

Doula support compared with standard care

Meta-analysis of the effects on the rate of medical interventions during labour for low-risk women delivering at term

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Abstract

Objective To determine the effect of support provided by doulas on the rate of medical interventions during labour for low-risk women intending to deliver vaginally at term.

Data sources Comprehensive searches of the MEDLINE, EMBASE, and CINAHL databases were undertaken using the search terms *labour support* and *doula*.

Study selection Randomized controlled trials evaluating the use of trained doulas for medical interventions during labour were selected and evaluated for methodologic quality. Articles of adequate quality were included in the synthesis. The outcomes of interest were rates of cesarean section, instrumental vaginal delivery, the use of oxytocin, and epidural anesthesia.

Synthesis Outcomes were synthesized to determine overall odds ratios for relevant outcomes. Sensitivity analysis using only studies with high methodologic quality was completed, and publication bias was assessed. The presence and support of a trained doula reduced the odds of delivery by cesarean section and instrumental vaginal delivery. No significant effect was seen for the use of epidural anesthesia or the rates of oxytocin use. There was considerable heterogeneity among the studies.

Conclusion Trained doulas help to reduce the odds of certain medical interventions during labour for low-risk women delivering at term.

EDITOR'S KEY POINTS

- Previous work has shown that continuous physical and emotional support for women in labour is associated with fewer medical interventions and a slightly shorter duration of labour, among other clinically relevant outcomes. Doulas are increasingly being used to provide emotional and physical support to women and their partners during pregnancy, childbirth, and the postpartum period, including continuous support throughout labour and delivery. This study aimed to assess the effects of such support provided by doulas on the rate of medical interventions during low-risk labour.
- The authors found that the presence of a trained doula reduced the odds of cesarean section (odds ratio 0.68, 95% CI 0.47 to 0.99, $P=.04$) and instrumental vaginal delivery (odds ratio 0.54, 95% CI 0.35 to 0.92, $P=.02$) compared with women receiving standard maternity care. The presence of a doula did not have a significant effect on the use of epidural anesthesia or on the use of oxytocin to augment labour.

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Accouchement standard ou assisté d'une doula : une comparaison

Méta-analyse des effets sur le taux d'interventions médicales au cours du travail pour des femmes accouchant à terme

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Résumé

Objectif Déterminer l'effet du soutien fourni par les doulas sur le taux d'interventions médicales durant le travail chez des femmes à faible risque qui ont l'intention d'accoucher à terme par voie vaginale.

Sources des données On a effectué une recherche extensive dans les banques de données MEDLINE, EMBASE et CINAHL à l'aide des rubriques *labour support* et *doula*.

Choix des études Les essais randomisés évaluant l'effet du soutien de doulas qualifiées sur le taux d'interventions médicales durant le travail ont été retenus et évalués pour la qualité de leur méthodologie. Les articles de qualité adéquate ont été utilisés pour la synthèse. Les issues d'intérêt étaient les taux de césariennes, d'accouchements vaginaux assistés, l'utilisation d'ocytocine et d'anesthésie épidurale.

POINTS DE REPÈRE DU RÉDACTEUR

- Des études antérieures ont montré que les femmes qui bénéficient d'une assistance physique et émotionnelle continue durant le travail ont, entre autres effets cliniques pertinents, moins d'interventions médicales et un travail légèrement plus court. On fait de plus en plus appel à des doulas pour fournir aux femmes et à leurs conjoints une assistance émotionnelle et physique durant la grossesse, au moment de la naissance et durant le postpartum, incluant un soutien continu durant le travail et l'accouchement. Cette étude voulait évaluer les effets du soutien d'une doula sur le taux d'interventions médicales au cours d'un travail présentant peu de risque.

- Les auteurs ont observé que la présence d'une doula qualifiée réduisait la probabilité d'une césarienne (rapport de cotes 0,68, IC à 95 % 0,47 à 0,99, $P = ,04$) et d'un accouchement vaginal assisté (rapport de cotes 0,54, IC à 95 % 0,35 à 0,92, $P = ,02$) par rapport aux femmes qui reçoivent des soins de maternité standards. La présence d'une doula n'avait toutefois pas d'effet significatif sur l'utilisation d'une anesthésie épidurale ou sur l'emploi d'ocytocine pour accélérer le travail.

