[Intervention Review]
Continuous support for women during childbirth

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Editorial group: Cochrane Pregnancy and Childbirth Group.
Publication status and date: New search for studies and content updated (no change to conclusions), published in Issue 2, 2011.
Review content assessed as up-to-date: 9 January 2011.

Citation: Hodnett ED, Gates S, Hofmeyr GJ, Sakala C, Weston J. Continuous support for women during childbirth. *Cochrane Database of Systematic Reviews* 2011, Issue 2. Art. No.: CD003766. DOI: 10.1002/14651858.CD003766.pub3.

Abstract

Background
Historically, women have been attended and supported by other women during labour. However in hospitals worldwide, continuous support during labour has become the exception rather than the routine.

Objectives
Primary: to assess the effects of continuous, one-to-one intrapartum support compared with usual care. Secondary: to determine whether the effects of continuous support are influenced by: (1) routine practices and policies; (2) the provider's relationship to the hospital and to the woman; and (3) timing of onset.

Search strategy
We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (31 December 2010).

Selection criteria

All published and unpublished randomized controlled trials comparing continuous support during labour with usual care.

Data collection and analysis
We used standard methods of the Cochrane Collaboration Pregnancy and Childbirth Group. Two authors independently evaluated methodological quality and extracted the data. We sought additional information from the trial authors. We used random-effects analyses for comparisons in which high heterogeneity was present, and we reported results using the risk ratio for categorical data and mean difference for continuous data.

Main results
Twenty-one trials involving 15061 women met inclusion criteria and provided usable outcome data. Results are of random-effects analyses, unless otherwise noted. Women allocated to continuous support were more likely to have a spontaneous vaginal birth (RR 1.08, 95% CI 1.04 to 1.12) and less likely to have intrapartum analgesia (RR 0.90, 95% CI 0.84 to 0.97) or to report dissatisfaction (RR 0.69, 95% CI 0.59 to 0.79). In addition their labours were shorter (mean difference -0.58 hours, 95% CI -0.86 to -0.30), they were less likely to have a caesarean (RR 0.79, 95% CI 0.67 to 0.92) or instrumental vaginal birth (fixed-effect, RR 0.90, 95% CI 0.84 to 0.96), regional analgesia (RR 0.93, 95% CI 0.88 to 0.99), or a baby with a low 5-minute Apgar score (fixed-effect, RR 0.70, 95% CI 0.50 to 0.96). There was no apparent impact on other intrapartum interventions, maternal or neonatal complications, or on breastfeeding. Subgroup analyses suggested that continuous support was most effective when provided by a woman who was neither part of the hospital staff nor the woman's social network, and in settings in which epidural analgesia was not routinely available. No conclusions could be drawn about the timing of onset of continuous support.

Authors' conclusions
Continuous support during labour has clinically meaningful benefits for women and infants and no known harm. All women should have support throughout labour and birth.

Plain language summary

Continuous support for women during childbirth
Continuous support in labour increased the chance of a spontaneous vaginal birth, had no harm, and women were more satisfied.

Historically women have been attended and supported by other women during labour and birth. However in many countries, as more women are giving birth in hospital rather than at home, continuous support during labour has become the exception rather than the norm. This may contribute to the dehumanization of women's childbirth experiences. Modern obstetric care frequently subjects women to institutional routines, which may have adverse effects on the progress of labour. Supportive care during labour may involve emotional support, comfort measures, information and advocacy. These may enhance physiologic labour processes as well as women's feelings of control and competence, and thus reduce the need for obstetric intervention. The review of studies included 21 trials, from 15 countries, involving more than 15,000 women in a wide range of settings and circumstances. The continuous support was provided either by

hospital staff (such as nurses or midwives), women who were not hospital employees and had no personal relationship to the labouring woman (such as doulas or women who were provided with a modest amount of guidance), or by companions of the woman's choice from her social network (such as her husband, partner, mother, or friend). Women who received continuous labour support were more likely to give birth 'spontaneously', i.e. give birth with neither caesarean nor vacuum nor forceps. In addition, women were less likely to use pain medications, were more likely to be satisfied, and had slightly shorter labours. Their babies were less likely to have low 5-minute Apgar Scores. No adverse effects were identified. We conclude that all women should have continuous support during labour. Continuous support from a person who is present solely to provide support, is not a member of the woman's social network, is experienced in providing labour support, and has at least a modest amount of training, appears to be most beneficial. Support from a chosen family member or friend appears to increase women's satisfaction with their childbearing experience.

Background

The first version of this Cochrane Review was published in 1995 (Hodnett 2003) when the first systematic reviews in the Cochrane Collaboration Pregnancy and Childbirth Group Module were converted to the Cochrane Review format. Thus a formal Cochrane Protocol was not initially published. Subsequently the Review author, Ellen Hodnett, completed a trial of labour support (Hodnett 2002) with a sample size larger than the entire sample in the prior version of the original Review. As a protection against bias, she sought co-authors who were blind to the results of the new trial and who had special expertise that would enhance the quality of the Review. Discussions among the authors led to decisions to modify the background and methods. The authors decided that the best approach would be to write a new Protocol for the Review. The new Protocol was submitted through the peer review process of the Cochrane Pregnancy and Childbirth Group and has subsequently evolved into a Review that has been updated.

Historically and cross-culturally, women have been attended and supported by other women during labour and birth. However, since the middle of the 20th century, in many countries as the majority of women gave birth in hospital rather than at home, continuous support during labour has become the exception rather than the routine. Concerns about dehumanization of women's birth experiences (in high-, middle-, and low income countries) have led to calls for a return to continuous, one-to-one support by women for women during labour (Klaus 2002). Common elements of this care include emotional support (continuous presence, reassurance and praise), information about labour progress and advice regarding coping techniques, comfort measures (such as comforting touch, massage, warm baths/showers, promoting adequate fluid intake and output) and advocacy (helping the woman articulate her wishes to others).

Two complementary theoretical explanations have been offered for the effects of labour support on childbirth outcomes. Both explanations hypothesize that labour support enhances labour physiology and mothers' feelings of control and competence, reducing reliance on medical interventions. The first theoretical explanation considers possible mechanisms when companionship during labour is used in stressful, threatening and disempowering clinical birth environments (Hofmeyr 1991). During labour women may be uniquely vulnerable to environmental influences; modern obstetric care frequently subjects women to institutional routines, high rates of intervention, unfamiliar personnel, lack of privacy and other conditions

that may be experienced as harsh. These conditions may have an adverse effect on the progress of labour and on the development of feelings of competence and confidence; this may in turn impair adjustment to parenthood and establishment of breastfeeding, and increase the risk of depression. The provision of support and companionship during labour may to some extent buffer such stressors.

The second theoretical explanation does not focus on a particular type of birth environment. Rather, it describes two pathways - enhanced passage of the fetus through the pelvis and soft tissues, as well as decreased stress response - by which labour support may reduce the likelihood of operative birth and subsequent complications, and enhance women's feelings of control and satisfaction with their childbirth experiences (Hodnett 2002a). Enhanced fetopelvic relationships may be accomplished by encouraging mobility and effective use of gravity, supporting women to assume their preferred positions and recommending specific positions for specific situations. Studies of the relationships among fear and anxiety, the stress response and pregnancy complications have shown that anxiety during labour is associated with high levels of the stress hormone epinephrine in the blood, which may in turn lead to abnormal fetal heart rate patterns in labour, decreased uterine contractility, a longer active labour phase with regular well-established contractions and low Apgar scores (Lederman 1978; Lederman 1981). Emotional support, information and advice, comfort measures and advocacy may reduce anxiety and fear and associated adverse effects during labour.

Continuous support has been viewed by some as a form of pain relief, specifically, as an alternative to epidural analgesia (Dickinson 2002), because of concerns about the deleterious effects of epidural analgesia on labour progress (Anim-Somuah 2005). Many labour and birth interventions routinely involve, or increase the likelihood of, co-interventions to monitor, prevent or treat adverse effects, in a "cascade of interventions". Continuous, one-to-one support has the potential to limit this cascade and therefore to have a broad range of different effects, in comparison to usual care. For example, if continuous support leads to reduced use of epidural analgesia, it may in turn involve less use of electronic fetal monitoring, intravenous drips, synthetic oxytocin, drugs to combat hypotension, bladder catheterization, vacuum extraction or forceps, episiotomy and less morbidity associated with these, and may increase mobility during labour and spontaneous birth (Caton 2002).

A systematic review examining factors associated with women's satisfaction with the childbirth experience suggests that continuous support can make a substantial contribution to this satisfaction. When women evaluate their experience, four factors predominate: the amount of support from caregivers, the quality of relationships with caregivers, being involved with decision-making and having high expectations or having experiences that exceed expectations (Hodnett 2002a).

Clarification of the effects of continuous support during labour, overall and within specific circumstances, is important in light of public and social policies and programs that encourage this type of care. For example, the Congress in Uruguay passed a law in 2001 decreeing that all women have the right to companionship during labour. In several low- and middle-income countries (including China, South Africa, Tanzania and Zimbabwe), the Better Births Initiative promotes labour companionship as a core element of care for improving maternal and infant

health (WHO 2010). In many low income countries, women are not permitted to have anyone with them during labour and birth. Efforts to change policies in these settings have led to questions about the effectiveness of support from husbands/partners or other support people of the woman's own choosing, particularly in settings where the cost of paid companions would be prohibitive.

