Midwifery Research Review™

Making Education Easy

Issue 16 – 2017

In this issue:

Abbreviations used in this issue

BMI = body mass index
CS = caesarean section
DHB = District Health Board
LMC = lead maternity carer
MMPO = Midwifery and Maternity Providers Organisation
NICU = newborn intensive care unit
WHO = World Health Organization

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Welcome to the latest issue of Midwifery Research Review.

The issue covers a range of topics, including a reported link between maternal BMI and cerebral palsy risk, a comparison of balloon catheter and prostaglandin gel for induction of labour, and a discussion of the use of pulse oximetry screening for critical congenital heart disease in newborn infants. An Australian study identifies strategies for enhancing the use of water immersion for labour and birth in a tertiary setting, and a pilot study investigates the use of placentophagy, the practice of human maternal placenta ingestion.

We hope you find these and the other selected studies interesting, and welcome any feedback you may have.

Kind regards,

Nimisha Waller
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Association between maternal body mass index in early pregnancy and incidence of cerebral palsy

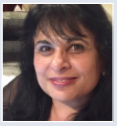
Authors: Villamor E et al.

Summary: This Swedish study examined the association between early pregnancy BMI and the incidence of cerebral palsy. Outcomes for 1,423,929 singleton children born in Sweden from 1997 through 2011 were reviewed. 3029 of the children were diagnosed with cerebral palsy over a median 7.8 years of follow-up (2.63/10,000 child-years). 2.4% of pregnant mothers had BMI <18.5 (underweight), 61.8% had BMI 18.5–24.9 (normal weight), 24.8% had BMI 25–29.9 (overweight), 7.8% had BMI 30–34.9 (obesity grade 1), 2.4% had BMI 35–39.9 (obesity grade 2), and 0.8% had BMI ≥40 (obesity grade 3). The rates of cerebral palsy in each BMI category (per 10,000 child-years) were 2.58, 2.35, 2.92, 3.15, 4.00, and 5.19, respectively. Compared with children of normal-weight mothers, adjusted hazard ratios for cerebral palsy were 1.22 for overweight, 1.28 for obesity grade 1, 1.54 for obesity grade 2, and 2.02 for obesity grade 3. Results were significant for full term but not preterm infants.

Comment: Cerebral palsy is the most common paediatric motor disability. In the USA the estimated prevalence by age 8 years was 3.1 per 1000 live births in 2008, and in Sweden, 2.2 per 1000 live births in 2006. Despite advances in obstetric and neonatal care, cerebral palsy prevalence increased from 1998 through 2006 in children born at full term. Cerebral palsy constitutes a significant lifetime disability for children and their families, and is associated with chronic diseases and a shortened life expectancy. The NZ Cerebral Palsy Society (2017) suggests that the prevalence of cerebral palsy has remained relatively stable at 2.0 to 2.5 per 1,000 live births. Approximately 7,000 people in NZ have some degree of cerebral palsy – one-third being under 21 years of age. It appears that cerebral palsy is classified differently in Europe and America. This retrospective, population-based cohort study evaluated women with live singleton births between 1997 and 2011 to assess for any connections between early pregnancy maternal BMI and the risk of cerebral palsy. The findings suggest that increased maternal BMI appears to be linked with an increased risk of cerebral palsy in the full term newborn. The large sample size (just over 1.4 million singletons) allowed for specific subgroup analyses, shedding light on potential pathways that could mediate this effect. The differing classification of cerebral palsy and a small degree of missing information among mothers may limit the generalisability of results. The findings have serious public health implications as the rate of women with BMI of 35 or greater has globally doubled from 2000 through to 2010. We should not just have conversations about healthy weight during pregnancy but also the importance of achieving normal BMI before pregnancy so the risk of hypoxic-ischaemic encephalopathy is lowered.

