# A COMPARISON OF THE OUTCOMES OF PARTNERSHIP CASELOAD MIDWIFERY AND STANDARD HOSPITAL CARE IN LOW RISK MOTHERS

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## ABSTRACT

***Background:***

**Maternal and infant clinical outcomes were compared for low risk mothers receiving a partnership caseload model of midwifery care, known as Primary Health Midwifery Care (PHMC), and standard hospital care (SHC).**

***Methods:***

**Using secondary analysis of data from the Obstet Data System routine collection (PHMC n=976, SHC n=976) from a large metropolitan hospital, maternal and infant clinical outcomes were examined.**

***Results:***

**Odds ratios (OR) demonstrated reduced rates of interventions for multiparous women (OR 0.62 [CI 0.49-0.80]), with multiparous women receiving PHMC being more likely to have a normal delivery (OR 1.75 [CI 1.22-2.5]). A higher proportion of both primiparous and multiparous women receiving PHMC received pethidine during labour (OR 1.78 [1.33-2.39], OR 1.55 [1.19-2.01] respectively). Primiparous women receiving PHMC underwent fewer episiotomies with an associated increase in the proportion of women experiencing perineal tears (OR 1.93, CI 2.35-2.78), although perineum trauma rates were similar for both care models. Similar and very small numbers of infants in both parity groups and care models had an Apgar of less than seven at five minutes or were admitted to the neonatal intensive care unit or special care unit.**

***Conclusion:***

**This study, within the limitations of its design, supports the safety of the partnership caseload midwifery care model, in addition to reduced rates of interventions experienced by multiparous women and fewer episiotomies in primiparous low risk English-speaking women receiving caseload care.**

## INTRODUCTION

Midwifery-led care for low risk mothers has been unfolding throughout the world in response to several tensions (Graham 1997; Hundley et al 1994). The disparity between what mothers want from health services and the realities of what they receive, has resulted in considerable consumer-focussed debate (Sandall 1995; Savage 1994; Warren 1994; Soderstrom et al 1990). A recent Australian report confirmed that 'Australian women value safety for their babies…[whilst] they are generally not impressed by the measures adopted to achieve them' (Commonwealth of Australia 1999, p.13).

Midwives themselves have also been active in seeking increased autonomy in their practice through innovative

approaches to care delivery (Lewis 1995; McDaid 1991). Research findings supporting the safety, cost effectiveness, and other benefits of midwifery-led care (often team midwifery) for mainly low-risk women have been demonstrated over the past decade (Law and Lam 1999; Farquhar et al 1998; Tinkler and Quinney 1998; Waldenstrom and Turnbull 1998; Hundley et al 1997; Harvey et al 1996; Hodnett 1996; Tucker et al 1996; Turnbull et al 1996; Carlisle 1995; Rowley et al 1995; Graveley and Littlefield 1992; Biro and Lumley 1991). In Australia, these developments have been closely paralleled by government taskforces supporting the need for reform (NSW Health 1996; Health Department of Victoria 1990; Ministerial Task Force on Obstetric Services in NSW 1989), although reform has been cautiously implemented.

Our health service provides a complex array of service options for the expectant mother - standard hospital care, specialist obstetrician and hospital care, general practitioner-obstetrician shared care, midwifery care models (midwives clinics for antenatal and postnatal care), domiciliary midwifery (postnatal care) - with the exception of team midwifery (four or more midwives) or caseload midwifery.

Caseload midwifery refers to a woman receiving care from the same midwife 24 hours a day (Morgan et al 1998). Partnership caseload midwifery, whereby the 'caseload is shared between two midwives and most of the care is provided by the named midwife and the rest by her partner, or occasionally by a larger group practice of midwives' (Morgan et al 1998, p.78), was the preferred model selected to complement our existing services. This contrasts with the definition by Biro et al (2003) of 'case-load midwifery includes one or two midwives who provide care throughout the childbearing episode' and team midwifery models being 'seven to eight midwives and provide care to a group of women throughout the childbearing year' (p.2).

Although partnership caseload midwifery practice is a slightly different model to team midwifery (carry a personal caseload and also provide support to others), research findings and outcome measures from this large body of research are relevant to this study.