In North America, the services of women with special training in labour support have become available. Most commonly known as doula (a Greek word for 'handmaiden'), this new member of the caregiver team may also be called a labour companion, birth companion, labour support specialist, labour assistant or birth assistant. A number of North American organizations offer doula training, certification and professional support; according to one estimate more than 50,000 people have received this training to date (P Simkin, personal communication). Some North American hospitals have begun to sponsor doula services. In recent national surveys of childbearing women in the United States, 3% to 5% of respondents indicated that they had used doula services during their most recent labours (Declercq 2002; Declercq 2006). An association for doulas has been established in the UK (McGinnis 2001). Maternal healthcare systems in dozens of high- and low- to middle-income countries throughout the world are developing new traditions for supportive female companionship during labour (Pascali-Bonaro 2010).

Questions have arisen about the ability of employees (such as nurses or midwives) to provide effective labour support, in the context of modern institutional birth environments (Hodnett 1997). For example, nurses and midwives often have simultaneous responsibility for more than one labouring woman, spend a large proportion of time managing technology and keeping records, and begin or end work shifts in the middle of women's labours. They may lack labour support skills or may work in short-staffed environments. Companions, such as husbands/partners and female relatives, usually have little experience in providing labour support and are themselves in need of support when with a loved one during labour and birth. In addition to questions about the impact of the type of provider of labour support, there are other questions about the effectiveness of support, including its impact under a variety of environmental conditions, and whether its effects are mediated by when continuous support begins (early versus active labour).

Childbearing women, policy-makers, payers of health services, health professionals and facilities and those who provide labour support all need evidence about the effects of continuous support, overall and under specific conditions.

The current update includes new trials and major revisions to all aspects of the Review, to align it with current Cochrane methodological guidelines (Higgins 2009).

Objectives

The primary objective was to assess the effects, on mothers and their babies, of continuous, one-to-one intrapartum support compared with usual care, in any setting. Secondary objectives were to determine whether the effects of continuous support are influenced by:
(1) routine practices and policies in the birth environment that may affect a woman's autonomy, freedom of movement and ability to cope with labour, including:

(a) policies about the presence of support people of the woman's own choosing;
(b) epidural analgesia; and
(c) continuous electronic fetal monitoring;
(2) whether the provider is a) a member of the staff of the institution (and thus has additional loyalties or responsibilities), b) not a staff member but not part of the woman's social network, or c) or a person chosen by the woman from family members and friends; and
(3) whether the continuous support begins early or later in labour.

Methods

Criteria for considering studies for this review

Types of studies

All controlled trials comparing continuous labour support by either a familiar or unfamiliar person (with or without healthcare professional qualifications) with usual care, in which there was random allocation to treatment and control groups, were considered for inclusion in the Review.

Types of participants

Pregnant women, in labour.

Types of interventions

The form of care that was evaluated was continuous presence and support during labour and birth. The person providing the support could have qualifications as a healthcare professional (nurse, midwife) or training as a doula or childbirth educator, or be a family member, spouse/partner, friend or stranger with little or no special training in labour support. The control group received usual care, as defined by the trialists. In all cases, 'usual care' did not involve continuous intrapartum support, but it could involve other measures, such as routine epidural analgesia, to help women to cope with labour.

Types of outcome measures

Theoretically continuous support can have many diverse physiological and psychosocial effects (both short- and long-term), and therefore a larger than usual number of outcomes were considered.

Primary outcomes

Mother

1. Any analgesia/anaesthesia (pain medication)
2. Synthetic oxytocin during labour
3. Spontaneous vaginal birth
4. Postpartum depression (defined using a pre-specified cutoff score on a validated instrument)
5. Negative rating of/negative feelings about the birth experience

Baby

1. Admission to special care nursery
2. Breastfeeding at 1-2 months postpartum

Secondary outcomes

Labour events

1. Regional analgesia/anaesthesia
2. Labour length
3. Severe labour pain (postpartum report)

Birth

1. Caesarean birth
2. Instrumental vaginal birth
3. Perineal trauma (defined as episiotomy or laceration requiring suturing)

Newborn

1. Low five-minute Apgar score (as defined by trial authors)
2. Prolonged newborn hospital stay

Longer-term maternal outcomes

1. Difficulty mothering
2. Low self-esteem in the postpartum period

Search methods for identification of studies

Electronic searches

We searched the Cochrane Pregnancy and Childbirth Group's Trials Register by contacting the Trials Search Co-ordinator (31 December 2010).

The Cochrane Pregnancy and Childbirth Group's Trials Register is maintained by the Trials Search Co-ordinator and contains trials identified from:

1. quarterly searches of the Cochrane Central Register of Controlled Trials (CENTRAL);
2. weekly searches of MEDLINE;
3. handsearches of 30 journals and the proceedings of major conferences;
4. weekly current awareness alerts for a further 44 journals plus monthly BioMed Central email

alerts.

Details of the search strategies for CENTRAL and MEDLINE, the list of handsearched journals and conference proceedings, and the list of journals reviewed via the current awareness service can be found in the 'Specialized Register' section within the editorial information about the Cochrane Pregnancy and Childbirth Group.

Trials identified through the searching activities described above are each assigned to a review topic (or topics). The Trials Search Co-ordinator searches the register for each review using the topic list rather than keywords.

We did not apply any language restrictions.

Data collection and analysis
For this update we re-assessed all trials (both those already in the review and the reports identified by the updated search), using the following methods.

Selection of studies
For the current update, two review authors (EH and JW) independently assessed for inclusion all potentially eligible studies. Had any disagreement occurred, we would have resolved it through discussion or, if required, we would have consulted a third member of the review team.

Data extraction and management
We designed a form to extract data. For eligible studies, two review authors (EH, JW) extracted the data using the agreed form. We resolved discrepancies through discussion. We entered data into Review Manager software (RevMan 2008) and checked for accuracy.

When information regarding any of the above was unclear, we attempted to contact authors of the original reports to provide further details.

Assessment of risk of bias in included studies
Two review authors (EH, JW) independently assessed risk of bias for each study using the criteria outlined in the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2009). We would have resolved any disagreement by discussion or by involving a third assessor.

(1) Sequence generation (checking for possible selection bias)
We described for each included study the method used to generate the allocation sequence in sufficient detail to allow an assessment of whether it should produce comparable groups.

We assessed the method as:

- adequate (any truly random process, e.g. random number table; computer random number generator),
- inadequate (any non-random process, e.g. odd or even date of birth; hospital or clinic record number) or,

- unclear.

(2) Allocation concealment (checking for possible selection bias)
We described for each included study the method used to conceal the allocation sequence, and determined whether intervention allocation could have been foreseen in advance of, or during recruitment, or changed after assignment.

We assessed the methods as:

- adequate (e.g. telephone or central randomization; consecutively numbered sealed opaque envelopes);
- inadequate (open random allocation; unsealed or non-opaque envelopes, alternation; date of birth);
- unclear.

(3) Blinding (checking for possible performance bias)
We described for each included study the methods used, if any, to blind personnel from knowledge of which intervention a participant received. Since women and care providers cannot be blinded as to whether continuous support was given, we considered blinding adequate if outcomes were recorded by outcome assessors who had no knowledge of the woman's group assignment. We judged studies at low risk of bias if they were blinded, or if we judged that the lack of blinding could not have affected the results. We assessed blinding separately for different outcomes or classes of outcomes.

4) Incomplete outcome data (checking for possible attrition bias through withdrawals, dropouts, protocol deviations)
We described for each included study, and for each outcome or class of outcomes, the completeness of data including attrition and exclusions from the analysis. We stated whether attrition and exclusions were reported, the numbers included in the analysis at each stage (compared with the total randomized participants), reasons for attrition or exclusion where reported, and whether missing data were balanced across groups or were related to outcomes. To be included in the review, data on a given outcome had to be available for at least 80% of those who were originally randomized. For outcomes collected post hospital discharge, we recognize that follow-up, particularly in low-income countries, can be very difficult. Therefore, we included data if the response rate was higher than 75% and there was no obvious imbalance in groups. Where sufficient information was reported, or could be supplied by the trial authors, we planned to include missing data in the analyses. We assessed methods as:

- adequate;
- inadequate;
- unclear.

(5) Selective reporting bias
We described for each included study how we investigated the possibility of selective outcome reporting bias and what we found.

We assessed the methods as:

- adequate (where it is clear that all of the study's pre-specified outcomes and all expected outcomes of interest to the review have been reported);
- inadequate (where not all the study's pre-specified outcomes have been reported; one or more reported primary outcomes were not pre-specified; outcomes of interest are reported incompletely and so cannot be used; study fails to include results of a key outcome that would have been expected to have been reported);
- unclear.

(6) Other sources of bias
We planned to describe for each included study any important concerns we had about other possible sources of bias, including, for example, whether the trial was stopped early due to a data-dependent process, there was evidence of extreme baseline imbalance, or there had been claims of fraud.