Reference: JAMA 2017;317(9):925-36
Abstract

Independent commentary by Nimisha Waller RGON, RM, ADM, Dip. Ed, MM, DHSc Candidate



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Outcome of pregnancy in women diagnosed with idiopathic polyhydramnios

Authors: Khan S & Donnelly J

Summary: This retrospective case-control study evaluated the association between polyhydramnios and adverse pregnancy outcomes. 288 singleton pregnancies delivered in the Rotunda Hospital, Dublin in 2013–2014 were included. Polyhydramnios was defined as amniotic fluid index (AFI) ≥25cm, maximal vertical pocket (MVP) ≥8cm, and a gestational age-specific threshold for AFI. Pregnancy outcomes for 144 women with polyhydramnios (cases) were compared with 144 women without polyhydramnios (controls). There were no significant differences in preterm deliveries, low birth weight, low Apgar score at 1 min and 5 min, and perinatal mortality between cases and controls. However, cases had an increased rate of caesarean deliveries (43.1% vs 21.5%), fetal distress (17.4% vs 6.9%) and NICU admissions (17.4% vs 4.9%).

Comment: In up to 70% of cases the exact cause of polyhydramnios is unknown. Zhu *et al.* (2010) demonstrated that increased expression of aquaporin 8 and 9 on fetal membrane occurs as an adaptive response in idiopathic polyhydramnios while Geum *et al.* (2015) observed that down-regulation of orexin-A levels was associated with development of polyhydramnios. This study found polyhydramnios was more common in younger women (median maternal age 32 years) than in older women and women with rising parity found in other studies. No association of preterm delivery or low Apgar scores was found, although other studies have reported this. There was an increase in CS rates and a strong correlation between large for gestational age babies and polyhydramnios as in other studies. The study did not find any small for gestational age babies, as polyhydramnios is rarely associated with feto-placental insufficiency, which is more likely to be associated with oligohydramnios. However, the study did find polyhydramnios to be an independent risk factor for fetal distress and noticed an increase in the number of NICU admissions. Other studies have reported malpresentation and macrosomia with idiopathic polyhydramnios. There were two cases of unexplained stillbirths in the polyhydramnios group. Small numbers in this study limited the comparison of perinatal mortality rate with other studies. The authors could not exclude participants with placental abnormalities as full placental data was not available for all and some women were referred to the hospital only for ultrasound but delivered in the other centres and were not followed up. There is a suggestion that a thorough investigation of the mother and the fetus is mandatory since several maternal disorders and fetal abnormalities should be excluded for a case to be referred to as "idiopathic". The authors of this retrospective case-control study suggest that as idiopathic polyhydramnios is associated with higher rates of caesarean delivery, fetal distress and NICU admissions, a close surveillance of these pregnancies is required, especially near term. Ministry of Health Referral Guidelines (2012) suggest transfer of care when polyhydramnios is confirmed.

Reference: Aust NZ J Obstet Gynaecol 2017;57(1):57-62
Abstract

'Where do you want to have your baby?' Women's narratives of how they chose their birthplace

Authors: Woog C

Summary: This study evaluated how low-risk, first-time mothers choose where to give birth. Nine low-risk mothers were recruited from a social networking site and data were collected using an online questionnaire. Two core themes emerged that were considered to influence the birthplace decision: the women's expectations of birth and perception of safety; and the influence of the midwife, the partner, and antenatal education.

Comment: Maternity Report (2014) suggests that the proportion of all women giving birth at a tertiary facility increased steadily from 40.9% to 46.6% between 2007 and 2014, while the proportion of women giving birth at a primary facility fell from 15.6% to 9.1%. The proportion of births at home and at secondary facilities remained stable during this time. MMPO (2012) data suggest that transfer from home to birthing facility has increased from 19.2% in 2011 to 25.4% in 2012 for all women. Various studies have highlighted the impact of culture, social factors and historical associations between birth and safety, and how women/whānau and health professionals may perceive risk. Recent openings of standalone primary birthing units in NZ have had mixed reactions from different groups of practitioners as well as from parent support and lobby groups, though they appear to be supportive of Alongside Primary Units such as Waioha in Hawke's Bay DHB. Practitioners comfortable with birthing in home and primary units state that transfer should not be viewed as negative but as a sign of a service that does not want to put mothers and babies at risk, while the others have commented on the need for women/whānau to have accurate information including transfer times and to be fully aware of exactly what the primary unit offers. Some DHBs have had discussion forums on what support practitioners may need to help inform women of the choices they have and supporting women with normal pregnancies to birth at home and in primary birthing units. The findings from women's narratives in this study provide an opportunity to reflect/discuss on how home and primary birthing units need to be positioned as culturally normative and acceptable practice within NZ. We may also need to increase familiarity with current evidence and be aware of our own biases that may influence the way we provide choice regarding the place of birth to women/whānau.

