



# Home Versus Clinic BP Monitoring in Women with Hypertensive Disorders of Pregnancy: A Systematic Review and Meta-Analysis

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## Background

- Hypertension affects 10% of all pregnancies worldwide
  - Annual incidence of 18.1 million
  - Major contributor to healthcare visits & perinatal outcomes
- Hypertensive Disorders of Pregnancy (HDP)
  - Gestational Hypertension, Superimposed Pre-eclampsia, Pre-eclampsia or Chronic Hypertension
- Home blood pressure monitoring (HBPM) as a monitoring tool
  - · Well tolerated, reproducible and cost effective
  - Alternative to clinic blood pressure monitoring
- Validated data on HBPM use and outcomes remain sparse
  - Lack of evidence-based recommendation to inform guidelines

# Aims & Methodology

#### Primary Objective

 To examine the safety of HBPM through a comparison of adverse maternal and fetal clinical outcomes in women with HDP managed with HBPM compared to standard clinic-based care

#### Main Outcomes

Rates of pre-eclampsia, adverse maternal composite outcomes, severe hypertension (≥160/100mmHg) events, emergency delivery indicated for hypertension, stillbirth, preterm delivery (<34 weeks), small for gestation age (<10th centile) and neonatal mortality</li>

#### Secondary Outcomes

 No. of antenatal visits, frequency of BP measurements, time to diagnosis of clinically confirmed hypertension

#### Methodology

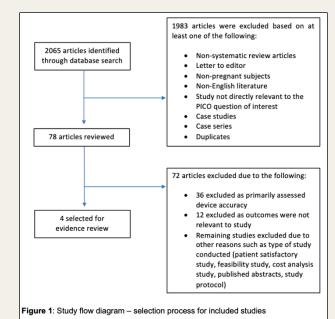
- Electronic database search: Cochrane, Medline, Embase, Pubmed between Jan 1970 to Dec 2022.
- Data extracted by two authors and analysed through Review Manager 5.4.1 (RevMan)
- Clinical outcomes of meta-analyses reported as Risk Ratios (RR) with 95% CI
- Risk of bias assessments conducted (RoB 2) & GRADE assessment

## Results

- 2065 articles identified from initial literature search
  - 1983 papers excluded based on abstracts
  - Further studies excluded due to non-relevance

 Four RCTs selected: 3,533 patients identified and analysed in meta-analysis

- Risk of bias: overall deemed moderate in all four trials
  - · Blinding not possible



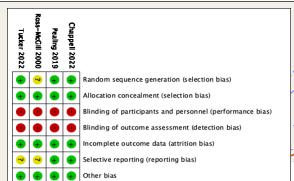


Figure 2: Risk of Bias Summary

### Results

- Out of 12 outcomes analysed, there were no statistically significant difference in the key maternal and fetal outcomes between women who underwent HBPM compared to clinic BP monitoring
- No statistically significant difference was observed in rates of:
  - Pre-eclampsia
  - Combined adverse maternal composite outcomes
  - Severe hypertension (>160/110mmHg)
  - Emergency delivery for hypertension
  - Stillbirth
  - Preterm delivery (<34 weeks)</li>
  - Neonatal mortality
  - Small for gestation age (<10<sup>th</sup> centile)

Figure 3: Rates of preeclampsia

	Home BP monitoring		Standard of Care			Risk Ratio	Risk Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% CI	M–H, Random, 95% CI
Chappell 2022	115	430	96	420	63.4%	1.17 [0.92, 1.48]	<b>=</b>
Pealing 2019	38	102	13	52	12.3%	1.49 [0.87, 2.54]	<del>  • -</del>
Tucker 2022	51	1209	51	1209	24.3%	1.00 [0.68, 1.46]	+
Total (95% CI)		1741		1681	100.0%	1.16 [0.96, 1.40]	<b>•</b>
Total events	204		160				
Heterogeneity: Tau2 =	= 0.00; Chi <sup>2</sup> $= 1$ .	44, df = 2	2 (P = 0.49);	$I^2 = 0\%$			0.01 0.1 1 10 100
Test for overall effect	z = 1.56 (P = 0)	.12)					Favours [Home BP] Favours [SOC]
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Figure 4: Combined adverse maternal composite outcomes