We assessed whether each study was free of other problems that could put it at risk of bias:

- yes;
- no;
- unclear.

(7) Overall risk of bias
We made explicit judgements about whether studies are at high risk of bias, according to the criteria given in the *Handbook* (Higgins 2009). With reference to (1) to (6) above, we assessed the likely magnitude and direction of the bias and whether we considered it is likely to impact on the findings. We explored the impact of the level of bias through undertaking sensitivity analyses - *see '* Sensitivity analysis'

Measures of treatment effect
Dichotomous data
For dichotomous data, we presented results as summary risk ratio with 95% confidence intervals.

Continuous data
All but one pre-specified outcome involved dichotomous data. For labour length, we used the mean difference because it was measured in the same way in the trials.

Unit of analysis issues
Cluster-randomized trials

Had we found cluster-randomized trials, we would have included them in the analyses along with individually randomized trials. Our plan was as follows: we would adjust their sample sizes or standard errors using the methods described in the *Handbook* (Section 16.3.4 or 16.3.6) using an estimate of the intracluster correlation co-efficient (ICC) derived from the trial (if possible), from a similar trial or from a study of a similar population. If we use ICCs from other sources, we will report this and conduct sensitivity analyses to investigate the effect of variation in the ICC. If we identify both cluster-randomized trials and individually-randomized trials, we plan to synthesize the relevant information. We will consider it reasonable to combine the results from both if there is little heterogeneity between the study designs and the interaction between the effect of intervention and the choice of randomization unit is considered to be unlikely. We will also acknowledge heterogeneity in the randomization unit and perform a separate meta-analysis.

Dealing with missing data
For included studies, we noted levels of attrition. We included data for a given outcome which occurred prior to hospital discharge only if the data were available for at least 80% of those originally randomized. For outcomes collected post-hospital discharge we included data if the response rate was higher than 75% and there was no obvious imbalance in groups.

For all outcomes we have carried out analyses, as far as possible, on an intention-to-treat basis, i.e. we attempted to include all participants randomized to each group in the analyses. The denominator for each outcome in each trial was the number randomized minus any participants whose outcomes were known to be missing.

Assessment of heterogeneity
We assessed statistical heterogeneity in each meta-analysis using the T^2, I^2 and Chi^2 statistics. We regarded heterogeneity as substantial if T^2 was greater than zero and either I^2 was greater than 30% or there was a low P value (less than 0.10) in the Chi^2 test for heterogeneity. In such cases we took the following steps:

1. a sensitivity analysis, in which methodological weak trials were removed from the analyses and results compared for the primary outcomes;

2. visual inspection of the forest plots for evidence of inconsistency in results; and

3. comparison of the results of fixed-effect and random-effects analyses.

Assessment of reporting biases
Had we suspected reporting bias, we would have attempted to contact study authors asking them to provide missing outcome data. If this were not possible, and the missing data were thought to introduce serious bias, we would not have included the outcome data from that trial**.**

Data synthesis
We carried out statistical analysis using the Review Manager software (RevMan 2008). We used fixed-effect Mantel-Haenszel meta-analysis for combining data. We defined heterogeneity as substantial if a given meta-analysis resulted in an I^2 value greater than 30%, and there was inconsistency among trials in the direction or magnitude of effects (judged visually in the forest plot), or a low (less than 0.10) P value in the Chi^2 test for heterogeneity.

We excluded from analyses data for any outcome in which data were missing for more than 20% of those originally randomized.

Subgroup analysis and investigation of heterogeneity
We planned the following subgroup analyses.

A) Three subgroup analyses that concern characteristics of the childbirth environment
(1) Trials in settings in which women were permitted to be accompanied by one or more support persons of their own choosing compared with trials in which accompaniment was not permitted;

(2) trials conducted in settings in which epidural analgesia was available compared with trials in settings in which it was unavailable;

(3) trials in which there was a policy of routine electronic fetal heart rate monitoring compared with trials in settings in which continuous electronic fetal monitoring was not routine.

(B) One subgroup analysis that concerns characteristics of the providers of labour support
(4) Trials in which the caregivers were employees of the institution, compared with trials in which the caregivers were not employees and were not members of the woman's social network, compared to trials in which the providers were not employees and were lay people chosen by the participants (e.g. husband/partner, friend, close relative).

(C) One subgroup analysis that concerns differences in the timing of onset of continuous support
(5) Trials in which continuous labour support began prior to or during early labour (as defined by trial authors), compared with trials in which continuous support began in active labour.

Because few of the trial reports contained all of the information needed for the above subgroup analyses, we contacted the trial authors in an attempt to verify the presence/absence of routine electronic fetal monitoring (EFM), the presence/absence of epidural analgesia and timing of onset of continuous support. We excluded some studies included in the primary comparisons from the subgroup analyses concerning the use of EFM because their status regarding EFM use was unknown. For tests of differences between these subgroups, we recalculated the overall analysis by including only the studies in which EFM use was known.

The seven primary outcomes and one secondary outcome were used in the subgroup analyses. While normally subgroup analyses are restricted to primary outcomes, we also included the outcome of caesarean delivery, because there is widespread concern about escalating caesarean rates worldwide, and subgroup analyses could be helpful to policy makers in decisions about the provision of continuous labour support. Thus the outcomes in the subgroup analyses were: any analgesia/anaesthesia, synthetic oxytocin during labour, spontaneous vaginal birth, caesarean birth, postpartum depression, negative ratings of the birth experience, admission to special care nursery, and breastfeeding at 1-2 months postpartum.

When I^2 levels were high but the amount of heterogeneity in treatment effects was low (as happens when there are a large number of big trials and thus the amount of variation due to sampling error is extremely low), we compared the results of random-effects and fixed-effect

analyses. In instances in which the conclusions were not materially different in both methods of analysis, we reported the results of fixed-effect, inverse variance meta-analysis, in order to be able to calculate a Chi^2 for the purpose of exploring differences based on pre-specified subgroups. As a consequence the totals in the subgroup analysis tables are sometimes slightly different from those in the main comparison, since the main comparisons used the Mantel-Haenszel rather than the inverse variance method.

Sensitivity analysis
We performed sensitivity analyses, for the primary outcomes, in instances in which there was a high risk of bias associated with the quality of included trials.

Results

Description of studies
See: Characteristics of included studies; Characteristics of excluded studies; Characteristics of studies awaiting classification.

Please *see* Characteristics of included studies table. While 22 trials met inclusion criteria, one trial (Thomassen 2003) provided no usable outcome data. We do not describe it here, but provide details in the Characteristics of included studies table.

All 21 trials (n = 15,061) that provided usable outcome data were conducted in hospitals. The trials were conducted in Australia, Belgium, Botswana, Brazil, Canada, Chile, Finland, France, Greece, Guatemala, Mexico, Nigeria, South Africa, Sweden and the United States, under widely disparate hospital conditions, regulations and routines. There was remarkable consistency in the descriptions of continuous support across all trials. In all instances the intervention included continuous or nearly continuous presence, at least during active labour. Nineteen of the 21 trials that provided usable outcome data (all except Cogan 1988 and Dickinson 2002) also included specific mention of comforting touch and words of praise and encouragement.

In 11 trials (Breart - Belgium 1992; Breart - France 1992; Campbell 2006; Cogan 1988; Dickinson 2002; Gagnon 1997; Hemminki 1990a; Hemminki 1990b; Hodnett 1989; Hodnett 2002; McGrath 2008), hospital policy permitted women to be accompanied by their husbands/partners or other family members during labour, while in the other 10 trials, no additional support people were allowed. Epidural analgesia was not routinely available in six trials (Breart - Greece 1992; Hofmeyr 1991; Kashanian 2010; Klaus 1986; Madi 1999; Morhason-Bello 2009). We were unsuccessful in obtaining information about availability of epidural analgesia in one trial (Cogan 1988). Epidural analgesia was routinely available in the other 14 trials. Electronic fetal heart rate monitoring was not routine in seven trials (Bruggemann 2007; Hofmeyr 1991; Kashanian 2010; Klaus 1986; Langer 1998; Madi 1999; Morhason-Bello 2009). In nine trials (Campbell 2006; Dickinson 2002; Gagnon 1997; Hemminki 1990a; Hemminki 1990b; Hodnett 1989; Hodnett 2002; Kennell 1991; McGrath 2008) electronic fetal monitoring was used routinely. We were unsuccessful in obtaining information about the use of electronic fetal monitoring in five trials (Breart - Greece 1992; Breart - Belgium 1992; Breart - France 1992; Cogan 1988; Torres 1999).

It was not possible to categorize most of the trials according to the pre-specified subgroups of

early versus active labour. In four trials (Cogan 1988; Hodnett 1989; Klaus 1986; Madi 1999), the support began in early labour. In the other 17 trials, the timing of onset of support was much more heterogenous, as were definitions of early and active labour, in instances in which these were defined. Women were in varying phases of labour, from elective induction to active labour.