Reference: Br J Midwifery 2017;25(2):94-102
Abstract

Induction of labour using balloon catheter and prostaglandin gel

Authors: Brown J & Beckmann M

Summary: This retrospective study compared outcomes associated with use of a balloon catheter versus prostaglandin E2 gel in women requiring induction of labour (IOL) at term. 427 women induced with a balloon catheter were matched to 427 women induced with prostaglandin gel. Women induced with a balloon catheter were more likely to have an unassisted vaginal birth (50.4% vs 42.9%; p=0.028), a lower mean estimated blood loss (420 vs 481ml; p=0.028), a reduction in fetal acidaemia (2.4% vs 8.8%; p=0.003) and a greater likelihood of having a vaginal delivery within 24h (33.7% vs 25.8%; p=0.011).

Comment: In high-income countries nearly one-third of all pregnant women undergo IOL. Maternity Report (2014) suggests almost one-quarter (24.4%) of women giving birth (excluding those who had elective CSs) had their labour induced. Women giving birth for the first time in 2014 had a higher proportion of inductions (28.7%) compared with women who had given birth previously (20.4%). The National Institute for Health and Clinical Excellence (NICE) guidelines state that mechanical methods like balloon catheters should not be used routinely for IOL, whereas the WHO guidelines specifically promote balloon catheter for IOL. Auckland DHB (2015) guidelines suggest it is reasonable to offer either cervical ripening method (balloon or prostaglandin gel) however a balloon IOL is recommended where maternal or fetal risks from tachysystole or hypertonus are increased; such as in suspected small for gestational age babies, oligohydramnios, decreased fetal movements or previous CS. This study reports a 'real-world' experience of using balloon catheters for IOL, and compares the clinical outcomes for women who had received mechanical and pharmacological cervical ripening. The balloon catheter used in this study appears to be a double balloon catheter (Cook catheter). Unlike Foley catheters, double-balloon catheters are licensed for use for IOL. Balloon catheters have been highly effective at preparing the cervix for labour with a high likelihood that an artificial rupture of membranes can be performed at the first review, more unassisted vaginal births are observed within 24 hours, and there is less blood loss and decreased fetal acidaemia. Apparently balloon catheter is less likely to cause uterine activity and hence fetal distress so routine post-insertion cardiotocography is not required, and neither is hospital admission. However, the authors suggest that balloon catheter induction may be associated with an increase in malpresentation, cord presentation and infectious morbidity. Apparently a large multicentre trial of outpatient balloon catheter versus inpatient prostaglandin induction is underway examining the questions of safety and efficacy, as well as cost and woman's experience. Results may suggest a need for review of the cervical ripening method presently used.

Reference: Aust NZ J Obstet Gynaecol 2017;57(1):68-73
Abstract

Should New Zealand introduce nationwide pulse oximetry screening for the detection of critical congenital heart disease in newborn infants?

Authors: Cloete E et al.

Summary: In NZ there currently is no national approach to newborn pulse oximetry screening for critical congenital heart disease (CHD), although some DHBs have begun screening at hospital level. A pulse oximeter that determines oxygen levels in the blood has been successfully utilised internationally to assist with the early diagnosis of cardiac defects. This article discussed whether a nationwide pulse oximetry screening programme should be introduced in NZ for the detection of critical CHD in newborn infants.

