Risk Factors Associated with Pyrexia in Labour: A Systematic Review and Meta-analysis

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Background

Pyrexia in labour (PIL), defined as maternal temperature ≥38°C, may have infectious or non-infectious causes(1). It is associated with increased maternal and neonatal investigations, antimicrobial exposure and adverse outcomes(2). Distinguishing infectious from non-infectious fever remains challenging. Identifying factors associated with PIL may improve understanding of its occurrence and inform the development of future prediction tools.

Aim

To identify and quantify maternal, obstetric, intrapartum and laboratory factors associated with PIL at term.

Methods

Component	Method
Study design	Systematic review and meta-analysis
Databases	MEDLINE, Embase and CINAHL
Search period	Inception to 21 June 2025
Population	Women at term (≥37 weeks)
Eligible studies	Observational studies
Risk-of-bias assessment	QUIPS
Statistical analysis	Random-effects meta-analysis
Effect measures	Odds ratios and mean differences

PRISMA Flow chart

7,530 Records identified

2,028 Records screened after duplicate removal

46 Full-text articles assessed

13 Studies included in the systematic review

Key Findings – Principal Pooled Associations

Factor	Pooled estimate (95% CI)	Heterogeneity (I^2)
Epidural Analgesia	OR 8.28 (6.57-10.45)	0%
Nulliparity	OR 4.36 (2.92-6.49)	88%
Induction of labour	OR 1.87 (1.47–2.38)	71%
Rupture of membranes duration	MD 4.21 hrs (1.98–6.44)	90%
Labour duration	MD 4.38 hrs (2.07–6.69)	80%
Neutrophil to lymphocyte ratio	MD 1.42 (0.52–2.32)	74%

Epidural analgesia demonstrated a strong association with PIL and no observed statistical heterogeneity, whereas nulliparity demonstrated a strong association with substantial heterogeneity.

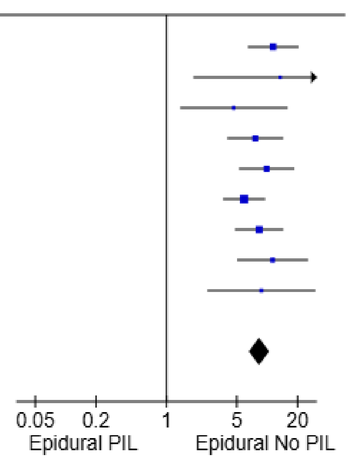
Sensitivity Analysis

Risk factor	Finding after excluding studies at high risk of bias
Epidural analgesia	Remained significant
Nulliparity	Remained significant
Induction of labour	Remained significant
Oxytocin use	Lost significance
Vaginal examinations	Lost significance
Birthweight	Lost significance
White blood cell count	Became significant
Meconium-stained amniotic fluid	Became significant

Epidural Analgesia and PIL

Study or Subgroup	PIL Events	PIL Total	No PIL Events	No PIL Total	Weight	Odds ratio M-H, Random, 95% CI
11 Tang	96	164	18	164	16.0%	11.45 [6.41 , 20.45]
12 Yancey	62	63	418	509	1.4%	13.50 [1.85 , 98.61]
13 Zhao	42	45	117	156	3.6%	4.67 [1.37 , 15.90]
2 Curtin	180	191	307	450	13.1%	7.62 [4.02 , 14.46]
5 Greenwell	535	545	2249	2664	13.4%	9.87 [5.24 , 18.62]
6 Herbst A	44	72	639	3037	23.2%	5.90 [3.64 , 9.55]
7 Jiang	50	72	89	415	17.6%	8.32 [4.79 , 14.48]
8 Kim	598	604	2887	3215	8.2%	11.32 [5.03 , 25.51]
9 Kovo	117	120	98	120	3.5%	8.76 [2.54 , 30.13]
Total (Wald[a])		**1876**		**10730**	**100.0%**	**8.28 [6.57 , 10.45]**
Total events:	1724		6822			

Test for overall effect: Z = 17.85 (P < 0.00001)



Heterogeneity: Tau² (DL[b]) = 0.00; Chi² = 5.38, df = 8 (P = 0.72); I² = 0%

Footnotes

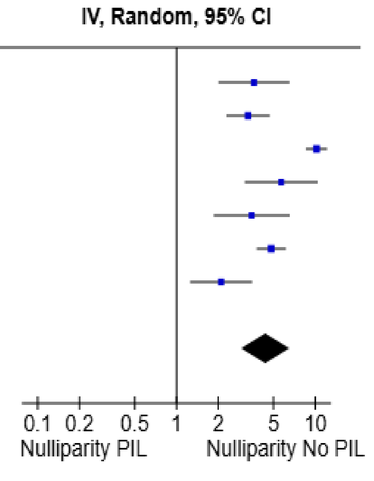
[a]CI calculated by Wald-type method.

[b]Tau² calculated by DerSimonian and Laird method.

Nulliparity and PIL

Study or Subgroup	PIL Events	PIL Total	No PIL Events	No PIL Total	Weight	Odds ratio IV, Random, 95% CI
1 Chen	157	171	335	443	12.7%	3.62 [2.01 , 6.51]
2 Curtin	134	191	188	450	15.4%	3.28 [2.28 , 4.71]
3 Dior	815	959	15209	42601	17.0%	10.19 [8.53 , 12.18]
6 Herbst A	59	72	1349	3037	12.5%	5.68 [3.10 , 10.40]
7 Jiang	59	72	235	415	12.2%	3.48 [1.85 , 6.53]
8 Kim	522	604	1830	3215	16.5%	4.82 [3.78 , 6.14]
9 Kovo	71	120	49	120	13.6%	2.10 [1.25 , 3.51]
Total (Wald[a])		**2189**		**50281**	**100.0%**	**4.36 [2.92 , 6.49]**
Total events:	1817		19195			

Test for overall effect: Z = 7.23 (P < 0.00001)



Heterogeneity: Tau² (REML[b]) = 0.24; Chi² = 69.43, df = 6 (P < 0.00001); I² = 88%

Footnotes

[a]CI calculated by Wald-type method.

[b]Tau² calculated by Restricted Maximum-Likelihood method.

Clinical implications

Several maternal and intrapartum characteristics were associated with PIL. However, potential confounding, substantial heterogeneity and reliance on unadjusted data limit their interpretation as independent predictors. These findings do not distinguish infectious from non-infectious pyrexia but may inform future research into clinical risk assessment.

Conclusion

Epidural analgesia showed the strongest and most consistent association with PIL. Nulliparity, induction of labour, longer labour and membrane rupture durations were also associated with PIL, although heterogeneity was substantial for several factors. Further research is needed to establish independent predictors and distinguish infectious from non-infectious pyrexia.

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