In addition, the persons providing the support intervention varied in their experience, qualifications and relationship to the labouring women. In nine trials (Breart - Belgium 1992; Breart - France 1992; Breart - Greece 1992; Dickinson 2002; Gagnon 1997; Hemminki 1990a; Hemminki 1990b; Hodnett 2002; Kashanian 2010), the support was provided by a member of the hospital staff, for example, a midwife, student midwife or nurse. In seven trials the providers were not members of the hospital staff and were not part of the woman's social network; they were women with or without special training, such as doulas or women who had given birth before (Hodnett 1989; Hofmeyr 1991; Kennell 1991; Klaus 1986; McGrath 1999): a childbirth educator (Cogan 1988), or retired nurses (Langer 1998). In five trials they were companions of the woman's choice from her social network, with or without brief training -- a female relative or friend or the woman's husband/partner (Bruggemann 2007; Campbell 2006; Madi 1999; Morhason-Bello 2009; Torres 1999).

Risk of bias in included studies

The trials were of generally good quality (Figure 1;Figure 2), although the risk of selection bias was high in three small trials (Bruggemann 2007; Hodnett 1989; Kashanian 2010).

Figure 1. Methodological quality summary: review authors' judgements about each methodological quality item for each included study.
[Full View]

Figure 2. Methodological quality graph: review authors' judgements about each methodological quality item presented as percentages across all included studies
[Full View]

Allocation concealment: Hodnett 2002 used a central, computerized randomization service accessed by telephone. In 17 trials (Breart - Belgium 1992; Breart - France 1992; Breart - Greece 1992; Campbell 2006; Dickinson 2002; Gagnon 1997; Hemminki 1990a; Hemminki 1990b; Hofmeyr 1991; Kashanian 2010; Kennell 1991; Klaus 1986; Langer 1998; Madi 1999; McGrath 2008; Morhason-Bello 2009; Torres 1999) randomization was by sealed, opaque envelopes. In Bruggemann 2007 women picked their treatment allocation from an opaque container. Two trials used methods that were centrally controlled but not concealed (Cogan 1988; Hodnett 1989). One trial (Thomassen 2003) did not describe the method of random assignment.

Performance bias: neither those providing nor receiving care could be blinded to the presence/absence of a person providing continuous support. Hodnett 2002 provided evidence to discount contamination and co-intervention as serious threats to validity.

Attrition bias: we did not include data for outcomes assessed in hospital in a comparison if there

was more than 20% loss to follow-up; we did not include longer-term outcome data if there was more than 25% loss to follow-up; based on this criterion, one trial (Thomassen 2003) provided no usable outcome data.

Detection bias: in the trials which sought participants' evaluations of their birth experiences (Breart - Belgium 1992; Breart - France 1992; Hofmeyr 1991; Hodnett 2002; Kennell 1991), efforts were made to reduce response bias, through use of an interviewer blinded to the woman's group allocation or self-administered questionnaires.

Effects of interventions
Main comparison: continuous support versus usual care - all trials
We considered 17 outcomes. Between one and 21 trials contributed to the analyses of each outcome. Sensitivity analyses, conducted by removing the trials (all of which were small) with a high likelihood of selection bias (Bruggemann 2007, Hodnett 1989; Kashanian 2010) did not alter the conclusions. According to our pre-specified criteria, there was substantial statistical heterogeneity in all but four outcomes (instrumental vaginal birth, low 5-minute Apgar score, low postpartum self-esteem and postpartum depression). Inspection of the forest plots did not suggest sources of heterogeneity. Comparisons of fixed-effect and random-effects analyses did not yield substantive differences nor alter conclusions. We report results of average random-effects analyses for all comparisons, for all outcomes except instrumental vaginal birth, low 5-minute Apgar score, low postpartum self-esteem data, and postpartum depression. (Each of the latter two comparisons only contain data from one trial.) We have noted in the text the three instances in which fixed-effect analysis was used.

Primary outcomes
Women who had continuous, one-to-one support during labour were:

more likely to have

- a spontaneous vaginal birth (18 trials, n = 14,005, RR 1.08, 95% CI 1.04 to 1.12, I^2 48%, τ^2 0.00);

less likely to have

- any intrapartum analgesia/anaesthesia (13 trials, n = 12,169, RR 0.90, 95% CI 0.84 to 0.97, I^2 76%, τ^2 0.01);
- reported negative rating of/negative feelings about childbirth experience (11 trials, n = 11,133, RR 0.69, 95% CI 0.59 to 0.79, I^2 63%, τ^2 0.03);

and there was no apparent impact of continuous support on

- use of synthetic oxytocin during labour (14 trials, n = 12,506; RR 0.97, 95% CI 0.90 to 1.04, I^2 67%, τ^2 0.01);
- admission to the special care nursery (7 trials; n = 8897; RR 0.97, 95% CI 0.76 to 1.25, I^2

37%, τ^2 0.03);

- breastfeeding at 1-2 months postpartum (3 trials, n = 5363, RR 1.01, 95% CI 0.94 to 1.09, I^2 52%, τ^2 0.00); and

- postpartum depression (1 trial, n = 5567; RR = 0.86, 95% CI 0.73 to 1.02, fixed-effect).

Secondary outcomes
Women who had continuous, one-to-one support were:

more likely to have

- shorter labours (11 trials; n = 5269; mean difference -0.58 hours, 95% CI -0.86 to -0.30, I^2 50%, τ^2 0.09);

less likely to have

- regional analgesia/anaesthesia (9 trials; n = 11,444, RR 0.93, 95% CI 0.88 to 0.99, I^2 81%, τ^2 0.01);
- an instrumental vaginal birth (18 trials; n = 14,004; RR 0.90, 95% CI 0.84 to 0.96, fixed-effect);
- a caesarean birth (21 trials; n = 15,061; RR 0.79, 95% CI 0.67 to 0.92, I^2 55%, τ^2 0.05);
- a baby with a low 5-minute Apgar score (12 trials; n = 12,401; RR 0.70, 95% CI 0.50 to 0.96, fixed-effect);

and there was no apparent impact of continuous labour support on

- the likelihood of serious perineal trauma (4 trials; n = 8120; RR 0.97, 95% CI 0.92 to 1.01, I^2 44%, τ^2 0.00);
- severe labour pain (4 trials; n = 2456; RR 1.00, 95% CI 0.83 to 1.12, I^2 78%, τ^2 0.03);
- difficulty mothering (3 trials; n = 6308, RR 0.60, 95% CI 0.35 to 1.02, I^2 94%, τ^2 0.19);
- low postpartum self-esteem (1 trial; n = 652; RR 1.00, 95% CI 0.77 to 1.30, fixed-effect); and
- prolonged neonatal hospital stay (3 trials; n = 1098, RR 0.83, 95% CI 0.42 to 1.65, I^2 62%, τ^2 0.15).

Subgroup comparisons
For the first time, the Review includes trials of support by companions of the woman's own choosing, i.e. husband/partner, relative, or friend from her existing social network. Therefore we grouped the trials according to the following provider characteristics: 1) staff members of the hospital; 2) neither hospital employees nor part of the woman's social network; and 3) chosen by

the woman from her social network.

We have presented the results of the subgroup analyses below. While we made every effort to obtain the required information from trial authors, none of the subgroup comparisons are based on the total number of included trials for which usable data were available. Thus results must be interpreted with caution. The text below does not present the results for postpartum depression or breastfeeding at 1-2 months postpartum, because too few trials provided data. Only one trial contributed data about postpartum depression (Hodnett 2002) and three about breastfeeding (Hodnett 2002; Hofmeyr 1991; Langer 1998).

We were unable to conduct the planned subgroup comparison based on timing of onset of labour support. It was not possible to categorize most of the trials according to the pre-specified subgroups of early versus active labour. In four trials (Cogan 1988; Hodnett 1989; Klaus 1986; Madi 1999), the support began in early labour. In the other 17 trials, the timing of onset of support was much more heterogenous, as were definitions of early and active labour, in instances in which these were defined. Women were in varying phases of labour, from elective induction to active labour.

As noted in Subgroup analysis and investigation of heterogeneity, totals in the subgroup analysis figures may differ slightly from those in the main comparisons, because a different method of analysis had to be used. All subgroup comparisons used fixed-effect, to allow computation of tests for differences between subgroups.

Outcome: any intrapartum analgesia/anaesthesia

1. Policies about the presence of companions during labour and birth: In seven trials (n = 9752) companions were permitted; RR 0.97, 95% CI 0.96 to 0.99, while in six trials (n = 2484) companions were not permitted; RR 0.91, 95% CI 0.85 to 0.96. Chi^2 for the subgroup comparison = 4.98, P = 0.03.
2. Availability of epidural analgesia: In nine trials (n = 10,888), epidural analgesia was routinely available; RR 0.97, 95% CI 0.96 to 0.98. In four trials (n = 1348) epidural analgesia was not routinely available; RR 0.83, 95% CI 0.69 to 0.99. Chi^2 for the subgroup comparison = 2.89, P = 0.09.
3. Routine use of EFM: in six trials (n = 8580), EFM was routine; RR 0.97, 95% CI 0.96 to 0.99. In five trials (n = 2072), EFM was not routine; RR 0.96, 95% CI 0.90 to 1.03. In two trials (n = 1579), the policy about routine EFM was unknown; RR 0.89, 95% CI 0.80 to 0.99. Chi^2 for the subgroup comparison = 2.31, P = 0.32.
4. Provider characteristics: in six trials (n = 9152) the support was provided by a member of the hospital staff; RR 0.97, 95% CI 0.95 to 0.98. In four trials (n = 1790), the support was provided by a woman who was not a member of the staff and was not part of the woman's social network; RR 0.91, 95% CI 0.86 to 0.97. In three trials (n = 1294) the support was provided by a member of the woman's social network; RR 0.94, 95% CI 0.88 to 1.00. $Chi^2$for the subgroup comparison = 4.76, P = 0.09.