	Home BP mor	itoring	Standard of	Care		Risk Ratio	Risk Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% CI	M-H, Random, 95% CI
Chappell 2022	32	430	42	420	68.4%	0.74 [0.48, 1.16]	-
Pealing 2019	1	102	2	52	2.3%	0.25 [0.02, 2.75]	
Tucker 2022	15	1209	19	1209	29.3%	0.79 [0.40, 1.55]	<del></del>
Total (95% CI)		1741		1681	100.0%	0.74 [0.51, 1.06]	•
Total events	48		63				
Heterogeneity: Tau2 =	= 0.00; Chi <sup>2</sup> $= 0$	81, df = 2	2 (P = 0.67);	$I^2 = 0\%$			0.01 0.1 1 10 100
Test for overall effect	Z = 1.63 (P = 0)	0.10)					Favours [Home BP] Favours [SOC]

Figure 5: Rates of emergency delivery for hypertension

	Home BP monitoring		Standard of	f Care		Risk Ratio	Risk Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% CI	M-H, Random, 95% CI
Chappell 2022	95	442	82	428	45.3%	1.12 [0.86, 1.46]	+
Pealing 2019	36	102	13	52	10.8%	1.41 [0.82, 2.42]	+-
Tucker 2022	97	1259	100	1244	43.9%	0.96 [0.73, 1.25]	*
Total (95% CI)		1803		1724	100.0%	1.07 [0.90, 1.28]	•
Total events	228		195				
Heterogeneity: Tau2 =	= 0.00; Chi <sup>2</sup> = 1.	79, df = 2	2 (P = 0.41);	$I^2 = 0\%$			0.01 0.1 1 10 100
Test for overall effect	Z = 0.78 (P = 0.78)	).43)					Favours [Home BP] Favours [SOC]

## Results

• Reduced frequency of antenatal visits observed in remote BP monitoring group (mean difference of 2.9 less visits, P < 0.00001)

- Increased frequency of BP measurements observed in remote BP monitoring group (additional 3.1 weeks of BP recordings, P < 0.00001)</li>
- No observed significant difference in time to diagnosis of clinically confirmed hypertension in both groups

Figure 6: Number of antenatal visits recorded during the study

	Home BP	Standard of Care				Mean Difference	Mean Difference		
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Fixed, 95% CI	IV, Fixed, 95% CI
Ross-McGill 2000	4.5	2.2	40	7.4	2.2	40	100.0%	-2.90 [-3.86, -1.94]	•
Total (95% CI)			40			40	100.0%	-2.90 [-3.86, -1.94]	)
Heterogeneity: Not ap Test for overall effect:		P < 0.00	0001)						-100 -50 0 50 100 Favours [Home BP] Favours [SOC]

Figure 7: Frequency of blood pressure measurements performed during the study

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	Home BP monitoring			Standard of Care				Mean Difference	Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI
Ross-McGill 2000	10	2.4	40	6.9	2.2	40	100.0%	3.10 [2.09, 4.11]	-
Total (95% CI)			40			40	100.0%	3.10 [2.09, 4.11]	•
Heterogeneity: Not ap		(D - O O (	2001)						-100 -50 0 50 100
Test for overall effect:	Z = 6.02	(r < 0.00	)001)						Favours [Home BP] Favours [SOC]

## Conclusion

- Home blood pressure monitoring may be an acceptable alternative to conventional clinic-based blood pressure monitoring
- Our review showed that HBPM compared to clinic blood pressure monitoring did not lead to increased rates of adverse maternal or fetal outcomes
- Highlights need for further studies to define diagnostic criteria,
   management and escalation thresholds specific to the use of HBPM