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Introduction

Prehospital identification of intracerebral haemorrhage (ICH) in suspected stroke cases may enable the initiation of appropriate treatments and facilitate better-informed transport decisions, thus potentially improving patient outcomes.

Objectives

- To identify early clinical features and portable devices for the detection of ICH in the prehospital setting.
- To evaluate the feasibility of conducting a future meta-analysis.

Methods

- This scoping review followed the guidelines of the JBI and PRISMA-ScR [1,2] (Table 1).
- A detailed study protocol was published recently in BMJ Open [3].
- Three databases were searched via Ovid (MEDLINE, EMBASE and CENTRAL) from inception to August 2022 using pre-specified search strategies (Figure 1).

PCC	Included	Excluded
Population	<ul style="list-style-type: none"> Studies of adult patients (≥16 years old) with suspected stroke or intracranial haemorrhage. 	<ul style="list-style-type: none"> Studies of children (<16 years old). Studies combined ICH clinical features with other aetiologies.
Concept	<ul style="list-style-type: none"> Studies reported the clinical features of suspected stroke patients, obtained during prehospital care or within 24 hours of symptoms onset upon hospital admission. Studies evaluated portable devices to detect ICH. 	<ul style="list-style-type: none"> Studies examined the clinical features of patients after 24 hours of symptoms onset or focused on ICH-related clinical features without comparisons to other suspected stroke cases. Studies that failed to provide information on the diagnostic performance of the technology being tested, or examined advances in conventional detection methods, or restricted their testing to phantoms or animal models.
Context	<ul style="list-style-type: none"> Prehospital and in-hospital studies. 	<ul style="list-style-type: none"> Primary care studies.

Table 1. Inclusion and exclusion criteria.

Results

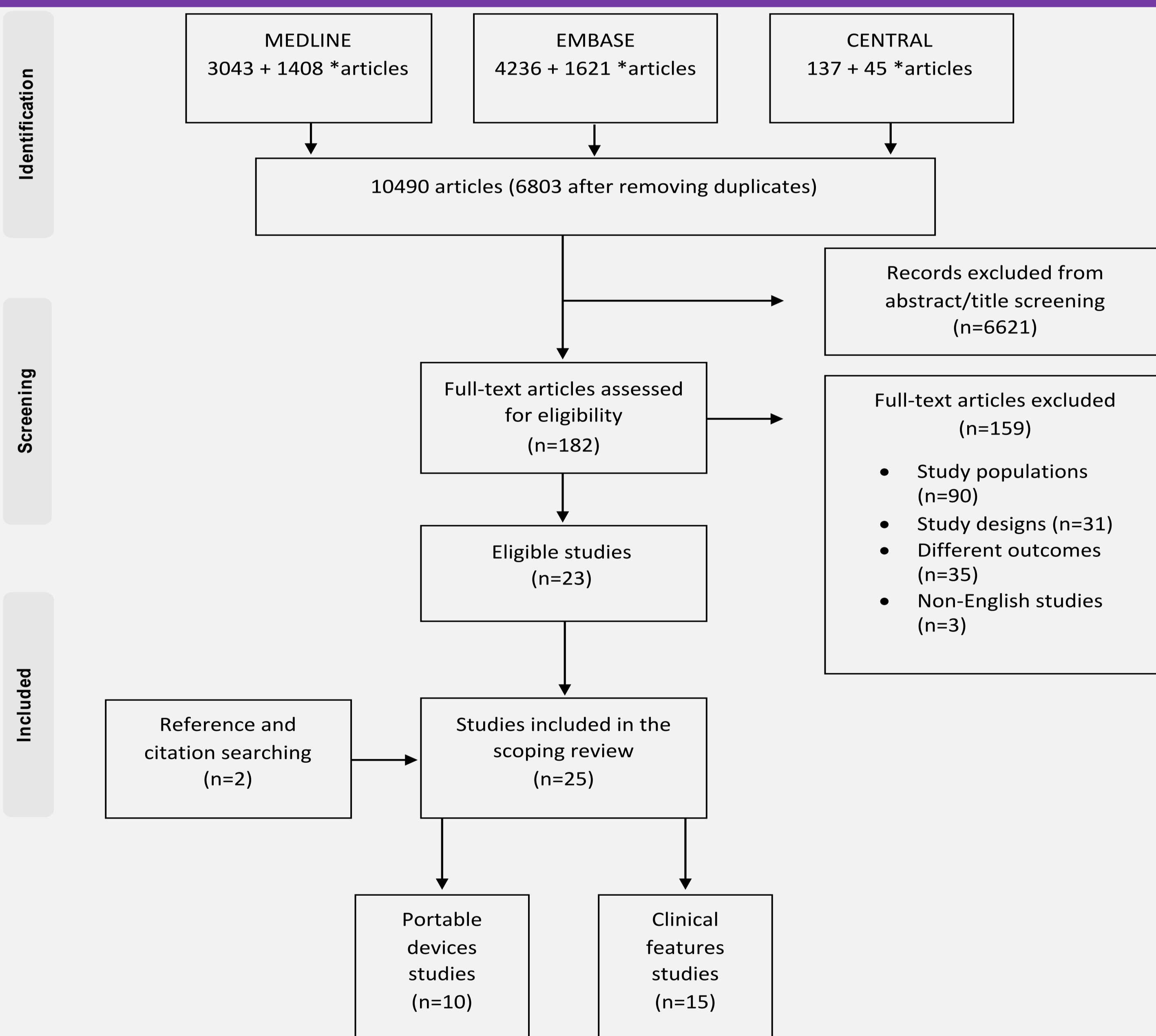


Figure 1. PRISMA flowchart of study selection process (*search results for clinical features + portable devices, respectively).

Early clinical features of ICH

- Associations between age, sex, and past medical histories with the presence of ICH varied across studies.
- ICH patients exhibited more severe neurological deficits (n=6) and higher blood pressure levels (n=11) at onset compared to other diagnoses.

Portable devices to detect and differentiate ICH

- Five technologies were identified for ICH detection:
 - Microwave imaging technology
 - Volumetric impedance phase shift spectroscopy
 - Transcranial ultrasound
 - Near-infrared spectroscopy
 - Electroencephalography
- Microwave and ultrasound imaging techniques were shown to be capable of distinguishing ICH from other diagnoses.
 - The microwave device had an area under the curve of 0.85 for distinguishing ICH from ischaemic stroke and 0.87 for distinguishing ICH patients from healthy individuals [4].
 - Transcranial ultrasound showed sensitivities of 63-94% and specificities of 95-99% in differentiating ICH from other diagnoses [5-7].

Conclusion

- The considerable heterogeneity among the included studies precludes meta-analysis of available data.
- Further studies are needed to evaluate portable devices' ability to differentiate between stroke subtypes and non-stroke diagnoses.

References

Please scan the QR code for references.