Thus, the effects of continuous support on use of any intrapartum analgesia/anaesthesia appeared to be stronger in settings where companions were not permitted, but did not appear to be

influenced by the availability of epidural analgesia, the use of routine EFM, or provider characteristics.

Outcome: synthetic oxytocin during labour

1. Policies about the presence of companions: in five trials (n = 9495) companions were permitted; RR 1.04, 95% CI 0.99 to 1.10. In nine trials (n = 3011) companions were not permitted; RR 0.99, 95% CI 0.97 to 1.01. Chi^2 for the subgroup comparison = 3.16, P = 0.08.
2. Availability of epidural analgesia: in eight trials (n = 10,568) epidural analgesia was routinely available; RR 1.00, 95% CI 0.98 to 1.02. In six trials (n = 1952), epidural analgesia was not routinely available; RR 1.02, 95% CI 0.93 to 1.11. Chi^2 for the subgroup comparison = 0.17, P = 0.68.
3. Use of routine EFM: in four trials (n = 8340) EFM was routine; RR 1.04, 95% CI 0.98 to 1.11. In six trials (n = 1612) EFM was not routine; RR 0.99, 95% CI 0.96 to 1.01. In 4 trials (n = 2568) it is not known whether EFM was routine; RR 1.02, 95% CI 0.97 to 1.08. Chi^2 for the subgroup comparison = 3.32, P = 0.19.
4. Provider characteristics: in six trials (n = 9561), the support was provided by a member of the hospital staff; RR 1.06, 95% CI 1.01 to 1.11. In three trials (n = 1018), the support was provided by a woman who was not a member of the staff and was not part of the woman's social network; RR 0.69, 95% CI 0.50 to 0.94. In five trials (n = 1927), the support was provided by a member of the woman's social network; RR 0.99, 95% CI 0.96 to 1.01. Chi^2 for the subgroup comparison = 11.51, P = 0.003.

Thus the effects of continuous support on use of synthetic oxytocin during labour did not appear to be influenced by policies about the presence of companions, use of routine EFM, or availability of epidural analgesia. The effectiveness of continuous support in reducing the likelihood of intrapartum oxytocin seemed to be strongest when the provider was neither a staff member nor part of the woman's social network.

Outcome: spontaneous vaginal birth

1. Policies about companions: In nine trials (n = 10,889) companions were permitted; RR 1.03, 95% CI 1.00 to 1.05. In nine trials (n = 3215) companions were not permitted; RR1.12, 95% CI 1.07 to 1.16. Chi^2 for the subgroup comparison = 12.04, P = 0.005.
2. Availability of epidural analgesia: In 13 trials (n = 12,672), epidural analgesia was routinely available; RR 1.04, 95% CI 1.01 to 1.06). In five trials (n = 1432) epidural analgesia was not routinely available; RR 1.12, 95% CI 1.06 to 1.17. Chi^2 for the subgroup comparison = 6.82, P = 0.009.
3. Routine use of EFM: In eight trials (n = 9717) EFM was routine; RR 1.03, 95% CI 1.01 to 1.06. In six trials (n = 1799) EFM was not routine; RR 1.12, 95% CI 1.06 to 1.17. In 4 trials (n = 2561), the policy about routine EFM is not known; RR 1.07, 95% CI 1.01 to 1.13. Chi^2 for the subgroup comparison = 8.78, P = 0.01.
4. Provider characteristics: in nine trials (n = 10,813) the support was provided by a member of the hospital staff; RR 1.03, 95% CI 1.01 to 1.06. In five trials (n = 1935) the support was provided by a woman who was not part of the hospital staff nor part of the woman's social network; RR 1.12, 95% CI 1.07 to 1.17. In four trials (n = 1356), the support was provided by

a member of the woman's social network; RR 1.07, 95% CI 0.99 to 1.15. Chi^2 for the subgroup comparison = 10.00, P = 0.007.

Thus the effectiveness of continuous support in increasing the likelihood of spontaneous vaginal birth appeared to be stronger when hospital policies did not permit companions, when epidural analgesia was not available, when EFM was not routine, and when the support provider was neither a staff member nor part of the woman's social network.

Outcome: caesarean birth

1. Policies about companions: in 11 trials (n = 11,326) companions were permitted; RR 0.94, 95% CI 0.85 to 1.03. In 10 trials (n = 3735) companions were not permitted; RR 0.75, 95% CI 0.65 to 0.87. Chi^2 for the subgroup comparison = 6.10, P = 0.01.
2. Availability of epidural analgesia: in 14 trials (n = 13,064), epidural analgesia was routinely available; RR 0.93, 95% CI 0.86 to 1.02. In six trials (n = 1963), epidural analgesia was not routinely available; RR 0.52, 95% CI 0.41 to 0.67. In one very small trial (n = 34), we were unable to determine if epidural analgesia was routinely available; RR 1.40, 95% CI 0.14 to 13.98. Chi^2 for the subgroup comparison = 19.40, P < 0.0001.
3. Routine use of EFM: in nine trials (n = 10,123), EFM was routine; RR 0.92, 95% CI 0.83 to 1.01. In seven trials (n = 2343) EFM was not routine; RR 0.66, 95% CI 0.55 to 0.80. In five trials (n = 2595), it is not known whether EFM was routine; RR 1.06, 95% CI 0.84 to 1.33. Chi^2 for the subgroup comparison = 12.38, P = 0.002.
4. Provider characteristics: in nine trials (n = 10,786), the support was provided by a member of the hospital staff; RR 0.95, 95% CI 0.85 to1.05. In seven trials (n = 2330), the support was provided by a woman who was not a member of the hospital staff and not part of the woman's social network; RR 0.72, 95% CI 0.60 to 0.86. In five trials (n = 1945), the support was provided by a member of the woman's social network; RR 0.84, 95% CI 0.69 to 1.03. Chi^2 for the subgroup comparison = 6.75, P = 0.03.

Thus the effectiveness of continuous support in reducing the likelihood of caesarean birth appeared to be stronger in settings where companions were not permitted, epidural analgesia was not routinely available and EFM was not routine, and when the provider was neither a staff member nor part of the woman's social network.

Outcome: admission to special care nursery

1. Policies about companions: in two trials (n = 7328), companions were permitted; RR 0.99, 95% CI 0.84 to 1.17. In five trials (n = 1569), companions were not permitted; RR 0.91, 95% CI 0.71 to 1.17. Chi^2 for the subgroup comparison = 0.28, P = 0.60.
2. Availability of epidural analgesia: in five trials (n = 8380) epidural analgesia was routinely available; RR 0.98, 95% CI 0.85 to 1.13. In two trials (n = 517) epidural analgesia was not routinely available; RR 0.26, 95% CI 0.08 to 0.88. Chi^2 for the subgroup comparison = 4.51, P = 0.03.
3. Routine use of EFM: in three trials (n = 7740) EFM was routine; RR 0.97, 95% CI 0.84 to 1.11. In three trials (n = 729) EFM was not routine; RR 0.48, 95% CI 0.21 to 1.12. In one trial

(n = 428), it is not known whether EFM was routine; RR 1.98, 95% CI 0.76 to 5.18. Chi^2 for the subgroup comparison = 4.76, P = 0.09.

4. Provider characteristics: in three trials (n = 7428), the support was provided by a member of the hospital staff; RR 0.99, 95% CI 0.84, 1.17. In two trials (n = 829), the support was provided by a woman who was not a member of the hospital staff and not part of the woman's social network; RR 0.86, 95% CI 0.66 to 1.12. In two trials (n = 640) the support was provided by a member of the woman's social network; RR 1.40, 95% CI 0.67 to 2.93. Chi^2 for the subgroup comparison = 1.74, P = 0.42.

Thus the effectiveness of continuous support in reducing the likelihood of admission of the newborn to a special care nursery appeared to be stronger in settings in which epidural analgesia was not routinely available, but effectiveness did not appear to be influenced by policies about companions or routine EFM, or by provider characteristics.