Waldenstrom and Turnbull (1998) undertook a comprehensive evaluation of team midwifery through a systematic review of existing studies. This review identified seven randomised controlled trials including 9148 women, conducted from 1989 to 1997. Each of the seven studies (Waldenstrom et al 1997; Harvey et al 1996; Turnbull et al 1996; Rowley et al 1995; Kenny et al 1994; MacVicar et al 1993; Flint et al 1989) was considered in terms of interventions during labour and birth (induction, augmentation, electronic foetal monitoring, analgesia in labour [epidural, narcotics], operative delivery [caesarean section, instrumental vaginal delivery], maternal outcomes such as episiotomy, and infant outcomes such as five minute Apgar scores, admissions to intensive care or the special care baby unit, and stillbirths and neonatal death rates [perinatal mortality]) (Waldenstrom and Turnbull 1998). Although there was considerable diversity in designs and sample sizes of these clinical trials, they represent a group of midwifery models focused upon continuity of care.

The odds ratios from each of these studies, and the ratios from the pooled data, provide important reference points and outcome measures for this study of caseload midwifery practice. These studies of team midwifery practice collectively (pooled data) confirm that team midwifery approaches were related to less interventions during labour (OR=0.76), no difference in caesarean section rates (OR=0.91), lower episiotomy rates (OR=0.69) (in the presence of higher rates of perineal tears, OR=1.15), similar numbers of babies with Apgars of less than seven at birth (OR=1.13), and similar numbers of babies admitted to special care baby units (OR=0.86) (Waldenstrom and Turnbull 1998). A recent Australian study comparing team midwifery (seven midwives providing antenatal, intrapartum and postpartum care to a group of low- risk women) to standard care found increases in satisfaction - particularly in antenatal care - (Biro et al 2000) and some benefits from continuity of care ('provision of midwifery care from early pregnancy through to the early postpartum period by a team of 76 midwives for the same group of women', p.2).

One-to-one midwifery care (one midwife planning and providing most maternity care) has also been evaluated in London, UK, with reports of high satisfaction with antenatal and birth care and greater preparedness for birth and the time after the baby's birth (McCourt et al 1998) in comparison with women receiving conventional care.

This study examines partnership caseload midwifery, and while minor differences may be evident when considering team midwifery (greater number in the team four to seven versus two and a group of women versus a personal caseload), the emphasis on continuity of care is consistent across models.

This study complements other results relating to women-centred care and caseload midwifery models where this team confirmed the benefits of partnership caseloads as including delivery of continuity of care (known midwife at antenatal visits, at labour and delivery), and improved satisfaction with care during pregnancy, labour and delivery (Johnson et al 2003). These outcomes mirror Biro et al's (2000) work in team midwifery compared to standard care. The partnership caseload model of midwifery practice provides an opportunity for evaluation of a slightly different model of midwifery-led care within an Australian context. No research has explored the maternal and infant outcomes of low-risk mothers receiving care from partnership caseload midwives within Australia.

### Partnership Caseload Midwifery Model - PHMC

The PHMC sought to provide an appropriate maternity service which offers greater choice, control, and continuity of care to low risk childbearing women. Women with no pre-existing medical, gynaecological, or hereditary disorders, previous poor obstetric history, or other factors associated with potential obstetric problems at booking are eligible to participate in the program. At any time this risk status could change. Staff education and skills enhancement occurred within the hospital, and these midwives work in close consultation with obstetricians.

A primary health care approach was fundamental to the model with delivery of services when and where mothers wanted them, in the community rather than hospitals, and focusing on wellness rather than the medicalisation of childbirth (NSW Health 1996).

Each mother received the usual schedule of antenatal visits (generally six to eight PHMC visits (medical officer visits at weeks 12-16, 36 and 40 or more weeks; although flexibility in attendance times was possible). On admission to the labour ward the PHMC midwife or associate attended the woman. Finally the PHMC midwife or associate provided supportive postnatal care in the unit, (although immediate needs were attended to by the hospital staff), and follow-up domiciliary care. Domiciliary post-natal care was provided within 24 hours of discharge and included home visits up to day six or beyond (if required) and was usually three to four visits.

Thus, care within the antenatal, intrapartum and postnatal periods was delivered by a known or associate midwife.

### Standard hospital care

These women received care from doctors and midwives within the antenatal clinic. Similar numbers of antenatal visits were available to this group as the PHMC group. On admission to the labour ward any midwife on duty attended this mother. Finally postnatal care was delivered within the postnatal ward and the community, where the midwife may or may not have been known to the woman. These women may or may not have known the midwife or doctor who delivered care to them in the antenatal, intrapartum or postnatal periods. These women may have received care from the PHCM for postnatal home visits.