Comment: Pulse oximetry is used in all aspects of newborn care, including resuscitation of newborns in the delivery room to routine monitoring in the operating room to evaluate subclinical hypoxaemia that occurs during transitioning physiology of some CHDs. According to Chisholm (2017) around 75 children/year are born with critical CHD in NZ. The pilot is primarily to investigate potential pitfalls, such as the impact of false-positive and false-negative tests and improve detection rate as fewer than 50% are detected in pregnancy. Data show that 2 of the 3 infants with CHD were missed by physical examination alone. Use of pulse oximetry screening raised the diagnosis rate to 82%. Pulse oximetry picks up CHDs that result in hypoxaemia such as transposition of the great arteries, truncus arteriosus communis, hypoplastic left heart syndrome, total anomalous pulmonary venous connection, tricuspid atresia, tetralogy of Fallot, and pulmonary atresia. If diagnosis is delayed there is a risk of significant morbidity and mortality. There are CHDs that do not cause hypoxaemia but can lead to serious complications such as organ damage if not detected early. Diagnostic strategies for these may soon become clinically available in newer generation pulse oximeters. It appears that at present there are not sufficient data available on the burden to the health care system with the increase in infant echocardiograms completed due to failed pulse oximetry screening following birth. The existing pilot is being funded by the Starship Foundation and the lead researcher by Liggins Institute. Discussions are occurring regarding the best approach to screen for CHD whether that is through a national screening programme or improving the quality of fetal-anomaly screening in the 18–20 week ultrasound scan. It appears that the situation in regards to CHD screening is still developing.

Reference: NZ Med J 2017;130(1448):64-69
Abstract

Sink or swim: water immersion for labor and birth in a tertiary maternity unit in Australia

Authors: Plint E & Davis D

Summary: This Australian study investigated attitudes and practices of midwives and obstetric doctors in a tertiary setting regarding water immersion for labour and birth. A questionnaire was distributed to midwives and obstetric doctors who were providing labour care in the facility. Continuity midwives routinely facilitated water immersion but birth suite midwives rarely did, despite considering it useful. Obstetric doctors were unsupportive of water immersion. The main strategies that were identified for increasing bath usage in labour were staff training, antenatal education, and greater access to continuity of care.

Comment: Ways to reduce unnecessary or routine interventions and promote normal birth are being considered by secondary/tertiary facilities internationally as well as in NZ. One way has been the introduction of use of water for labour and birth for pain relief and then extending the option to women being able to birth in water. This Australian study aimed to identify strategies for enhancing the use of baths in tertiary settings. Fewer than 2% of all births were water births, whereas the alongside birth centre facilitated more than 22% of their births in water. It was not possible to ascertain how many women used water immersion in the first stage of labour, but anecdotal evidence suggests the rates to be low. The National Women's Health (NWH) Annual Clinical Report (2015) stated that 37 babies were born in water in 2015 (out of 6933 total births). 10 of these were under the care of the NWH LMC service, 35 were under the care of an LMC midwife and 2 were under the care of a private obstetrician. It is not possible to know how many births out of 6933 would have fitted the criteria for use of water for labour and birth. The MMPO (2013) data report the waterbirth rate as 21.9% at home, 21.2% in primary care facilities, 4.8% in secondary care hospitals, and 2.3% in tertiary care hospitals. The low rate in tertiary hospitals will not be a surprise to many though there may be tacit support for waterbirth and official waterbirth education provided to practitioners. The researchers do suggest strategies to increase the rate, but it would be helpful to have clear data on how many women meet the criteria for use of water in labour and birth as well as being able to birth in water. Out of this, how many women choose to use water, and how many actually achieve to use water and/or birth in water? Thoughts of all practitioners in being able to support this option when their main focus is on women with complexities would be enlightening and help develop appropriate strategies.

Reference: Int J Childbirth 2016;6(4):206-222
Abstract

Time spent reading this publication has been approved by the Midwifery Council of New Zealand for NZ midwives as Continuing Midwifery Education.

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Effects of human maternal placentophagy on maternal postpartum iron status

Authors: Gryder L et al.

Summary: This pilot study investigated the effect of ingested encapsulated placenta on maternal postpartum iron levels. 23 healthy women with a normal pregnancy were randomised in a double-blind design to received encapsulated placenta or a beef placebo capsule. Maternal iron status was measured at the 36th week of pregnancy, within 96 hours of parturition, between days 5 and 7 postpartum, and during week 3 postpartum. 18 out of 23 (78%) of the women had a haemoglobin level above the WHO cut-off for gestational iron deficiency (≥11.0 g/dL) during the 36th week of pregnancy. There were no significant differences in maternal iron status between women receiving the placenta supplement or the placebo at any of the follow-up points.

