour ward, at St George Hospital in Sydney. The birth centre was purpose-built and opened in 1991. It is situated 50 metres from the labour ward and contains two birthing rooms each with a double bed and a spa bath. Basic neonatal resuscitation equipment is immediately available, although concealed. Women are transferred to the labour ward in order to receive electronic foetal monitoring, intravenous infusions or epidural analgesia. Women who wish to attend the birth centre are referred by general practitioners and accepted for care if they are deemed to be at low-risk according to strict criteria. Antenatal, intrapartum and postpartum care are provided by midwives and care continues in the birth centre unless medical or obstetric complications necessitate review by an obstetrician and/or subsequent transfer to the labour ward.

## METHOD

Prior to commencement, the study was approved by the Ethics Committees of the South Eastern Sydney Area Health Service (Southern Section) and the University of Technology, Sydney. Data was collected retrospectively for the calendar year 1995. Women suitable for inclusion in the study were public patients presenting in spontaneous labour after a pregnancy free of medical or obstetric complications, with a singleton vertex presentation between 37 and 42 weeks gestation.

Three hundred and sixty-seven women presented in labour to the birth centre in 1995 and all were included in the sample. Medical records were retrieved for these women and data collected by a researcher (CH) experienced in data collection. The labour ward sample was identified by obtaining a computer-generated random selection of women who presented in labour to the labour ward in 1995. Women were excluded if they had been booked for the birth centre and transferred out due to complications, or had been admitted antenatally for

medical or pregnancy-related complications. The medical records of 632 women were reviewed. Of these, 265 women did not fulfill the low-risk criteria and were excluded to obtain the final labour ward sample of 367. The most common reasons for exclusion were induction of labour (19%), private insurance (15%), elective caesarean section (12%), pre-eclampsia (8%) and preterm delivery (7%).

## Analysis

Data were entered into a database using Epi-Info software and transferred into a SPSS statistical package for the purposes of analysis. Analysis was performed on an intention to treat basis, that is, the women who presented to the birth centre were analysed as such, even if they transferred to the labour ward during their labour.

Student's *t* test was used for continuous variables and categorical data were analysed using the chi-squared statistic. All tests were two-tailed and significance was regarded as  $P < 0.05$ .

## RESULTS

### Demographics

The women from the birth centre and the labour ward were of similar mean age (28 years in the birth centre and 27.5 years in the labour ward) and parity, with more women in the birth centre group from an English speaking background (Table 1).

**Table 1. The primary language spoken by women labouring in the birth centre and labour ward (Values are given as n (%) and the chi-squared statistic is applied to the table)**

	Birth centre n=367	Labour ward n=367
English	304 (82.8%)	155 (42.2%)
Chinese	3 (0.8%)	63 (17.2%)
Arabic	17 (4.6%)	68 (18.5%)
Other	43 (11.8%)	81 (22.1%)

$\chi^2_3 = 150, p = 0.001$

### Transfers from birth centre to labour ward

Of the 367 women who commenced labouring in the birth centre, 111 (30%) were transferred during labour to the labour ward. The principal reasons for transfer were slow progress in labour (39%), request for epidural analgesia (16%), meconium staining of the liquor (14%), and foetal distress (12%).

### Mode of delivery

There were no differences in mode of delivery between the two birth groups, with the overall caesarean section

rate being 4% and the instrumental delivery rate 11.9% (Table 2). Twenty-two of the 312 nulliparous women had a caesarean section (7%) compared with 7 of the 422 multiparous women (1.7%).

**Table 2. Mode of delivery of women commencing labour in the birth centre and labour ward (Values are given as n (%) and the chi-squared statistic is applied to the table)**

	Birth centre n=367	Labour ward n=367	Total n=734
normal vaginal delivery	316 (86.1%)	302 (82.3%)	618 (84.2%)
caesarean section	13 (3.5%)	16 (4.3%)	29 (4%)
instrumental delivery	38 (10.4%)	49 (13.4%)	87 (11.9%)
$\chi^2 = 3.5, p = 0.62$			

The most common reason for an assisted delivery (caesarean section or instrumental vaginal delivery) was failure to progress in labour. Significantly more women in the labour ward group had an assisted delivery for foetal distress (24 of 65 assisted births [36.9%]) than in the birth centre group (10 of 51 assisted births [19.6%]) [(21 = 4.14,  $P = 0.04$ )].

Electronic foetal monitoring was significantly more likely to be used in the labour ward group (53% versus 24%,  $p < 0.001$ ). Electronic foetal monitoring was defined as the use of continuous cardiotocography for a significant part of the labour and delivery.

### Analgesia in labour

Women in the birth centre group were significantly less likely to use analgesia in labour. More than half the women (53%) from the birth centre did not receive analgesia compared with only 21% from the labour ward ( $p < 0.001$ ). More women who presented to the labour ward used epidural anaesthesia (19.6%) than those who presented to the birth centre (15.5%). Other forms of analgesia included nitrous oxide inhalation and narcotic injection.