Therefore, the purpose of this study is to evaluate, through a retrospective comparison of existing data, the maternal and perinatal outcomes of mothers who received maternity services from partnership caseload midwives (referred to hereafter as Primary Health Midwifery Care - PHMC) and mothers receiving standard hospital care (SHC). This study examines maternal and infant outcomes of this midwifery practice model by confirming or refuting the following hypotheses:

1. Less low risk women (number and proportion) receiving PHMC will experience interventions - including induction, augmentation, analgesia in labour (epidural, narcotics), and operative delivery (caesarean section, instrumental vaginal delivery; or undergo episiotomy or perineal tearing, than low risk women receiving SHC.

2. Similar numbers (proportion) of infants with Apgar scores less than seven at five minutes will be demonstrated for low risk mothers receiving PHMC and SHC.

3. Similar numbers (proportion) of infants will be admitted to intensive care or special care baby unit for low risk mothers receiving PHMC and SHC.

## METHODS

This study involved secondary analysis of existing data from the Obstet Data System (ODS), which uses data items and definitions from the New South Wales Midwives Data Collection (MDC). The MDC is 'a population-based surveillance system covering all births in NSW public and private hospitals, as well as home births' (Taylor et al 1998, p.9) and includes several measures of maternal and infant morbidity and mortality. MDC data are entered by the midwife at various points throughout the woman's birthing experience.

Several outcome measures were included in this study, the definitions of which are provided within the MDC Report (Taylor et al 1998), including induction, augmentation, analgesia in labour (epidural, narcotics), operative delivery (caesarean section, instrumental vaginal delivery), maternal outcomes such as episiotomy, and infant outcomes such as five minute Apgar scores of less than seven, admissions to intensive care or special care baby unit, and stillbirth and neonatal death rates (perinatal mortality).

The reliability of the data entered into the ODS (reflecting MDC) has been reported as 'perfect or near perfect agreement' when compared with medical record entries (95% of records examined) (Taylor et al 1998, p.97). Seventy per cent of data items have reported 'kappa coefficients of 0.75' (Taylor et al 1998, p 98) with minimal missing data. These data form the outcome measures considered in this study.

An item identifying the various care options such as PHMC, standard hospital care, general practitioner shared care and other care options was also included in the data set. Mothers receiving maternity care from a large metropolitan health service during the time period of 1 July 1997 to 30 June 2000 (PHMC commenced in 1997) were included in the study.

### Data extraction and comparison of groups

From the data collected during the above time periods all women receiving public health care and whose language spoken was English were included. From this

initial available sample of records of 9964, 2693 high risk women were excluded. These were women with a history of antepartum haemorrhage (due to placenta praevia, abruptio placentae or other causes), pregnancy induced hypertension, gestational diabetes, prolonged rupture of membranes, threatened premature labour, blood group isoimmunisation, cervical suture, amniocentesis (<20 weeks), or CVS (<20 weeks). Similarly, 2065 records had missing data in the language spoken item of the data base and were excluded. Other records were excluded as they represented other models of care resulting in 3815 records with 976 records for PHMC and 2839 for SHC. An equivalent sample of 976 records from the SHC group was randomly selected using a statistical package and formed the comparison group. The total sample used included 1952 records representing low risk, English-speaking women, who had chosen (self-selected) or received either PHMC or SHC. These data were compared on a selection of maternal and infant clinical outcomes.

This study used existing data sources with an item embedded that identified whether the mother had received PHMC or SHC. Although PHMC was often a preferred option for mothers, only 600 mothers per year could experience PHMC, resulting in SHC being experienced initially by approximately twice as many mothers during the data extraction period. Analyses were conducted on the entire sample of records available which did not evidence substantial differences to the findings presented in this comparison of a randomly selected equivalent group of women. As odds ratios examine proportions, variations in sample size between groups have minimal impact on the outcome.

Nonetheless, selection bias associated with mothers choosing to participate in the PHMC program is a considerable study limitation. While this study initially planned to use a randomised control trial design, the research team members supported women's rights to choose their care option.

## ANALYSIS

All data were analysed using Statistical Package for the Social Sciences (SPSS), version 10. Odds ratios and their related confidence intervals were used to explore proportional differences in the two care methods (PHMC and SHC). The analyses were conducted separately for primiparous and multiparous women and then for all groups.

