INPLASY

Diagnostic Performance of Routine Automated Blood Pressure Monitoring for Detecting Atrial Fibrillation: A Systematic Review and Meta-Analysis

INPLASY2025100042
doi: 10.37766/inplasy2025.10.0042
Received: 13 October 2025
Published: 13 October 2025

Lv, WM.

Corresponding author:
Wenming Lv

187185610@qq.com

Author Affiliation:
The Affiliated People's Hospital of Ningbo University.

ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Data analysis.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY2025100042

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 13 October 2025 and was last updated on 13 October 2025.

INTRODUCTION

Review question / Objective This systematic review and meta-analysis aimed to determine the diagnostic accuracy of routine automated blood pressure monitoring for detecting AF.

Condition being studied Atrial fibrillation (AF), the most common clinical arrhythmia, is a major risk factor for stroke and heart failure. Since AF is often asymptomatic or paroxysmal, its detection remains challenging. Automated blood pressure monitors frequently incorporate algorithms for AF detection using oscillometric methods; however, their overall diagnostic performance has not been systematically evaluated.

METHODS

Search strategy PubMed:
((("office blood pressure"[tiab] OR "clinic blood pressure"[tiab] OR "routine blood pressure"[tiab] OR "automated office blood pressure"[tiab] OR "AOBP"[tiab]) OR ("home blood pressure"[tiab] OR "self-measured blood pressure"[tiab] OR "self-monitored blood pressure"[tiab]) OR ("ambulatory blood pressure"[tiab] OR "24-hour blood pressure"[tiab] OR "daytime blood pressure"[tiab] OR "nighttime blood pressure"[tiab] OR "nocturnal blood pressure"[tiab]) OR ("Blood Pressure Monitoring, Ambulatory"[Mesh] OR "Blood Pressure Determination"[Mesh]))
AND ("atrial fibrillation"[tiab] OR AF[tiab] OR AFib[tiab] OR "Atrial Fibrillation"[Mesh]) AND
("diagnos*"[tiab] OR "detect*"[tiab] OR "screen*"[tiab] OR "accuracy"[tiab] OR "sensitivity"[tiab] OR "specificity"[tiab] OR "ROC curve"[tiab] OR "receiver operating characteristic"[tiab] OR "AUC"[tiab] OR "area under the curve"[tiab] OR "predictive value"[tiab] OR "likelihood ratio"[tiab])

EmBase:
#1 'office blood pressure':ti,ab OR 'clinic blood pressure':ti,ab OR 'routine blood pressure':ti,ab OR 'automated office blood pressure':ti,ab OR 'aobp':ti,ab

#2 'home blood pressure':ti,ab OR 'self-measured blood pressure':ti,ab OR 'self-monitored blood pressure':ti,ab
#3 'ambulatory blood pressure':ti,ab OR '24-hour blood pressure':ti,ab OR 'daytime blood pressure':ti,ab OR 'nighttime blood pressure':ti,ab OR 'nocturnal blood pressure':ti,ab
#4 'ambulatory blood pressure monitoring'/exp OR 'blood pressure measurement'/exp
#5 #1 OR #2 OR #3 OR #4
#6 'atrial fibrillation':ti,ab OR 'af':ti,ab OR 'afib':ti,ab
#7 'atrial fibrillation'/exp
#8 #6 OR #7
#9 'diagnos*':ti,ab OR 'detect*':ti,ab OR 'screen*':ti,ab OR 'accuracy':ti,ab OR 'sensitivity':ti,ab OR 'specificity':ti,ab
#10 'roc curve':ti,ab OR 'receiver operating characteristic':ti,ab OR 'auc':ti,ab OR 'area under the curve':ti,ab
#11 'predictive value':ti,ab OR 'likelihood ratio':ti,ab
#12 #9 OR #10 OR #11
#13 #5 AND #8 AND #12

