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Maternal and perinatal outcomes amongst low risk women giving birth in water compared to six birth positions on land. A descriptive cross sectional study in a birth centre over 12 years

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ABSTRACT

Background: the option of giving birth in water is available to most women in birth centres in Australia but there continues to be resistance in mainstream delivery wards due to safety concerns. Women in birth centres are more likely to give birth in upright positions and be attended by experienced midwives and obstetricians who are comfortable facilitating normal birth. The aim of this study was to determine rates of perineal trauma, postpartum haemorrhage and five-minute Apgar scores amongst low risk women in a birth centre who gave birth in water compared to six birth positions on land.

Methods: this was a descriptive cross sectional study of births occurring in a large alongside Sydney birth centre from January 1996 to April 2008. Handwritten records were kept by midwives on each birth in the birth centre over twelve and a half years (n=6,144). Descriptive statistics and logistic regression were applied controlling for risk factors for perineal trauma, postpartum haemorrhage and the five-minute Apgar score.

Findings: waterbirth (13%) and six main birth positions on land were identified: kneeling/all fours (48%), semi-recumbent (12%), lateral (5%), standing (8%), birth stool (10%) and squatting (3%). Compared to waterbirth, birth on a birth stool led to a higher rate of major perineal trauma (second, third, fourth degree tear and episiotomy) (OR 1.40 [1.12–1.75]) and postpartum haemorrhage (OR 2.04 [1.44–2.90]). Compared to waterbirth, babies born in a semi-recumbent position had a significantly greater incidence of five-minute Apgar scores <7 (OR 4.61 [1.29–16.52]).

Conclusions: waterbirth does not lead to more infants born with Apgar score <7 at 5 mins when compared to other birth positions. Waterbirth provides advantages over the birth stool for maternal outcomes of major perineal trauma and postpartum haemorrhage.

Introduction

The use of water immersion during pregnancy, labour and birth for relaxation and pain relief has a long history (Garland, 2000). There are suggestions in the literature that giving birth in water may increase the elasticity of the perineum, reducing the incidence and severity of perineal trauma (Alderdice et al., 1995; Cluett and Burns, 2009). A systematic review of immersion in water (Cluett and Burns, 2009) found that out of the eleven trials, eight were related to the first stage of labour, one to first and second stage, one to early vs. late immersion in the first stage of labour, and another to the second stage (Cluett and Burns, 2009). A significant reduction in the use of epidural analgesia was found with no differences in perineal trauma or Apgar sores less than seven at 5 mins. The authors concluded there was no evidence of increased adverse effects to the fetus/neonate or woman from

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labouring in water or waterbirth (Cluett and Burns, 2009). While waterbirth is an option for childbearing women in most birth centres in Australia, concern continues to be expressed by some health practitioners regarding the potential for neonatal respiratory distress (Kassim et al., 2005). Getting waterbirth policies implemented and designing facilities to enable waterbirth continues to be a slow process in mainstream delivery wards in Australia.

A recent review of the literature reported both physical and psychological benefits for women when they are able to adopt physiological positions in labour, and birth in an upright position of their choice (Priddis et al., 2011). Supporting women to assume upright birth positions during labour and birth is recognised as having benefits, such as a reduction in second stage length, episiotomy, instrumental deliveries, fetal heart rate abnormalities and severe pain, as well as psychological benefits, such as increased control and satisfaction (Green and Baston, 2003; Goodman et al., 2004). Also reported are an increase in second degree tears and blood loss greater than 500 ml (Simkin, 1991). An increase in second degree tears was not found in another meta-analysis where the experience of the accoucheur was taken into consideration (de Jonge et al., 2004), indicating that the experience of practitioners may have an influence on perineal outcomes. The increased blood loss in the upright positions has also been found to be associated mostly with perineal trauma rather than the upright *position* itself, with oedema cited as a possible contributor (de Jonge et al., 2007).

There is a lack of research into factors and/or practices within the current health system that facilitate or inhibit women to adopt various positions during labour and birth (Dahlen et al., 2010). Upright birth positioning occurs more within certain birth settings, such as birth centres and home. The preferences for positions, and the philosophies of health professionals, are also reported to impact upon the position that women adopt during birth (Priddis et al., 2011).