Cet article a fait l'objet d'une révision par des pairs.
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Synthèse On a comparé les résultats pour établir les rapports de cotes pour les issues pertinentes. Une analyse de sensibilité a été effectuée en utilisant seulement les études qui avaient une méthodologie de grande qualité; on a également vérifié les biais de publication. La présence et le soutien d'une doula qualifiée ont diminué la probabilité de césarienne et d'accouchement assisté. Il n'y avait pas d'effet significatif sur l'utilisation de l'anesthésie épidurale ou de l'ocytocine. On a noté une hétérogénéité importante entre les études.

Conclusion Les doulas qualifiées contribuent à diminuer la probabilité de certaines interventions médicales au cours du travail chez des femmes à faible risque qui accouchent à terme.

Childbirth can be a time of excitement and anxiety, and many women and their partners are nervous when labour approaches. A Cochrane review concluded that continuous physical and emotional support for women in labour was associated with fewer medical interventions and a slightly shorter duration of labour, among other clinically relevant outcomes.¹ That review included any continuous support, not just that offered by trained doulas.

Traditionally, women in many cultures have been supported by female companions during their labour.^{1,2} In the contemporary hospital setting, support has primarily been provided by a woman's partner or a family member, and by the nurses responsible for the woman's care. The role of nurse as supporter is considered both effective and valuable by patients,³ but studies suggest that even with ideal 1-to-1 staffing ratios nurses are able to devote only a small percentage of their time to providing supportive care.^{4,5} With their many responsibilities in providing intrapartum care, it is almost impossible for nurses to provide continuous support to women and their partners in a typical obstetric ward.⁶

To complement the support provided by hospital staff and family, labouring women increasingly choose to avail themselves of the services of doulas.^{1,7} Doulas are trained to provide emotional and physical support to women and their partners during pregnancy, childbirth, and the postpartum period, including continuous support throughout labour and delivery.¹ Although some doulas might have a background in nursing or midwifery, many are lay women without previous training in health care, and the profession is generally unregulated.⁷ Some but not all doulas have formal training in labour support techniques,⁷ and professional organizations such as the Doulas of North America have membership requirements for certification.⁸

Our objective was to examine the effects of the continuous support provided by doulas on the method of delivery, use of epidural anesthesia, and use of oxytocin during labour when compared with women receiving standard maternity care. Our population of interest was low-risk women intending a vaginal delivery at term.

DATA SOURCES

We performed literature searches of MEDLINE, CINAHL, and EMBASE using the key words *doula* and *labour support*. Searches were restricted to peer-reviewed journal articles with abstracts available. For MEDLINE, the search was limited to clinical trials. The references for relevant systematic reviews and meta-analyses were hand searched to identify additional trials.

We included randomized controlled trials that evaluated the effect of the continuous support of trained

doulas for women delivering at term on the outcomes of cesarean section, instrumental vaginal delivery, use of epidural anesthesia, and use of oxytocin. **Figure 1** details the process of choosing the final articles included in the analysis. A total of 555 records were reviewed, yielding 47 relevant studies.⁹ Of these, 37 were excluded in the initial screening phase because support was provided by a relative, a friend, or an untrained supporter; they evaluated different outcomes; the study was not in English; descriptive or qualitative outcome measures were used; or the study employed a methodology other than a randomized controlled trial. It should be noted that all of the non-English articles met additional criteria for exclusion (eg, support from family member, very poor methodologic quality); in the event that a high-quality, relevant non-English article had been identified, translation would have been sought.