### Ethical considerations

This study was approved by the South Western Sydney Area Health Service Ethics Committee and the University of Western Sydney (Macarthur) Ethics Committee.

## RESULTS

### Sample

These low risk women had a mean age of 27.08 years (SD 4.93 years), 73% were born in Australia (1036/1417), 79% were in relationships (1542/1952), with 47% (904/1912) having an occupation of home duties and a further 53% (1008/1912) either employed or engaged in other activities. Seventy-five percent of women did not smoke (1462/1952). Multiparous women represented 61% (1195/1952) with 39% (757/1952) being primiparas. The mean gestational age of the infants was 39.63 weeks (SD 1.90 weeks).

Maternal ages for the PHMC (mean 27.5 years, SD 4.25 years) and the SHC group (mean 26.65 years, 5.50 years) were similar. Gestational ages for infants were also comparable for both groups (PHMC 39.88 weeks, SD 1.36 weeks; SHC 39.38 weeks, SD 2.30 weeks).

### Maternal outcomes (including interventions)

Maternal outcomes were examined and are presented in table 1. For primiparous women there was no significant difference in the numbers (proportion) of women undergoing induction or augmentation. However, less multiparous women experienced induction and this was consistent in the analysis for all women (PHMC OR 0.83, CI .76-0.92; SHC OR 1.19, CI 1.08-1.30).

Unexpectedly, more PHMC primiparous and multiparous women received pethidine during labour, emphasised in the primiparous group (PHMC OR 1.3, CI 1.14-1.48; SHC OR 0.72, CI 0.61-0.85 SHC). PHMC multiparous women experienced more normal vaginal deliveries (OR 1.38, CI 1.10-1.73) compared to multiparous women receiving SHC (OR 0.78, CI 0.69-0.93) and had a corresponding lower incidence of caesarean sections (PHMC OR 0.71, CI 0.53-0.95; SHC 1.26, CI 1.08-1.48). No significant differences were found when incidences of forceps deliveries were compared for any of the groups.

Less PHMC primiparous women (PHMC OR 0.85, CI 0.72-99; SHC 1.20, CI 1.00-1.43) experienced an episiotomy, although there was a corresponding rise in the number of perineal tears for these women (PHMC OR 1.33, CI 1.14-1.54; SHC 0.68, CI 0.55-0.85). Closer examination of the degree of perineal tears revealed there were more primiparous PHMC women experiencing 2nd degree tears (21.0% compared to 12.0% SHC) with similar proportions for 1st and 3rd tears. However, examination of perineal trauma overall versus intact perineum numbers for both groups, confirmed that overall trauma experienced by both groups was similar (OR 1.05, CI 0.75-1.46, _2=0.08, df=1, p=0.79).

These analyses confirm less intervention for multiparous PHMC women in the areas of induction and caesarean section, but more perineal tears with less

**Table 1: Maternal outcomes (including interventions) for partnership caseload (PHMC) and standard hospital care (SHC) groups**

| Maternal outcome | Primipara | | | Mulitpara | | | All n=1952 |
|---|---|---|---|---|---|---|---|
| | PHMC n=408 | SHC n=349 | OR (95% CI) | PHMC n=568 | SHC n=627 | OR (95% CI) | OR (95% CI) |
| Induction | 177/217§ | 172/161§ (0.57-1.02) | 0.76 | 167/384§ | 239/345§ (0.49-0.80) | 0.62*** (0.58-0.84) | 0.70*** |
| Augmentation | 93/301§ | 89/244§ (0.60-1.18) | 0.84 | 73/478§ | 101/483§ (0.52-1.01) | 0.73 (0.64-1.02) | 0.85 |
| Analgesia in labour (pethidine) | 210 | 130 (1.33-2.39) | 1.78*** | 174 | 139 (1.19-2.01) | 1.55*** (1.40-2.06) | 1.70*** |
| Analgesia in labour (epidural) | 80 | 70 (0.67-1.39) | 0.97 | 31 | 50 (0.41-1.05) | 0.66 (0.69-1.20) | 0.91 |
| Normal vaginal delivery | 305 | 251 (0.83-1.59) | 1.15 | 516/52§ | 533/94§ (1.22-2.5) | 1.75** (1.02-1.73) | 1.29* |
| Caesarean section | 51 | 45 (0.62-1.48) | 0.96 | 32/536§ | 60/567§ (0.36-0.88) | 0.56** (0.57-1.04) | 0.77 |
| Instrumental vaginal delivery (forceps) | 8 | 12 (0.22-1.39) | 0.56 | 5/563§ | 5-622§ (0.31-3.8) | 1.10 (0.36-1.57) | 0.76 |
| Episiotomy | 116/194§ | 120/262§ (0.50-0.98) | 0.70* | 50/254§ | 63/233§ (0.48-1.09) | 0.72 (0.59-0.97) | 0.75 |
| Perineal tear | 131/179§ | 72/190§ (1.35-2.78) | 1.93*** | 185/119§ | 162/134§ (0.92-1.77) | 1.28 (1.16-1.85) | 1.46*** |