Outcome: negatives ratings of/negative views about the birth experience

1. Policies about companions: in five trials (n = 8639) companions were permitted; RR 0.70, 95% CI 0.62 to 0.78. In six trials (n = 2539) companions were not permitted; RR 0.62, 95%CI 0.56 to 0.69. Chi^2 for the subgroup comparison = 2.03, P = 0.15.
2. Availability of epidural analgesia: in nine trials (n = 10,404) epidural analgesia was routinely available; RR 0.70, 95% CI 0.64 to 0.77. In two trials (n = 774) epidural analgesia was not routinely available; RR 0.55, 95% CI 0.48 to 0.63. Chi^2 for the subgroup comparison = 7.92, P 0.0005.
3. Routine use of EFM: four trials (n = 7467) were conducted in settings with routine EFM; RR 0.67, 95% CI 0.60 to 0.76. Four trials (n = 1710) were conducted in settings in which EFM was not routine; RR 0.60, 95% CI 0.53 to 0.68. Three trials (n = 1977) were in settings in which the use of routine EFM is not known; RR 0.84, 95% CI 0.65 to 1.08. Chi^2 for the subgroup comparison = 5.55, P = 0.06.
4. Provider characteristics: in four trials (n = 8145) support providers were hospital staff; RR 0.87, 95% CI 0.73 to 1.03. In three trials (n = 1325) the providers were not hospital staff and not part of the woman's social network; RR 0.66, 95% CI 0.57 to 0.77. In four trials (n = 1708), providers were part of the woman's social network; RR 0.57, 95% CI 0.51 to 0.64. Chi^2 for the subgroup comparison = 16.47, P = 0.0003.

Thus the effectiveness of continuous support in reducing the likelihood of dissatisfaction with or negative views of the childbirth experience appeared to be stronger in settings in which epidural analgesia was not routinely available, and when the provider was neither a staff member nor part of the woman's social network.

Discussion

This Review summarizes results of 21 trials involving 15,061 women, conducted in 15 countries under a wide variety of circumstances. Continuous one-to-one support was given by providers with a variety of experiences, through having given birth themselves and/or through education

and practice as nurses, midwives, doulas or childbirth educators, or by the woman's husband or partner, female relative or close friend. The methodological quality of the trials was generally good to excellent. Much of the heterogeneity in the trials appears to be due to wide variations in the size of the trials; comparisons of fixed-effect and random-effects analyses did not yield material differences in the results. Thus neither the risk of bias nor heterogeneity should be of concern when interpreting results.

In the primary comparison, women who were allocated to continuous one-to-one support were more likely to have a spontaneous vaginal birth (RR 1.08, 95% CI 1.04 to 1.12) and less likely to have intrapartum analgesia (RR 0.90, 95% CI 0.84 to 0.97) or to report dissatisfaction (RR 0.69, 95% CI 0.59 to 0.79). In addition their labours were shorter (mean difference -0.58 hours, 95% CI -0.86 to -0.30), they were less likely to have a caesarean (RR 0.79, 95% CI 0.67 to 0.92) or instrumental vaginal birth (RR 0.90, 95% CI 0.84 to 0.96), regional analgesia (RR 0.93, 95% CI 0.88 to 0.99), or a baby with a low five-minute Apgar score (RR 0.70, 95% CI 0.50 to 0.96). The trial reports do not list any adverse effects. This form of care appears to confer important benefits without attendant risks. The results of earlier versions of this Review prompted organizations in Canada, the UK and the USA to issue practice guidelines, advocating continuous support (AWHONN 2002; NICE Intrapartum Care 2007; MIDIRS 1999; SOGC 1995). The results of the primary comparison in the current Review offer continued justification for such practice guidelines.

The subgroup analyses should be interpreted with caution. Individually each should be considered exploratory and hypothesis-generating, particularly when the sample size in one subgroup was much smaller than in another. However, taken in their totality, the consistency of the patterns suggests that the effectiveness of continuous intrapartum support may be enhanced or reduced by policies and practices in the birth setting and by the nature of the relationship between the provider and labouring woman.

We chose three aspects of the birth environment - routine use of electronic fetal monitoring, availability of epidural analgesia and policies about the presence of additional support people of the woman's own choosing - as proxies for environmental conditions that may mediate the effectiveness of labour support. This Review cannot answer questions about the mechanisms whereby settings with epidural analgesia limit the effectiveness of labour support. The impact of epidural analgesia may be direct (Anim-Somuah 2005) or indirect, as part of the 'cascade of interventions' described in the Background. The effects of a policy of routine EFM are less clear, most likely because we were unable to obtain information about EFM policies for several of the trials. However continuous labour support in settings without routine EFM was associated with greater likelihood of spontaneous vaginal birth and lower likelihood of a caesarean birth. These results raise questions about the ability of labour support to act as a buffer against adverse aspects of routine medical interventions. Labour support appears to be effective in reducing the adverse consequences of the fear and distress associated with labouring alone in an unfamiliar environment. A report of a qualitative component of one of the included trials (Langer 1998), aptly titled "Alone, I wouldn't have known what to do", provides further justification for this argument.

Effects of continuous labour support appear to vary by provider characteristics. Divided

loyalties, additional duties besides labour support, self-selection and the constraints of institutional policies and routine practices may all have played a role in the apparently limited effectiveness of members of the hospital staff. Childbirth environments influence the healthcare professionals who work in them as well as labouring women and their support people. Furthermore, while women want and benefit from the presence of selected members of their social network, the support of partners and others with whom they have a longstanding relationship is qualitatively different and more complex than that of a woman who is experienced and often trained to provide labour support and who has no other role other than to provide it. An early trial of labour support with partners present found that women received more support from their partners when a doula was present to guide them, and the partners themselves reported more support (Hodnett 1989). While continuous labour support appears to be more effective when it is provided by caregivers who are not employees of an institution (and thus have no obligation to anyone other than the labouring woman) and who have an exclusive focus on this task, the trials of husband/partner/relative/friend support in this update to the Review demonstrate that support from a member of the woman's social network is also effective in improving women's satisfaction with their birth experiences.

There remains relatively little information about the effects of continuous intrapartum support on mothers' and babies' health and well-being in the postpartum period.

Authors' conclusions

Implications for practice
Continuous support during labour should be the norm, rather than the exception. Hospitals should permit and encourage women to have a companion of their choice during labour and birth, and hospitals should implement programs to offer continuous support during labour. Policy makers and hospital administrators in high-income countries who wish to effect clinically important reductions in inappropriately high caesarean rates should be cautioned that continuous support by nurses or midwives may not achieve this goal, in the absence of other changes to policies and routines. In many settings, the labour ward functions according to a risk-oriented, technology-dominated approach to care. Institutional staff are unlikely to be able to offer labouring women benefits comparable to non-staff members, in the absence of fundamental changes in the organization and delivery of maternity care. Changes to the content of health professionals' education and to the core identity of professionals may also be important. Policy makers and administrators must look at system reform and rigorous attention to evidence-based use of interventions that were originally developed to diagnose or treat problems and are now used routinely during normal labours. Given the clear benefits and absence of adverse effects of continuous labour support, policy makers should consider including it as a covered service for all women.

Every effort should be made to ensure that women's birth environments are empowering, non-stressful, afford privacy, communicate respect and are not characterized by routine interventions that add risk without clear benefit. In most areas of the world, childbearing women have limited or no access to trained doulas. Where available, costs of doula services are frequently borne by childbearing families and may be a barrier to access. In areas where doulas are not available, a comprehensive guidebook for designated companions is available for those with good English literacy (Simkin 2007). The 'Better Births Initiative' is a structured motivational program which promotes humane, evidence-based care during labour. The program focuses on promoting labour companionship and avoiding unproven interventions such as routine starvation, supine position and routine episiotomy. The educational materials for the Better Births Initiative include a video presentation on childbirth companions which is available in the World Health Organization Reproductive Health Library (WHO 2010). It can be accessed free of charge on the internet in Arabic, Chinese, French, English, Spanish, Russian and Vietnamese and is distributed on CD to health workers in resource-poor countries. The selection of Cochrane Reviews in the Reproductive Health Library includes this Review of continuous labour support.

Implications for research

There remains relatively little information about the effects of continuous intrapartum support on mothers' and babies' health and well-being in the postpartum period, and thus trials across all types of settings, which include a focus on longer-term outcomes for mother and baby, would be helpful. The trials in resource-constrained countries were relatively small, and additional, large trials may be required in such settings, where the cost of providing continuous support may compete with other resource priorities. Particular attention should be paid to outcomes that have been under-researched in resource-poor settings, but are causes of significant morbidity, including urinary and faecal incontinence, pain during intercourse, prolonged perineal pain and depression.

Trials of different models of training providers of labour support would help to inform decision makers about the most effective models in the context of their settings. All trials should include economic analyses of the relative costs and benefits.

Acknowledgements

We are very grateful to the investigators who provided additional information: O Bruggemann, D Campbell, R Cogan, A Gagnon, E Hemminki, M Kashanian, J Kennell, M Klaus, A Langer, B Madi, S McGrath, G Trueba and E Kopplin. We thank Agnes Cho, Qian Xu and Jiang Huangye

for translation of Chinese publications, and Qian Xu for contacting the trial author for additional details. Ellen Hodnett and Justus Hofmeyr also provided additional information about their trials. Tanya Webb performed the second data entry on the earlier version of the Review, contacted trial authors for additional information and provided secretarial support. The Consumer Panel of the Pregnancy and Childbirth Group (of which Carol Sakala is a member) provided many helpful suggestions for both the Protocol and earlier versions of the Review.