### Perineal outcomes

After controlling for parity, women in the birth centre group were more likely to have an intact perineum (36%) than those in the labour ward (27%). Women in the labour ward group were more likely to have an episiotomy (17%) than in the birth centre (13%), however, these differences were not statistically significant.

### Neonatal outcomes

All infants were liveborn and Apgar scores at five minutes were similar between the two groups. There were

no five minute Apgar scores less than 4 in either group. One neonatal death occurred, an infant from the labour ward group with a severe congenital abnormality who died on day 10 after being transferred to a level three neonatal nursery.

## DISCUSSION

While this is a small, non-randomised study, the results have implications for clinical practice and the organisation of maternity services at this hospital and in similar centres. More women from English speaking backgrounds chose to attend the birth centre than the labour ward. Cultural preferences may account for this difference but it could also be related to a dearth of information about birth centres in other languages. Research conducted in Sydney in the late 1980's also reported an imbalance in the primary language of those seeking birth centre as compared to labour ward care (Martins et al 1987). Birth centres may not be an attractive option to all women and this should be considered when the planning and introduction of maternity services is undertaken. It is also important to ensure that language does not act as a barrier to birth centre access.

Women who presented to our birth centre in labour had a low emergency caesarean section rate. Birth centres in Australia (Stern et al 1992), the United States (Rooks et al 1989) and Sweden (Waldenström and Nilsson 1997) have reported comparable caesarean section rates, reflecting the low-risk nature of this group of women.

When this project was planned, it was thought that the emergency caesarean section rate in women of similar risk status would be higher in the conventional labour ward. This proved not to be the case, suggesting that the labour ward can achieve similarly low operative delivery rates. In the only randomised controlled trial of comprehensive birth centre care (Waldenström and Nilsson 1997), there were also no significant differences in the caesarean section rates between birth centre and standard care. In our study, the only difference in caesarean section rate was between nulliparous and multiparous women, which was not unexpected.

Caesarean section rates are an important outcome in the provision of maternity services, with significant implications for women in terms of physical as well as psychological health. An association has been found between emergency caesarean section and subsequent maternal psychological problems (Fisher et al 1997; Boyce and Todd 1992). Research in Queensland (Creedy 1999) has also identified a strong correlation between obstetric interventions (including caesarean section) and post-traumatic stress disorder. Caesarean sections also impact on health services in terms of costs. For example, in the United Kingdom, it has been estimated that each 1%

increase in caesarean section rate costs the National Health Service an additional £5 million (Anonymous 1997).

We believe women attend a birth centre as they feel that this will mean their chance of experiencing a normal birth is higher. Our study and others would suggest that this is not true. Birth centres can offer a home-like atmosphere, a non-interventionist women-centred philosophy and usually, continuity of midwifery care. However, we believe that the philosophy in conventional labour wards is moving towards that of a birth centre in terms of meeting women's needs and avoiding unnecessary intervention.

Significantly more women in the birth centre group did not require any analgesia during labour. This may reflect the self-selection bias inherent in this study, that is, women who wanted a 'natural' labour and birth were more likely to choose to attend the birth centre. Similar proportions of women from the two groups used epidural analgesia. Earlier research in low-risk primiparous women has reported mean epidural rates of 53% (Hewson et al 1985) and more recently, 28% (Williams et al 1998). Randomised trials of continuity of midwifery care for low-risk women have reported epidural rates ranging from 16 to 32% (MacVicar et al 1993; Flint et al 1989; Turnbull et al 1996). The Birth Centre Trial in Sweden reported rates of 12 and 15% in the birth centre and standard care groups respectively (Waldenström and Nilsson 1997). Our overall rate of 17.5% reflects the low-risk status of the women and the philosophy of both the birth centre and the labour ward.

During labour, almost one third of women in our study transferred from the birth centre to the labour ward. This transfer rate is higher than others reported, for example, 19% in the Swedish (Waldenström and Nilsson 1997) and Australian (Stern et al 1992) studies and 12% in the United States (Rooks et al 1989). Possibly this is related to the close proximity of the birth centre to the labour ward which made intrapartum transfer easier to arrange than from a free-standing or external centre. Also, as the birth centre and the labour ward were part of one maternity unit, birth centre midwives were able to follow many of the transferred women which may result in a lower threshold for transfer than in other institutions.

More women in the labour ward group had an assisted delivery for foetal distress than those commencing labour in the birth centre. The reason for this is unclear, however it is possibly related to the easy accessibility to, and the subsequent increased use of, electronic foetal monitoring, with a resulting increase in the diagnosis of foetal distress in the labour ward group.

Perinatal mortality is a primary concern in the provision of maternity care, however, because of the low-risk nature of the women in our cohort, an impossibly large sample would be necessary to determine statistically

and clinically significant differences between the birth centre and labour ward groups. Our study did not have sufficient power to detect significant differences in perinatal mortality. Previous descriptive studies of birth centres in Australia and the United States have reported perinatal mortality rates of between 0.89 and 1.3 per 1000 births in women commencing labour in a birth centre (Stern et al 1992). The Swedish study (Waldenström and Nilsson 1997) however, raised concerns about an excess of perinatal deaths in their birth centre group (0.9% versus 0.2%) and recommended further research into the safety of birth centres be conducted.