§ Number present/number absent (where sample sizes vary)
Significant difference: *p<0.05, **p<0.01, ***p<0.001.
Induction: Onset of labour not spontaneous (Rowley et al 1995, p.291). Excludes no labour group.
Augmentation: Artificial rupture of membranes or use of oxytocic drugs after spontaneous onset of labour (excludes induced labour) (Taylor et al 1998, p.12-14).
Caesarean section: Delivery of the foetus through an abdominal incision, including elective.
Episiotomy: An incision in the perineum and vagina to enlarge the vulval orifice (Taylor et al 1998, p.12-14).

episiotomies for primiparous PHMC women, and thus only partially supporting hypothesis 1.

### Infant outcomes

Table 2 outlines the odds ratios for infant outcomes for primiparous, multiparous and all women. There were small numbers of babies with five minute Apgar scores of less than seven in both primiparous and multiparous comparisons. There were similar numbers (proportions) of babies admitted to either intensive care or the special care nursery for all groups. The related confidence intervals for these odds ratios were wide and in the presence of such small numbers were not significantly different for the group comparisons. Hypothesis 2 and 3 were supported by these analyses.

## DISCUSSION

This study was undertaken to evaluate the maternal and infant outcomes of a partnership caseload model of midwifery practice. Findings from previous studies and a systematic review of clinical trials relating to team midwifery research by Waldenstrom and Turnbull (1998) suggested there were potentially improved outcomes (reduced interventions) for women receiving continuity of midwifery care. This partnership caseload model of midwifery practice, although being different to team midwifery, would be expected to achieve similar clinical outcomes (the focus of this study) for women and their babies, given the very low maternal and infant mortality and infant morbidity.

This study represents a retrospective examination of a large sample of data routinely collected within our health service and is only broadly comparable to clinical trial outcomes of team midwifery. Women's satisfaction with this midwifery practice model has also been evaluated through a prospective survey reported elsewhere (Johnson et al 2003).

### Maternal outcomes

Improved outcomes were found for PHMC women, including less multiparous women experiencing inductions and caesarean sections and less primiparous women experiencing episiotomies, although primiparous women receiving PHMC experienced more perineal tears. Close scrutiny of the odds ratios for these outcomes for all PHMC versus SHC women provide a point of comparison with the odds ratios determined by the Waldenstrom and Turnbull (1998) systematic review. Similar odds ratios from the PHMC study (PHMCS) versus pooled data from the Waldenstrom and Turnbull (1998) systematic review (SR) were found including induction (PHMCS OR 0.70; SR OR 0.76), augmentation (PHMCS OR 0.85; SR OR

**Table 2. Infant outcomes for partnership caseload (PHMC) and standard hospital care (SHC) groups**

| Infant outcome | Primipara | | | Mulitpara | | | All n=1952 |
|---|---|---|---|---|---|---|---|
| | PHMC n=408 | SHC n=349 | OR (95% CI) | PHMC n=568 | SHC n=627 | OR (95% CI) | OR (95% CI) |
| Babies with 5 minute Apgar <7 | 10 | 12/332§ | 0.69 (0.29-1.62) | 12/555§ | 17/606§ | 0.77 (0.36-1.62) | 0.74 (0.42-1.30) |
| Babies admitted to intensive care or special care nursery | 35 | 23 | 1.33 (0.77-2.29) | 20 | 24 | 0.91 (0.50-1.67) | 1.18 (0.79-1.76) |
| § Number present/number absent (where sample sizes vary) | | | | | | | |

0.78), caesarean section (PHMCS OR 0.77; SR OR 0.91), instrumental delivery (forceps) (PHMCS OR 0.76; SR OR 0.82), episiotomy (PHMCS OR 0.75; SR OR 0.69), and perineal tear (PHMCS OR 1.46; SR OR 1.15), epidurals (PHMCS OR 0.91; SR OR 0.76). Dissimilar odds ratios were demonstrated for the use of narcotics (PHMCS OR 1.70; SR OR 0.69), although Waldenstrom et al's (1997) large Swedish study reported an OR of 1.69 very similar to this study.