Comment: Placentophagy, the practice of human maternal placenta ingestion has gained popularity among women in developed countries. Various benefits such as prevention of postnatal depression, reduction in postpartum haemorrhage, maintaining energy levels, boosting milk production and replacing lost iron have been cited when swallowed in capsule form to boost postnatal health. In Switzerland placenta injections are available while in Japan you can drink smoothies made from pig placenta. In NZ the practice of encapsulated placenta capsules is becoming popular. Clinical studies have shown that, even in women who have normal iron levels (measured as haemoglobin concentration), there is a drop within 24–48 hours and then rebound within 7 days with serum ferritin also increasing by the end of the first week postpartum. The aim of this randomised, double-blind, placebo-controlled pilot study was to compare the iron status of women ingesting their own encapsulated placenta to those ingesting a dehydrated and encapsulated beef placebo over a 3-week postpartum period. The results provide very first clinical data regarding the effects of human maternal placentophagy on human postpartum physiology and postpartum maternal iron status. The findings suggest that encapsulated placenta supplementation (two 550mg capsules 3 times per day for days 1–4, two 550mg capsules twice daily for days 5–12, and two 550mg capsules once daily for days 13–21 postpartum) neither significantly improves nor impairs postpartum maternal iron status for women consuming at least adequate amounts of dietary iron during pregnancy and the peripartum period, compared to a beef placebo. The authors suggest that the findings may be especially important for women who are iron deficient prenatally and/or postpartum, and whose only source of supplemental dietary iron is encapsulated placenta, as this likely will provide an inadequate source of supplemental iron in cases of deficiency. Need to read the full study to appreciate the findings.

Reference: J Midwifery Womens Health 2017;62:68-79
Abstract

Time spent reading this publication has been approved for CNE by The College of Nurses Aotearoa (NZ) for RNs and NPs. For more information on how to claim CNE hours please **CLICK HERE**

Maternal health in pregnancy and associations with adverse birth outcomes: evidence from Growing Up in New Zealand

Authors: Bird A et al.

Summary: This study used Growing Up in NZ study data to examine associations between pregnancy health and adverse birth outcomes in a diverse cohort of women. 6822 women who gave birth in 2009–2010 were included. After adjusting for confounders, there were patterns of increased risk for low birth weight (LBW) and pre-term birth (PTB) in women who smoked, had elevated pre-pregnancy BMI, or had insufficient pregnancy weight gain. Small for gestational age (SGA) births were associated with maternal smoking, alcohol use, insufficient weight gain, and nausea and vomiting during pregnancy. Risk of CS was associated with having a diagnosed illness before pregnancy, elevated BMI, greater pregnancy weight gain and less exercise during pregnancy.

Comment: This prospective study addresses the need for up-to-date information on the association between maternal pregnancy health and birth outcomes and examines risk of adverse birth outcomes in women who in reality present with multiple health indicators. Though we have a zero tolerance policy for alcohol use, and have increased public health messages for smoking, bodyweight and maternal illness, they are still prevalent within our population and shown to be a strong predictor of adverse birth outcomes. Weight loss is associated with increased risk of LBW, PTB and SGA infants. However, it is the maternal pregnancy BMI (being overweight or obese) that predicted an increased risk of LBW, PTB and CS. The authors suggest that clinicians need to consider both pre-pregnancy BMI and weight gain during pregnancy and suggest regular, sustained physical activity to manage pregnancy weight gain. The findings support that pre-pregnancy exercise is not associated with increased risk of adverse birth outcomes, and was in fact associated with reduced risk for caesarean delivery. Though other studies have suggested pregnancy nausea and vomiting to be protective against adverse birth outcomes the study finds that women with severe nausea and vomiting throughout pregnancy, and mild nausea during the latter parts of pregnancy were at increased risk of having a SGA infant. It is therefore essential to clinically assess and manage persistent nausea and vomiting during pregnancy. The study highlights the importance of identifying and supporting women who present with >1 health risk factor as women with >2 of these risk factors are at 2–6 times the risk of adverse birth outcomes. The authors suggest that for women with poorer pre-pregnancy health, or those with unplanned pregnancies, behavioural change, even later in pregnancy, is beneficial and important. We therefore need to continue to discuss smoking cessation, limiting alcohol use, managing weight gain and engaging in physical exercise as they are all associated with lower risks of adverse birth outcomes.