Data and analyses

Download statistical data

Comparison 1. Continuous support versus usual care - all trials

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Any analgesia/anaesthesia	13	12169	Risk Ratio (M-H, Random, 95% CI)	0.90 [0.84, 0.97]
2 Regional analgesia/anaesthesia	9	11444	Risk Ratio (M-H, Random, 95% CI)	0.93 [0.88, 0.99]
3 Synthetic oxytocin during labour	14	12506	Risk Ratio (M-H, Random, 95% CI)	0.97 [0.90, 1.04]
4 Labour length	11	5269	Mean Difference (IV, Random, 95% CI)	-0.58 [-0.86, -0.30]
5 Spontaneous vaginal birth	18	14005	Risk Ratio (M-H, Random, 95% CI)	1.08 [1.04, 1.12]
6 Instrumental vaginal birth	18	14004	Risk Ratio (M-H, Fixed, 95% CI)	0.90 [0.84, 0.96]

7 Caesarean birth	21	15061	Risk Ratio (M-H, Random, 95% CI)	0.79 [0.67, 0.92]
8 Perineal trauma	4	8120	Risk Ratio (M-H, Random, 95% CI)	0.97 [0.92, 1.01]
9 Low 5-minute Apgar score	12	12401	Risk Ratio (M-H, Fixed, 95% CI)	0.70 [0.50, 0.96]
10 Admission to special care nursery	7	8897	Risk Ratio (M-H, Random, 95% CI)	0.97 [0.76, 1.25]
11 Prolonged neonatal hospital stay	3	1098	Risk Ratio (M-H, Random, 95% CI)	0.83 [0.42, 1.65]
12 Postpartum report of severe labour pain	4	2456	Risk Ratio (M-H, Random, 95% CI)	1.00 [0.83, 1.21]
13 Negative rating of/negative feelings about birth experience	11	11133	Risk Ratio (M-H, Random, 95% CI)	0.69 [0.59, 0.79]
14 Difficulty mothering	3	6308	Risk Ratio (M-H, Random, 95% CI)	0.60 [0.35, 1.02]
15 Breastfeeding at 1-2 months postpartum	3	5363	Risk Ratio (M-H, Random, 95% CI)	1.01 [0.94, 1.09]
16 Postpartum depression	1	5567	Risk Ratio (M-H, Fixed, 95% CI)	0.86 [0.73, 1.02]
17 Low postpartum self-esteem	1	652	Risk Ratio (M-H, Fixed, 95%	1.00 [0.77,

		CI)	1.30]

Comparison 2. Continuous support versus usual care - policy regarding presence of companion

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Any analgesia/anaesthesia	13		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
1.1 Other support permitted	7	9752	Risk Ratio (IV, Fixed, 95% CI)	0.97 [0.96, 0.99]
1.2 Other support not permitted	6	2484	Risk Ratio (IV, Fixed, 95% CI)	0.91 [0.85, 0.96]
2 Synthetic oxytocin during labour	14		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
2.1 Other support permitted	5	9495	Risk Ratio (IV, Fixed, 95% CI)	1.04 [0.99, 1.10]
2.2 Other support not permitted	9	3011	Risk Ratio (IV, Fixed, 95% CI)	0.99 [0.97, 1.01]
3 Spontaneous vaginal birth	18		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only

3.1 Other support permitted	9	10889	Risk Ratio (IV, Fixed, 95% CI)	1.03 [1.00, 1.05]
3.2 Other support not permitted	9	3215	Risk Ratio (IV, Fixed, 95% CI)	1.12 [1.07, 1.16]
4 Caesarean birth	21		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
4.1 Other support permitted	11	11326	Risk Ratio (IV, Fixed, 95% CI)	0.94 [0.85, 1.03]
4.2 Other support not permitted	10	3735	Risk Ratio (IV, Fixed, 95% CI)	0.75 [0.65, 0.87]
5 Admission to special care nursery	7		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
5.1 Other support permitted	2	7328	Risk Ratio (IV, Fixed, 95% CI)	0.99 [0.84, 1.17]
5.2 Other support not permitted	5	1569	Risk Ratio (IV, Fixed, 95% CI)	0.91 [0.71, 1.17]
6 Postpartum depression	1		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
6.1 Other support permitted	1	5567	Risk Ratio (IV, Fixed, 95% CI)	0.86 [0.73, 1.02]

6.2 Other support not permitted	0	0	Risk Ratio (IV, Fixed, 95% CI)	Not estimable
7 Negative rating of/negative feelings about birth experience	11		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
7.1 Other support permitted	5	8639	Risk Ratio (IV, Fixed, 95% CI)	0.70 [0.62, 0.78]
7.2 Other support not permitted	6	2539	Risk Ratio (IV, Fixed, 95% CI)	0.62 [0.56, 0.69]
8 Breastfeeding at 1-2 months postpartum	3		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
8.1 Other support permitted	1	4559	Risk Ratio (IV, Fixed, 95% CI)	0.97 [0.92, 1.02]
8.2 Other support not permitted	2	804	Risk Ratio (IV, Fixed, 95% CI)	1.05 [0.98, 1.13]

Comparison 3. Continuous support versus usual care - availability of epidural analgesia

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Any analgesia/anaesthesia	13		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only

1.1 Epidural analgesia routinely available	9	10888	Risk Ratio (IV, Fixed, 95% CI)	0.97 [0.96, 0.98]
1.2 Epidural analgesia not routinely available	4	1348	Risk Ratio (IV, Fixed, 95% CI)	0.83 [0.69, 0.99]
2 Synthetic oxytocin during labour	14		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
2.1 Epidural analgesia routinely available	8	10568	Risk Ratio (IV, Fixed, 95% CI)	1.00 [0.98, 1.02]
2.2 Epidural analgesia not routinely available	6	1952	Risk Ratio (IV, Fixed, 95% CI)	1.02 [0.93, 1.11]
3 Spontaneous vaginal birth	18		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
3.1 Epidural analgesia routinely available	13	12672	Risk Ratio (IV, Fixed, 95% CI)	1.04 [1.01, 1.06]
3.2 Epidural analgesia not routinely available	5	1432	Risk Ratio (IV, Fixed, 95% CI)	1.12 [1.06, 1.17]
4 Caesarean birth	21		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
4.1 Epidural analgesia routinely available	14	13064	Risk Ratio (IV, Fixed, 95% CI)	0.93 [0.86, 1.02]

4.2 Epidural analgesia not routinely available	6	1963	Risk Ratio (IV, Fixed, 95% CI)	0.52 [0.41, 0.67]
4.3 Unknown availability of epidural analgesia	1	34	Risk Ratio (IV, Fixed, 95% CI)	1.4 [0.14, 13.98]
5 Admission to special care nursery	7		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
5.1 Epidural analgesia routinely available	5	8380	Risk Ratio (IV, Fixed, 95% CI)	0.98 [0.85, 1.13]
5.2 Epidural analgesia not routinely available	2	517	Risk Ratio (IV, Fixed, 95% CI)	0.26 [0.08, 0.88]
6 Postpartum depression	1		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
6.1 Epidural analgesia routinely available	1	6915	Risk Ratio (IV, Fixed, 95% CI)	0.89 [0.75, 1.05]
6.2 Epidural analgesia not routinely available	0	0	Risk Ratio (IV, Fixed, 95% CI)	Not estimable
7 Negative rating of/negative feelings about birth experience	11		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
7.1 Epidural analgesia routinely available	9	10404	Risk Ratio (IV, Fixed, 95% CI)	0.70 [0.64, 0.77]
7.2 Epidural analgesia	2	774	Risk Ratio	0.55

not routinely available			(IV, Fixed, 95% CI)	[0.48, 0.63]
8 Breastfeeding at 1-2 months postpartum	3		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
8.1 Epidural analgesia routinely available	2	5214	Risk Ratio (IV, Fixed, 95% CI)	0.99 [0.95, 1.03]
8.2 Epidural analgesia not routinely available	1	149	Risk Ratio (IV, Fixed, 95% CI)	1.15 [0.95, 1.40]

Comparison 4. Continuous support versus usual care - policy about routine EFM

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Any analgesia/anaesthesia	13		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
1.1 Setting had routine EFM	6	8580	Risk Ratio (IV, Fixed, 95% CI)	0.97 [0.96, 0.99]
1.2 Setting did not have routine EFM	5	2072	Risk Ratio (IV, Fixed, 95% CI)	0.96 [0.90, 1.03]
1.3 Policy about routine EFM not known	2	1579	Risk Ratio (IV, Fixed, 95% CI)	0.89 [0.80, 0.99]