Cochrane Library:
#1 MeSH descriptor: [Blood Pressure Monitoring, Ambulatory] this term only
#2 MeSH descriptor: [Blood Pressure Determination] this term only
#3 ("office blood pressure" OR "clinic blood pressure" OR "routine blood pressure" OR "automated office blood pressure" OR "AOBP" OR "home blood pressure" OR "self-measured blood pressure" OR "self-monitored blood pressure" OR "ambulatory blood pressure" OR "24-hour blood pressure" OR "daytime blood pressure" OR "nighttime blood pressure" OR "nocturnal blood pressure"):ti,ab,kw
#4 #1 OR #2 OR #3
#5 MeSH descriptor: [Atrial Fibrillation] this term only
#6 ("atrial fibrillation" OR AF OR AFib):ti,ab,kw
#7 #5 OR #6
#8 ("diagnos*" OR "detect*" OR "screen*" OR "accuracy" OR "sensitivity" OR "specificity" OR "ROC curve" OR "receiver operating characteristic" OR "AUC" OR "area under the curve" OR "predictive value" OR "likelihood ratio"):ti,ab,kw
#9 #4 AND #7 AND #8

Web of Science:
#1 TS=("office blood pressure" OR "clinic blood pressure" OR "routine blood pressure" OR "automated office blood pressure" OR "AOBP")
#2 TS=("home blood pressure" OR "self-measured blood pressure" OR "self-monitored blood pressure")
#3 TS=("ambulatory blood pressure" OR "24-hour blood pressure" OR "daytime blood pressure" OR "nighttime blood pressure" OR "nocturnal blood pressure")
#4 #1 OR #2 OR #3
#5 TS=("atrial fibrillation" OR AF OR AFib)
#6 TS=("diagnos*" OR "detect*" OR "screen*" OR "accuracy" OR "sensitivity" OR "specificity" OR "ROC curve" OR "receiver operating characteristic" OR "AUC" OR "area under the curve" OR "predictive value" OR "likelihood ratio")
#7 #4 AND #5 AND #6.

Participant or population Adult patients (≥18 years) with or without a history of AF or hypertension.

Intervention Routine automated blood pressure monitors using the oscillometric method.

Comparator AF diagnosis confirmed by standard ECG interpreted by a cardiologist, Holter monitoring, or pacemaker recordings.

Study designs to be included Diagnostic studies.

Eligibility criteria The eligibility criteria were as follows: (1) population: adult patients (≥18 years) with or without a history of AF or hypertension; (2) index test: routine automated blood pressure monitors using the oscillometric method; (3) reference standard: AF diagnosis confirmed by standard ECG interpreted by a cardiologist, Holter monitoring, or pacemaker recordings; and (4) study design: primary diagnostic accuracy studies providing sufficient data to construct a 2×2 contingency table (i.e., true positives, false positives, false negatives, and true negatives).

Information sources PubMed, Embase, Web of Science, and the Cochrane Library.

Main outcome(s) True positives, false positives, false negatives, and true negatives.

Quality assessment / Risk of bias analysis Quality Assessment of Diagnostic Accuracy Studies (QUADAS-2) tool, which evaluates four domains: patient selection, index test, reference standard, and flow and timing.

Strategy of data synthesis Using the extracted 2×2 contingency tables, we calculated sensitivity, specificity, positive likelihood ratio (PLR), negative likelihood ratio (NLR), diagnostic odds ratio (DOR),

and the area under the summary receiver operating characteristic curve (AUC) for each study. A bivariate generalized linear mixed model with random-effects meta-analysis was used to derive pooled estimates and their 95% confidence intervals [14,15]. This model accounts for within-study and between-study heterogeneity and incorporates the inherent negative correlation between sensitivity and specificity.

Subgroup analysis Subgroup analyses were conducted based on country, mean age, proportion of males, prevalence of hypertension, prevalence of diabetes, and type of reference standard.

Sensitivity analysis Not applicable.

Language restriction No restriction.

Country(ies) involved China.

Keywords Routine automated blood pressure monitor; atrial fibrillation; diagnostic performance; systematic review; meta-analysis.

Contributions of each author

Author 1 - Wenming Lv.
Email: 187185610@qq.com