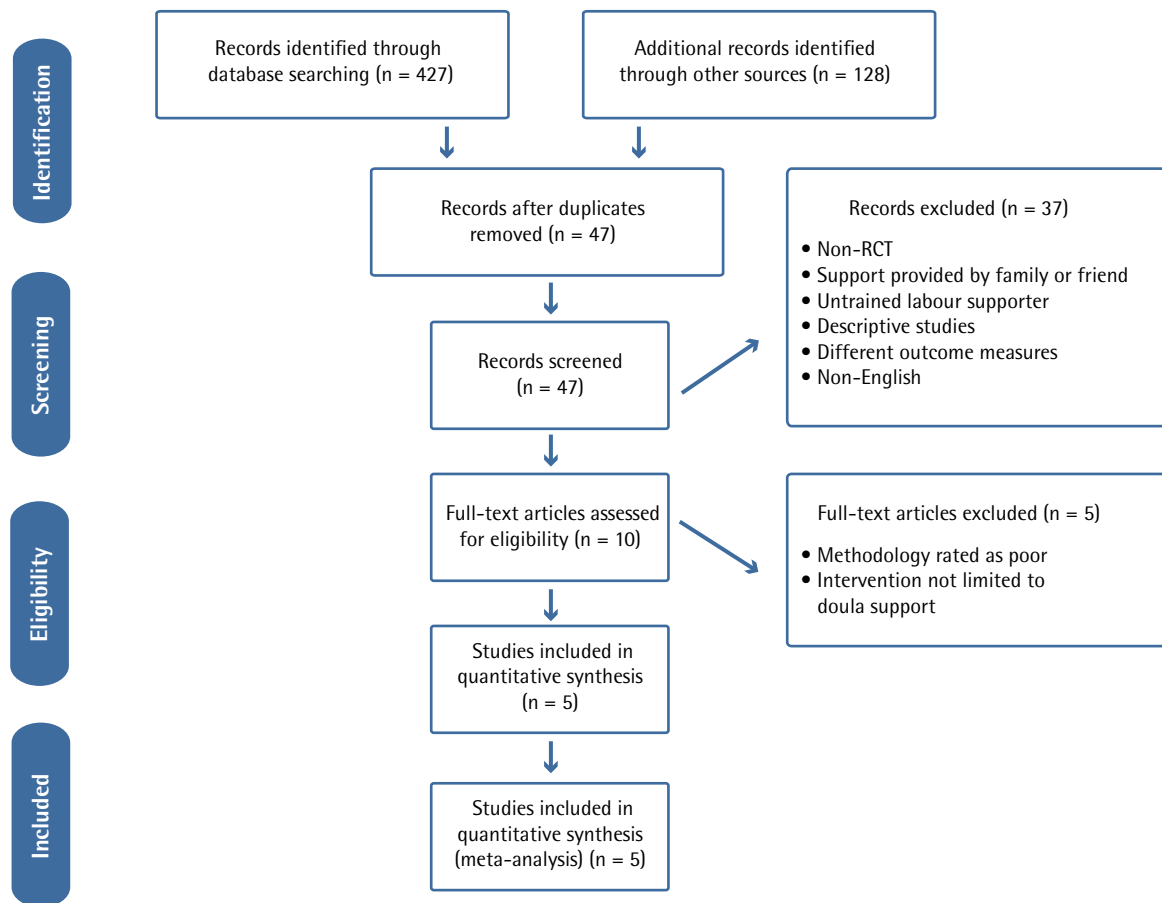
The 10 remaining studies were independently assessed for quality and eligibility by both authors using the US Preventive Services Task Force quality rating criteria; **Table 1** outlines the ratings for the included studies.¹⁰⁻¹⁵ These criteria were developed by experts in primary care as a means of assessing the quality of published articles in 7 areas, with articles being rated as good, fair, or poor overall. Discrepancies in assessment between the authors were discussed and consensus was reached. Of the articles assessed for eligibility, 5 were rated good or fair and were included in the quantitative synthesis.¹⁰⁻¹⁴ Among the articles excluded from the synthesis, 1 was rated as having poor methodologic quality,¹⁶ 1 was reporting outcomes from a trial already included in the synthesis,¹⁷ 1 provided additional comfort measures alongside the continuous labour support,¹⁸ and 2 required the nurses to provide both intrapartum care and continuous labour support with the potential for a change in support when the nurse's shift ended^{19,20} (**Table 2**).¹⁶⁻²⁰ In the latter 2 instances, it was decided that the interventions were sufficiently different from the type of labour support intervention in the pooled articles that they must be excluded.

SYNTHESIS

Table 3 outlines the populations, interventions, and outcomes of articles included in the meta-analysis.¹⁰⁻¹⁴ The meta-analysis was performed using Comprehensive Meta-Analysis and RevMan 5 software.^{21,22} Between 4 and 5 studies were pooled for each outcome measure, and a random effects model was used. Sensitivity analysis using only articles with a methodologic rating of good was conducted for the outcomes of cesarean section and epidural anesthesia.