In Australia in 2008 around 6,460 women were reported as giving birth in a birth centre, which represents 2.2% of all women giving birth (Laws et al., 2010b). Birth centres are designed to provide an intermediate option of care between home and hospital birth, where women are involved in planning their own care with advice and support from midwives (Waldenström and Lawson, 1997; Senate Community Affairs References Committee, 1999; Byrne et al., 2000; Griew, 2003; Gottvall et al., 2004; Stewart et al., 2005). With care based upon the philosophy of minimal intervention for low risk women, birth centres are often thought of as an option that gives women some of the benefits of homebirth with some of the benefits of hospital birth, or a safe home away from home option (Griew, 2003). Research conducted with women who choose a birth centre for their care in Australia have demonstrated a reduction in interventions in labour, with no statistically significant difference in perinatal mortality when compared to a standard labour ward (Laws et al., 2010a; Tracy et al., 2007). Women are more likely to use a variety of birth positions and have the option of waterbirth in birth centres (Ryan, 1999). Midwives and obstetricians, working in birth centres also tend to be very experienced with facilitating normal birth in a variety of positions, so the birth centre environment provides an ideal place to observe differences in outcomes for women who are low risk and experience minimal obstetric intervention. Despite this fact the numbers of birth centres in Australia have declined in the past 10 years (Laws et al., 2011) and questions about safety and practices are still raised at local hospital level and in the media when adverse events occur, making further research a priority.

The aim of this study is to determine rates of perineal trauma, postpartum haemorrhage (PPH) and five-minute Apgar scores amongst low risk women giving birth in a birth centre in water compared to six birth positions on land.

Methods

Midwives working in an alongside birth centre in Australia had kept handwritten records of each birth they attended from January 1996 to April 2008 (12 years and 4 months) During this time there were 8,338 women who commenced labour in the birth centre and 6,144 women gave birth there, with 2,194 (26%) women transferred to the delivery ward during labour or giving birth before arrival (54 births). The women who were transferred during labour or gave birth before arrival are not included in this study. Those transferred after the birth for postnatal complications are included in the study.

The 12 years of birth centre data included detailed descriptions of the birth positions women had assumed for the birth as well as recording; parity, length of first, second and third stage of labour, blood loss, accoucheur, perineal trauma, sutured or not sutured, shoulder dystocia, physiological or active third stage management, use of oxytocis for third stage and analgesia. The data from January 1996 to April 2008 was entered into SPSS. The data on neonatal intensive care admissions, length of stay and outcomes following admission were not well recorded in the data set we were able to examine and so this has not been included.

The particular birth centre that the study was undertaken in was located in the same building as the Delivery Ward with easy access to medical intervention should it be required. The women giving birth in the birth centre were generally encouraged to be active during labour and birth, to assume any birth position they wished and directed pushing was not used during second stage. Women under midwife care did not differ in risk profile to women under private obstetrician care in this birth centre.

Data analysis

All data were analysed with Statistical Package for Social Sciences (SPSS) version 12 (SPSS, 2003). The alpha level was set at 0.05 for all analyses. Simple descriptive statistics were used for analysis and Chi square and logistic regression were used to examine differences between birth position groups. A random audit of 50 clinical notes, where midwives document the labour and birth details and data is extracted to complete national statistical reports, was compared to the written birth records which were kept in the birth centre and used for this study. There was greater than 95% similarity which supported the accuracy of the data used in this study. *In order to check between the data entered by the midwives in the clinical records which are used to gather national data and the handwritten data on each birth by midwives kept in the birth centre we randomly checked 50 clinical notes and they were highly similar. This was just another way to verify if the data was accurate that we were using.*

Unfortunately information recorded on women who were transferred during labour was less reliable, with inaccuracies and missing data and so could not be used. Due to the extended time period of the study we looked at outcomes for before 2003 and after 2003 and found little change in intervention (induction, augmentation) and transfers to delivery ward.

We generated descriptive statistics for the outcome measures of mode of birth and postpartum haemorrhage. Independent variables that were clinically plausible explanatory variables and that were available from the data set were examined first with univariate logistic regression analysis. We evaluated bivariate associations, including the potential for multicollinearity, between independent variables. Odds ratios and the 95% confidence interval (CI) were calculated. Multivariable logistic regression was undertaken using variables with significant associations from the univariate analysis. A conservative screen of $p < 0.25$