Reference: Aust NZ J Obstet Gynaecol 2017;57:16-24
Abstract

Customised and noncustomised birth weight centiles and prediction of stillbirth and infant mortality and morbidity

Authors: Iliodromiti S et al.

Summary: This population-based linkage study determined birth weight thresholds at which infant mortality and morbidity increase. 979,912 term singleton pregnancies in Scotland in 1992– 2010 were included. Birth weight ≤25th centile was associated with higher risk for all mortality and morbidity outcomes. Risk also increased from the 85th centile for stillbirth, low Apgar score, and neonatal unit admission.

Comment: In developed countries 30% of stillbirths and infants deaths occur at term. Whether the use of customised birth weight centiles (accounting for sex, gestation, and maternal characteristics) can identify stillbirths and infant deaths at term more accurately than non-customised centiles is unknown. This large Scottish study examined data on term singleton pregnancies over a 19-year period to study the associations of birth weight centiles (non-customised and partially customised) with stillbirth, infant mortality, admission to the neonatal unit and Apgar score <7 at 5 min. Researchers also assessed whether partially customised centiles perform better in predicting adverse outcomes compared with non-customised centiles. Lack of data on maternal ethnicity and weight prevented them from assessing fully customised centiles. They found that birth weight ≤25th or ≥85th centile (both partially and noncustomised) are associated with greater risk of adverse outcomes. Partially customised centiles did not identify more fetuses at risk of death compared with non-customised centiles. Researchers suggest closer surveillance or earlier delivery of those fetuses with a predicted birth weight ≤25th or ≥85th centile may reduce adverse outcomes. Information from this study supports other studies that have suggested that being born too small or too large is associated with an increased risk of mortality and morbidity. They recommend replication of the analysis with fully customised birth weight centiles.

Reference: PLoS Med 2017;14(1):e1002228
Abstract

A predictive model for cesarean among low-risk nulliparous women in spontaneous labor at hospital admission

Authors: Janssen P et al.

Summary: This study developed a prediction model for CS in low-risk spontaneously labouring nulliparous women, using data from 1,302 participants in a clinical trial of early labour support. Independent predictors for CS were advanced maternal age, shorter maternal height, greater gestational age, perception of labour lasting >24h, mild or moderate contractions, less cervical dilation, and higher fetal station at the time of hospital admission.

Comment: There has been a considerable increase in CS rates globally as well as in NZ. The perception of CS being a safer mode of birth is also being challenged as large studies have reported a 3-fold increase in risk of serious maternal and neonatal morbidity associated with planned CS versus planned vaginal delivery. It is acknowledged by many that preventing primary CS is important in lowering the overall CS rates. This American study highlights that in a cohort of healthy women having their first baby, increased maternal age, short maternal stature, more advanced gestational age, maternal perception of labour lasting >24h, irregular contractions, lower cervical dilatation, and higher station of the fetus on admission to hospital were significant predictors of CS. These findings are supported by other studies though they were limited by including multiparous women, women at early gestations, women who had not attended antenatal care as well as not having a range of socio-demographic, pregnancy characteristic and lifestyle that is examined in this study. The authors have developed a prediction model using variables that are routinely measureable at first examination on admission to the hospital. They suggest that opportunities to screen healthy women for risk for caesarean birth and individualising their care accordingly will increase their chance of a vaginal birth. Further research is required to validate the model. Would knowing of a higher risk of CS from a prediction model undermine the woman's ability to birth normally? Would such information in advance, and support of midwifery model of care, motivate and support women to use all the strategies to ensure a vaginal birth?

Reference: Birth 2017;44(1):21-28
Abstract