The presence of a doula significantly reduced the odds of cesarean section (odds ratio [OR] 0.68, 95% CI

Figure 1. Study identification and screening process using the PRISMA flow diagram



PRISMA—Preferred Reporting Items for Systematic Reviews and Meta-Analyses, RCT—randomized controlled trial.
PRISMA structure from Moher et al.⁹

0.47 to 0.99, $P=.04$) and the rate of instrumental vaginal delivery (OR 0.54, 95% CI 0.35 to 0.92, $P=.02$). Other outcomes did not quite achieve statistical significance, specifically epidural anesthesia (OR 0.41, 95% CI 0.16 to 1.09, $P=.07$) and use of oxytocin (OR 0.49, 95% CI 0.24 to 1.02, $P=.06$) in the doula care groups (Figure 2).¹⁰⁻¹⁴

Sensitivity analysis using only studies with methodology rated as good showed similar effects for epidural anesthesia (OR 0.36, 95% CI 0.09 to 1.45, $P=.15$) and cesarean delivery (OR 0.63, 95% CI 0.49 to 0.81, $P<.001$). Sensitivity analysis was not performed for the outcomes of instrumental vaginal delivery or use of oxytocin, as only 2 articles with methodology rated as good measured the outcome in each category, and pooling was not appropriate.

There was significant heterogeneity observed in all analyses in the synthesis (Figure 2).¹⁰⁻¹⁴ For Cochran Q,

a statistic used for testing for the presence or absence of heterogeneity due to random error among studies, the P values were $P<.1$ for all outcomes, indicating significant heterogeneity at $\alpha=.10$. Given the small number of studies included in our synthesis, we also calculated I^2 , a measure of the percent variability in a pooled set of studies that has greater statistical power with fewer studies. The I^2 values ranged from approximately 52% to 94%, indicating a large amount of heterogeneity that was not attributable to random error.

Potential publication bias was assessed by visual inspection of funnel plots and calculation of classic fail-safe N values (Figure 3). Visual inspection of the funnel plots did not indicate publication bias for cesarean sections or instrumental deliveries, but the results were less clear for the outcomes of epidural anesthesia and use of oxytocin. Fail-safe N values were such that at least 8

Table 1. Assessment of studies selected for inclusion in the synthesis using USPSTF quality rating criteria

ARTICLE	ASSEMBLY OF COMPARABLE GROUPS	MAINTENANCE OF COMPARABLE GROUPS	NO IMPORTANT DIFFERENTIAL LOSS TO FOLLOW-UP OR OVERALL HIGH LOSS TO FOLLOW-UP	MEASUREMENTS: EQUAL, RELIABLE, VALID (INCLUDES MASKING OF OUTCOME ASSESSMENT)	CLEAR DEFINITION OF INTERVENTIONS	ALL IMPORTANT OUTCOMES CONSIDERED	ANALYSIS: ADJUSTMENT FOR POTENTIAL CONFOUNDERS	OVERALL ASSESSED QUALITY
Gordon et al, ¹⁰ 1999	Good	Fair	Fair	Good	Good	Good	Fair	Fair
Hodnett and Osborn, ¹¹ 1989	Unclear	Fair	Fair	Good	Good	Good	Fair	Fair
Kennell et al, ¹² 1991	Good	Good	Good	Good	Good	Good	Good	Good
Langer et al, ¹³ 1998	Good	Good	Good	Good	Good	Fair	Good	Good
McGrath and Kennell, ¹⁴ 2008	Good	Good	Good	Good	Good	Good	Good	Good

USPSTF—US Preventive Services Task Force.
USPSTF quality rating criteria from Harris et al.¹⁵

unpublished, extant studies with null results would have to exist to invalidate our results.

DISCUSSION

Continuous support during labour has been shown to be beneficial whether provided by a woman's partner, a family member or close friend, or a dedicated member of the clinical team providing intrapartum care.¹ The presence of a trained doula providing continuous support to labouring women and their partners appears to have a significant effect on rates of instrumental vaginal deliveries and cesarean sections.