It was not possible to conduct our study as a randomised controlled trial as the birth centre has been established for six years and women and clinicians were opposed to such a trial. Our study was also not designed to examine the reasons why women choose birth centre care, nor the impact that this environment had over their birthing experience and level of satisfaction. While we acknowledge the importance and significance of these factors, they were outside the scope of this project.

## CONCLUSION

This study suggests that appropriate care of low-risk women can result in excellent outcomes wherever labour is conducted. This study has implications for midwifery and maternity service provision in the Australian context. Conventional labour wards, where the majority of low-risk women receive intrapartum care, can achieve favourable outcomes and women need to be reassured that low caesarean section rates are possible in both birth centres and labour wards.

In the future, when we plan the provision of maternity services in Australia, we may need to decide whether to increase the number of birth centres or to redesign conventional labour wards to make them more like birth centres. Our study has shown that a conventional setting can achieve excellent outcomes. We also know that birth centres are available to only a small proportion of women and are usually oversubscribed. Perhaps then, some of the answers lie in reorganising our maternity services so that all women can have access to a 'birth centre philosophy' if they choose.

## REFERENCES

- Anonymous. 1997. What is the right number of caesarean sections? [editorial] *Lancet*. 349(9055):815.
- Biro, M.A. and Lumley, J. 1991. The safety of team midwifery: The first decade of the Monash Birth Centre. *Medical Journal of Australia*. 155(7):478-480.
- Boyce, P. M. and Todd, A. L. 1992. Increased risk of postnatal depression after emergency caesarean section. *Medical Journal of Australia*. 157(3):172-174.
- Creedy, D. 1999. Birthing and the development of trauma symptoms: Incidence and contributing factors. Unpublished doctoral dissertation. Brisbane: Griffith University.
- Fisher, J., Astbury, J. and Smith A. 1997. Adverse psychological impact of operative obstetric interventions: A prospective longitudinal study. *Australian and New Zealand Journal of Psychiatry*. 31(5):728-738.
- Flint, C., Poulengeris, P. and Grant, A. 1989. The 'Know Your Midwife' scheme - a randomised trial of continuity of care by a team of midwives. *Midwifery*. 5(1):11-16.
- Hewson, D., Bennett, A., Holloday, S. and Booker, E. 1985. Childbirth in Sydney teaching hospitals: A study of low-risk primiparous women. *Community Health Studies*. 9(3):195-201.
- MacVicar, J., Dobbie, G., Owen-Johnstone, L., Jagger, C., Hopkins, M. and Kennedy, J. 1993. Simulated home delivery in hospital: A randomised controlled trial. *British Journal of Obstetrics and Gynaecology*. 100(4):316-323.
- Martins, J.M., Greenwell, J., Linder-Pelz, S. and Webster, M.A. 1987. *Evaluation of outcomes: Deliveries at the birth centre and traditional setting at the Royal Hospital for Women, Sydney*. Sydney: NSW Department of Health.
- NSW Health Department. 1989. *Final report of the ministerial task force on obstetric services in NSW: The Shearman Report*. Sydney: NSW Department of Health.
- Rooks, J. P., Weatherby, N. L., Ernst, E. K. M., Stapleton, S., Rosen, D. and Rosenfield A. 1989. Outcomes of care in birth centres. The National Birth Centre Study. *New England Journal of Medicine*. 321(26):1804-1811.
- Senate Community Affairs Reference Committee. 1999. *Rocking the cradle: A report into childbirth procedures*. Canberra: Commonwealth of Australia.
- Stern, C., Permezal, M., Petterson, C., Lawson, J., Eggers, T. and Kloss, M. 1992. The Royal Women's Hospital Family Birth Centre: The first 10 years reviewed. *Australian and New Zealand Journal of Obstetrics and Gynaecology*. 32(4):291-296.
- Taylor, L. and Pym, M. 1996. *New South Wales Midwives Data Collection*. 1995. Sydney: NSW Health Department.
- Turnbull, D., Holmes, A., Shields, N., Cheyne, H., Twaddle, S., Gilmour, W. H., McGinley, M., Reid, M., Johnstone, I., Geer, I., McIlwaine, G. and Lunan, C. B. 1996. Randomised, controlled trial of efficacy of midwife-managed care. *Lancet*. 348(9022):213-218.
- Waldenström, U. and Nilsson, C. A. 1993. Women's satisfaction with Birth Centre care: A randomised controlled trial. *Birth*. 21(1):3-13.
- Waldenström, U. and Nilsson, C. A. 1997. The Stockholm birth centre trial: Maternal and infant outcome. *British Journal of Obstetrics and Gynaecology*. 104(4):410-418.
- Williams, F. L., Florey, C. V., Ogston, S. A., Patel, N. B., Howie, P. W. and Tindall, V. R. 1998. UK study of intrapartum care for low-risk primigravidae: A survey of interventions. *Journal of Epidemiology and Community Health*. 52(8):494-500.