Statistically significant differences were found in the SR for induction, augmentation, epidural, narcotics, and episiotomy and perineal tear for the pooled data set from clinical trials of 3810 women. Statistically significant differences were found for induction, analgesia in labour, normal vaginal delivery and perineal tears in this retrospective study of 1952 women.

Major differences between the studies were evident in the area of the provision of pethidine during labour. Considerably more PHMC women received pethidine in both primiparous and multiparous women. The strong rapport between women and primary health midwives may have contributed to women feeling more comfortable to ask and receive pain relief. Primary health midwives may also have been more responsive to women's pain threshold and pain relief needs. The use of pethidine, in this study, may reflect practitioner preference. A large study of 471 women (pethidine (n=206) and epidural (n=201) with 64 women receiving no analgesia) by Mansoori et al (2000) demonstrated that women who requested an epidural block were more satisfied with their pain relief during labour than women receiving pethidine, however, those women having epidurals also had longer labours and were more likely to have instrumental delivery and caesarean sections (untoward aspects of care).

For primpara women there was a decrease in the number of episiotomies and an increase in the number of perineal tears. Further exploration of the perineal data found increased numbers of PHMC women with 2nd degree tears. Further, while there is a difference between the proportion of PHMC primpara women experiencing 2nd degree tears and SHC, 2nd degree tears are seen to be equivalent to both midline and mediolateral episiotomies in terms of the structures involved (McGuinness et al 1991). There appears to be considerable debate surrounding the efficacy of episiotomies over perineal tearing and these results may, in part, reflect the debate influencing practices (McGuinness et al 1991; Moses 1992). A contemporary study of 49,692 spontaneous vaginal births by Webb and Culhane (2002) confirmed the positive correlation between episiotomy rates and rates of a third or fourth degree perineal laceration and also concluded that 'liberal as opposed to restrictive use of episiotomy is unwarranted and probably even harmful' (p.132).

The decrease in episiotomies and the increase in perineal tears (particularly 2nd degree) in PHMC primiparas may indicate more effective clinical management of women receiving PHMC compared to those receiving SHC. Nonetheless, there was no significant difference in the number of PHMC primpara women experiencing perineal trauma overall.

### Infant outcomes

Similar outcomes were found for PHMC infants and SHC infants. Similar non-significant odds ratios were demonstrated for the PHMC study and the pooled data from the systematic review, including babies with five minute Apgar <7 (PHMCS OR 0.74; SR OR 1.13), and admissions to intensive or special care nursery (PHMCS OR 1.18; SR OR 0.86).

These findings support and confirm the similar infant outcomes of partnership caseload midwifery compared to standard care, also supporting the benefits of this model in such clinical outcomes as reduced rates of caesarean section and slightly higher rates of normal vaginal deliveries.

## LIMITATIONS

While this study initially planned to use a randomised control trial design, the research team members supported women's rights to choose their care option. Sample selection bias, as previously noted, may have occurred.

Only studies of the size of the Waldenstrom and Turnbull (1998) (n=9148) systematic review are likely to accurately reflect differences. This study has, therefore, sought to compare the odds ratios found in this study with those obtained from this very large review of clinical trials comparing continuity of midwifery care with standard hospital care.

It should be noted that at all times PHMC midwives were required to adhere to hospital policies and standards of practice. This may have indirectly reduced the opportunity for improved outcomes.

Although this study compared partnership caseload midwifery to standard care, only comparisons of the various midwifery-led models (such as team and caseload midwifery and standard care) within the same setting are likely to identify the magnitude and direction of difference between team and caseload approaches to midwifery practice.

## CONCLUSION

We acknowledge the restrictions that choice has placed on these results, but suggest that given the large number of randomised control trials undertaken in team midwifery or other models of continuity of care, this study provides additional support for existing evidence that midwifery-led practice for low risk women has improved maternal outcomes and similar infant outcomes.

Future research using this practice model in high-risk women is warranted. This study has provided support for some improved maternal outcomes for low risk women experiencing partnership caseload midwifery practice. We support this model of practice as another midwifery-led option of care based on the principles of continuity of care.

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