Table 2. Rationale for exclusion of studies assessed for eligibility but excluded from the quantitative synthesis

ARTICLE	REASON FOR EXCLUSION
Gagnon et al, ¹⁹ 1997	Intervention: Nurses providing support also responsible for intrapartum care and might hand care off to another nurse at the end of shift
Trueba et al, ¹⁶ 2000	Methodology: Poor. Incomplete collection of demographic information so comparability of groups could not be established
Kashanian et al, ¹⁸ 2010	Intervention: Patients receiving doula care were given a private room; allowed to walk, eat, and choose different positions in which to labour; and given education about labour
Hodnett and Osborn, ¹⁷ 1989	Duplication: This is a publication of different outcomes of a study already included in our synthesis (Hodnett and Osborn ¹¹)
Hodnett et al, ²⁰ 2002	Intervention: Nurses providing support also responsible for intrapartum care and handed care off to another nurse at the end of shift

Given the nature of the intervention and the diversity of the study populations, the observed degree of heterogeneity was not unexpected. Study populations ranged from women labouring in a public hospital in Mexico,¹³ to middle-income couples at a university health centre in Cleveland, Ohio,¹⁴ to young women of lower socioeconomic status giving birth without any family support at a hospital in Houston, Tex.¹² Age, income, education level, the presence of a partner or other family support, and standard hospital procedures varied substantially among trials, and the effect of these variables should be noted. The nature of doula care as an intervention would also introduce some heterogeneity; training for doulas might vary between studies, and almost certainly the comfort techniques used by a doula would be dictated by the needs of the individual woman in labour. In spite of this heterogeneity, women provided with trained doulas have significantly lower rates of cesarean section and instrumental vaginal delivery compared with women given standard care.

Our tests for publication bias did not generate any clear evidence of studies missing from the literature. The fail-safe N tests indicate that for those outcomes in which a statistically significant result was shown, there would need to be 8 or 9 studies with null results in order to invalidate our findings, a considerable number given that our analysis includes just 5 studies. We did not attempt more sophisticated measures of publication bias, such as Begg and Mazumdar rank correlation or Egger regression intercept, as both of these tests have limited statistical power when a small number of studies are pooled.

Table 3. Description of populations, interventions, and outcomes of articles included in meta-analysis

ARTICLE	ASSESSED QUALITY	POPULATION	INTERVENTION	OUTCOME	RESULTS	
					DOULA CARE, n/N (%)	STANDARD CARE, n/N (%)
Gordon et al, ¹⁰ 1999	Fair	N = 314 nulliparous women attempting vaginal delivery of uncomplicated pregnancy in Oakland, Calif	Continuous support by lay doulas. Doulas received community training, attended ≥ 2 births	Cesarean delivery	25/149 (16.8)*	26/165 (15.8)*
				Instrumental vaginal delivery	29/149 (19.2)*	47/165 (28.8)*
				Use of oxytocin	91/149 (61.7)*	102/165 (62.4)*
				Use of epidural anesthesia	81/149 (54.4)*	109/165 (66.1)*
Hodnett and Osborn, ¹¹ 1989	Fair	N = 145 low-risk women attempting vaginal deliveries at a teaching hospital in Toronto, Ont	Continuous support by trained lay midwives	Cesarean delivery	12/72 (16.7)	13/73 (17.8)
				Instrumental vaginal delivery	13/72 (18.1)	18/73 (24.7)
				Use of oxytocin	21/72 (29.2)	43/73 (58.9)
Kennell et al, ¹² 1991	Good	N = 416 nulliparous women with uncomplicated, full-term pregnancies attempting vaginal delivery. Hospital provided care for low-income population in Houston, Tex	Continuous support by lay doulas. Doulas given 3 weeks' training in obstetrics, support techniques, and hospital policies	Cesarean delivery	17/212 (8.0)	37/204 (18.1)
				Instrumental vaginal delivery	16/212 (7.5)	44/204 (21.6)
				Use of oxytocin	36/212 (17.0)	89/204 (43.6)
				Epidural anesthesia [†]	14/179 (7.8)	68/123 (55.3)
Langer et al, ¹³ 1998	Good	N = 724 nulliparous, low-risk women attempting vaginal delivery in Mexico City, Mexico	Continuous support by specially trained retired nurses	Cesarean delivery	85/357 (23.8)	97/356 (27.2)
				Instrumental vaginal delivery	12/356 (3.4)	12/356 (3.4)
				Epidural anesthesia	295/335 (88.1)	302/346 (87.3)
McGrath and Kennell, ¹⁴ 2008	Good	N = 420 nulliparous women aged 18–41 y with uncomplicated pregnancies, expecting to be accompanied by their male partners, in Cleveland, Ohio	Continuous support by lay doulas	Cesarean delivery	30/224 (13.4)	49/196 (25.0)
				Use of oxytocin	16/224 (7.1)	17/196 (8.7)
				Epidural anesthesia	145/224 (64.7)	149/196 (76.0)

*Publication contained percentages only; n/N values were calculated.