2 Synthetic oxytocin during labour	14		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
2.1 Setting had routine EFM	4	8340	Risk Ratio (IV, Fixed, 95% CI)	1.04 [0.98, 1.11]
2.2 Setting did not have routine EFM	6	1612	Risk Ratio (IV, Fixed, 95% CI)	0.99 [0.96, 1.01]
2.3 Policy about routine EFM not known	4	2568	Risk Ratio (IV, Fixed, 95% CI)	1.02 [0.97, 1.08]
3 Spontaneous vaginal birth	18		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
3.1 Setting had routine EFM	8	9717	Risk Ratio (IV, Fixed, 95% CI)	1.03 [1.01, 1.06]
3.2 Setting did not have routine EFM	6	1799	Risk Ratio (IV, Fixed, 95% CI)	1.12 [1.06, 1.17]
3.3 Policy about routine EFM not known	4	2561	Risk Ratio (IV, Fixed, 95% CI)	1.07 [1.01, 1.13]
4 Caesarean birth	21		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
4.1 Setting had routine EFM	9	10123	Risk Ratio (IV, Fixed, 95% CI)	0.92 [0.83, 1.01]

4.2 Setting did not have routine EFM	7	2343	Risk Ratio (IV, Fixed, 95% CI)	0.66 [0.55, 0.80]
4.3 Policy about routine EFM not known	5	2595	Risk Ratio (IV, Fixed, 95% CI)	1.06 [0.84, 1.33]
5 Admission to special care nursery	7		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
5.1 Setting had routine EFM	3	7740	Risk Ratio (IV, Fixed, 95% CI)	0.97 [0.84, 1.11]
5.2 Setting did not have routine EFM	3	729	Risk Ratio (IV, Fixed, 95% CI)	0.48 [0.21, 1.12]
5.3 Policy about routine EFM not known	1	428	Risk Ratio (IV, Fixed, 95% CI)	1.98 [0.76, 5.18]
6 Postpartum depression	1		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
6.1 Setting had routine EFM	1	6915	Risk Ratio (IV, Fixed, 95% CI)	0.89 [0.75, 1.05]
6.2 Setting did not have routine EFM	0	0	Risk Ratio (IV, Fixed, 95% CI)	Not estimable
7 Negative rating of /negative views about birth experience	11		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
7.1 Setting had routine	4	7467	Risk Ratio	0.67

EFM			(IV, Fixed, 95% CI)	[0.60, 0.76]
7.2 Setting did not have routine EFM	4	1710	Risk Ratio (IV, Fixed, 95% CI)	0.60 [0.53, 0.68]
7.3 Policy about routine EFM not known	3	1977	Risk Ratio (IV, Fixed, 95% CI)	0.84 [0.65, 1.08]
8 Breastfeeding at 1-2 months postpartum	3		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
8.1 Setting had routine EFM	1	4559	Risk Ratio (IV, Fixed, 95% CI)	0.97 [0.92, 1.02]
8.2 Setting did not have routine EFM	2	804	Risk Ratio (IV, Fixed, 95% CI)	1.05 [0.98, 1.13]

Comparison 5. Continuous support versus usual care - variations in provider characteristics

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Any analgesia/anaesthesia	13		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
1.1 Support people were hospital staff	6	9152	Risk Ratio (IV, Fixed, 95% CI)	0.97 [0.96, 0.99]

1.2 Support people were not hospital staff and not chosen by woman	4	1790	Risk Ratio (IV, Fixed, 95% CI)	0.91 [0.86, 0.97]
1.3 Support people were not hospital staff and were chosen by woman	3	1294	Risk Ratio (IV, Fixed, 95% CI)	0.94 [0.88, 1.00]
2 Synthetic oxytocin during labour	14		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
2.1 Support people were hospital staff	6	9561	Risk Ratio (IV, Fixed, 95% CI)	1.06 [1.01, 1.11]
2.2 Support people were not hospital staff and not chosen by woman	3	1018	Risk Ratio (IV, Fixed, 95% CI)	0.69 [0.50, 0.94]
2.3 Support people were not hospital staff and were chosen by woman	5	1927	Risk Ratio (IV, Fixed, 95% CI)	0.99 [0.96, 1.01]
3 Spontaneous vaginal birth	18		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
3.1 Support people were hospital staff	9	10813	Risk Ratio (IV, Fixed, 95% CI)	1.03 [1.01, 1.06]
3.2 Support people were not hospital staff and not chosen by woman	5	1935	Risk Ratio (IV, Fixed, 95% CI)	1.12 [1.07, 1.17]
3.3 Support people were not hospital staff and were chosen by woman	4	1356	Risk Ratio (IV, Fixed, 95% CI)	1.07 [0.99, 1.15]

4 Caesarean birth	21		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
4.1 Support people were hospital staff	9	10786	Risk Ratio (IV, Fixed, 95% CI)	0.95 [0.85, 1.05]
4.2 Support people were not hospital staff and not chosen by woman	7	2330	Risk Ratio (IV, Fixed, 95% CI)	0.72 [0.60, 0.86]
4.3 Support people were not hospital staff and were chosen by woman	5	1945	Risk Ratio (IV, Fixed, 95% CI)	0.84 [0.69, 1.03]
5 Admission to special care nursery	7		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
5.1 Support people were hospital staff	3	7428	Risk Ratio (IV, Fixed, 95% CI)	0.99 [0.84, 1.17]
5.2 Support people were not hospital staff and not chosen by woman	2	829	Risk Ratio (IV, Fixed, 95% CI)	0.86 [0.66, 1.12]
5.3 Support people were not hospital staff and were chosen by woman	2	640	Risk Ratio (IV, Fixed, 95% CI)	1.40 [0.67, 2.93]
6 Postpartum depression	1		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
6.1 Support people were hospital staff	1	5567	Risk Ratio (IV, Fixed, 95% CI)	0.86 [0.73, 1.02]

6.2 Support people were not hospital staff and not chosen by woman	0	0	Risk Ratio (IV, Fixed, 95% CI)	Not estimable
6.3 Support people were not hospital staff and were chosen by woman	0	0	Risk Ratio (IV, Fixed, 95% CI)	Not estimable
7 Negative rating of/negative feelings about birth experience	11		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
7.1 Support people were hospital staff	4	8145	Risk Ratio (IV, Fixed, 95% CI)	0.87 [0.73, 1.03]
7.2 Support people were not hospital staff and not chosen by woman	3	1325	Risk Ratio (IV, Fixed, 95% CI)	0.66 [0.57, 0.77]
7.3 Support people were not hospital staff and were chosen by woman	4	1708	Risk Ratio (IV, Fixed, 95% CI)	0.57 [0.51, 0.64]
8 Breastfeeding at 1-2 months postpartum	3		Risk Ratio (IV, Fixed, 95% CI)	Subtotals only
8.1 Support people were hospital staff	1	4559	Risk Ratio (IV, Fixed, 95% CI)	0.97 [0.92, 1.02]
8.2 Support people were not hospital staff and not chosen by woman	2	804	Risk Ratio (IV, Fixed, 95% CI)	1.05 [0.98, 1.13]
8.3 Support people were not hospital staff and were chosen by woman	0	0	Risk Ratio (IV, Fixed, 95% CI)	Not estimable

What's new

Last assessed as up-to-date: 9 January 2011.

Date	Event	Description
31 December 2010	New search has been performed	Search updated. We evaluated and added new trials. We obtained additional information from trial authors. Other revisions included numerous changes to bring the entire Review up-to-date in terms of current methodological guidelines. We altered the acceptable follow-up rate for long term outcomes, and we expanded the number of outcomes to be included in the planned subgroup analyses.
25 October 2010	New citation required but conclusions have not changed	New author joined the review team to update the review.

History

Protocol first published: Issue 3, 2002
Review first published: Issue 3, 2003

Date	Event	Description
12 May 2008	Amended	Converted to new review format.
18 April	New search	Search updated in February 2007. Two new trials

2007	has been performed	identified. We excluded one (Dalal 2006) and included the other (Campbell 2006). The Results section was updated accordingly. With the exception of the outcome of labour length, there were no substantive changes in results or conclusions of the Review. Minor edits were made throughout. Additional text was added to the Discussion.
30 October 2006	New search has been performed	Search updated. One 'awaiting assessment' trial was assessed and included (Thomassen 2003).

Contributions of authors

Ellen Hodnett wrote the initial draft of the protocol. Carol Sakala wrote the initial draft of the Discussion in the previous version of the Review. Simon Gates wrote the initial draft of the statistical methods and provided statistical advice for the Protocol and each update of the Review. Julie Weston entered the data for the current update. All review authors participated in all aspects of the preparation of the protocol and in writing the text of the Review. All authors participated in the update of the Review.

Declarations of interest

Ellen Hodnett was the principal investigator for two labour support trials. Justus Hofmeyr was the principal investigator for one labour support trial. Julie Weston was the Trial Coordinator for the Hodnett 2002 trial.

Sources of support

Internal sources

- University of Toronto, Canada.
- University of the Witwatersrand, South Africa.
- Fort Hare University, South Africa.
- East London Hospital Complex, South Africa.
- National Perinatal Epidemiology Unit, Oxford, UK.
- Childbirth Connection (formerly Maternity Center Association), USA.
- Warwick Clinical Trials Unit, University of Warwick, UK.

External sources

• No sources of support supplied

Index terms

Medical Subject Headings (MeSH)
*Delivery, Obstetric [methods; nursing]; *Labor, Obstetric; Midwifery; Obstetrical Nursing; Perinatal Care [*methods; standards]; Randomized Controlled Trials as Topic

MeSH check words
Female; Humans; Pregnancy

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