[†]Epidural use calculated only for women delivering vaginally without either forceps or vacuum.

Limitations and areas for further study

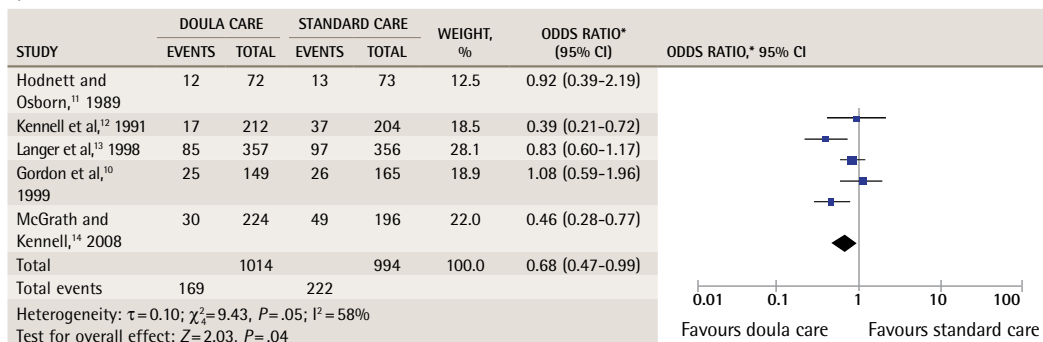
It must be noted that the population and context of 2 of the studies included in the synthesis, representing more than half of the pooled study population, do not much resemble the experience of most Canadian women and might have limited generalizability. The studies by Kennell et al¹² and Langer et al¹³ involved young, low-income women permitted little or no familial support in very different settings than would be found in modern Canadian obstetric units. We suggest that although the typical Canadian woman is unlikely to find herself labouring with no family support in a 12-bed hospital ward (as was the case in Kennell and colleagues' study), many women might have less than adequate support from their partners or families. In these cases, external support provided by a trained doula could be

extremely valuable. The significant reduction in the rate of cesarean section and instrumental vaginal delivery in populations that were so variable in their demographic characteristics, socioeconomic status, and levels of support suggests that most women might derive at least some benefit from doula support.

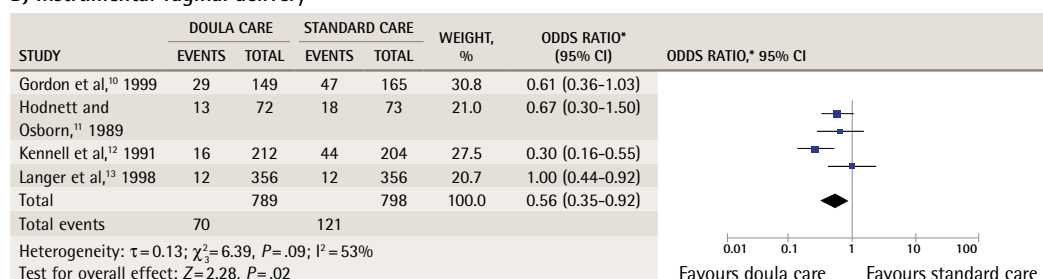
The small number of studies included in the synthesis precluded the use of subgroup analysis, but we hypothesize that doulas with previous training in nursing or midwifery might differ in the way their support is associated with the rate of medical interventions. A recent study suggests that "nurses' attitudes [are] influenced by workplace exposure to other care providers' birth practices,"²³ and it is not unreasonable to suggest that doulas with backgrounds in nursing might have different perspectives than lay doulas with respect to interventions

Figure 2. Forest plots and measures of heterogeneity for trials of doula care versus standard care among low-risk women attempting vaginal delivery at term: A) *Cesarean delivery*. B) *Instrumental vaginal delivery*. C) *Use of epidural anesthesia*. D) *Use of oxytocin*.

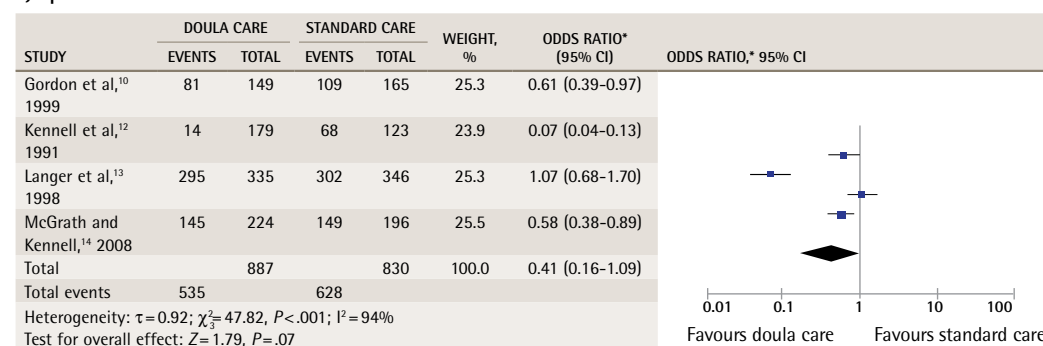
A) Cesarean section



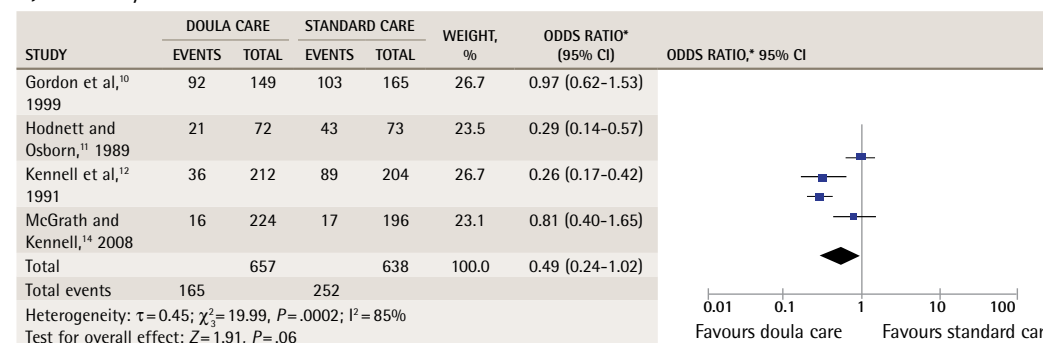
B) Instrumental vaginal delivery



C) Epidural anesthesia

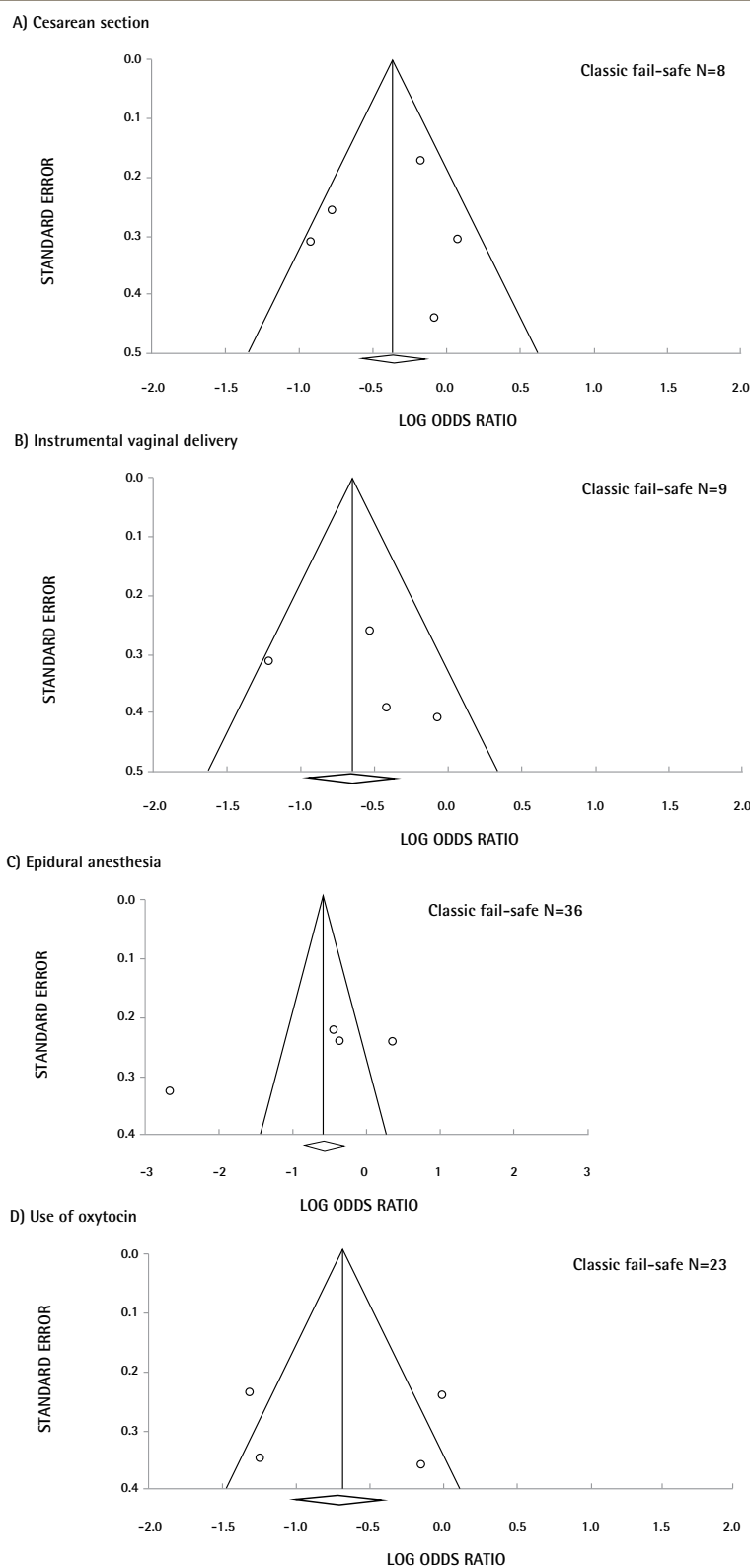


D) Use of oxytocin



*Using Mantel-Haenszel test under the random effects model.

Figure 3. Funnel plots: A) Cesarean section. B) Instrumental vaginal delivery. C) Use of epidural anesthesia. D) Use of oxytocin. Classic fail-safe N value is the number of studies with a null result that would be needed to show no effect in the synthesis for given outcomes.



during labour. Although it is outside any doula's scope of practice to provide medical advice to labouring women, a doula's past experiences will almost inevitably affect the way potential labour interventions are discussed. Further study into the role that a doula's previous training might play in the efficacy of the support she provides to women in labour would be a valuable addition to the current literature.

Although there is an established body of evidence describing the benefits of continuous support for women during labour, some caregivers might not be entirely comfortable with a doula in the delivery room. Cross-sectional studies of Canadian providers of maternity care—including family physicians, midwives, obstetricians, and nurses—indicate varying levels of support for the presence of doulas. Roughly half of obstetricians and a quarter of nurses and family physicians had unfavourable attitudes toward doula care, which contrasts with the generally positive attitudes reported by registered midwives.²⁴ Women are more frequently choosing to be accompanied by a doula during their labour,²⁵ and doulas will continue to be a relatively common presence on maternity wards. It is important that doulas and clinical caregivers work collaboratively and within their respective scopes of practice to provide women with safe birth experiences in which they feel empowered to make informed decisions about their care with the support of their clinical care team and doula. Given the number of studies describing the positive effects of doula support for low-risk women attempting vaginal delivery, physicians providing maternity care might consider recommending the services of a trained doula to patients during their pregnancy. Such recommendations might be particularly appropriate for patients who have a strong desire for fewer interventions during their labour, and for patients who might need additional support during the intrapartum period.

Conclusion

The presence of a trained doula reduces the odds of cesarean delivery and instrumental vaginal delivery when compared with women receiving standard maternity care. The presence of a doula does not have an effect on the use of epidural anesthesia or on the use of oxytocin to augment labour. We suggest that doulas have a positive effect on the rate of certain interventions during planned vaginal deliveries of term pregnancies in women of average risk. 🍁

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Contributors

Both authors contributed to the concept and design of the study; data gathering, analysis, and interpretation; and preparing the manuscript for submission.

Competing interests

None declared

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