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Applications of Mobile Health (mHealth) Interventions in Secondary Prevention of Patients with Venous Thromboembolism: A Scoping Review and Evidence Map

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - The review has not yet started.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 10 February 2026 and was last updated on 10 February 2026.

INTRODUCTION

Review question / Objective What is the current evidence on the application, characteristics, and outcomes of mobile health (mHealth) interventions in the secondary prevention of venous thromboembolism (VTE) patients?

PCC Framework Specification:
Population (P): Adult patients diagnosed with VTE (including DVT and/or PE) in the secondary prevention phase (post-acute treatment, post-discharge).
Concept (C): Patient-facing mHealth technologies including smartphone APPs, social media platforms (WeChat mini-programs/groups), wearable devices, and remote management platforms. Exclusions: Telephone-only follow-up and provider-facing systems.
Context (C): Secondary prevention settings (outpatient, community, home) focusing on preventing recurrence, managing post-thrombotic syndrome, improving anticoagulation adherence, and enhancing quality of life.

Objectives: (1) Map the evidence landscape of mHealth interventions; (2) Identify technology types, functional modules, and theoretical frameworks; (3) Reveal evidence gaps regarding technology-application fit and geographic distribution (China vs. Western contexts); (4) Differentiate mHealth from traditional telemedicine in VTE management.

Background Venous thromboembolism (VTE), including deep vein thrombosis and pulmonary embolism, requires long-term secondary prevention after acute treatment. However, post-discharge management faces challenges in medication adherence and post-thrombotic syndrome (PTS) prevention. Mobile health (mHealth) technologies (smartphone APPs,

WeChat, wearables) offer innovative solutions for continuous patient engagement.

While a systematic review protocol by Fu et al. (2024) focuses on clinical effectiveness of digital health interventions, it is limited to English literature and broad definitions potentially including telephone-based interventions. This scoping review addresses the gap by strictly defining mHealth as patient-facing mobile technologies (excluding pure telephone follow-up), incorporating Chinese literature (CNKI, Wanfang) to capture WeChat-based interventions unique to China, and mapping implementation science dimensions (theoretical frameworks, patient adoption barriers) beyond clinical outcomes. This evidence map will guide future precision interventions for VTE secondary prevention.

Rationale This scoping review is warranted for four reasons:
(1)The application of mHealth in VTE secondary prevention represents an emerging, heterogeneous field where the evidence landscape remains unclear; a scoping review optimally maps the breadth of literature rather than focusing narrowly on effectiveness.
(2)Existing protocols (Fu et al., 2024) examine broad "digital health" including telephone-based interventions, while we specifically map patient-facing mHealth technologies (APPs, WeChat, wearables) and incorporate Chinese-language evidence.
(3)Our objective is to generate an evidence map identifying gaps in technology-outcome fit, theoretical frameworks, and geographic distribution—dimensions best addressed by Arksey & O'Malley's scoping framework.
(4) Inclusion of qualitative/mixed-methods studies is essential for understanding implementation barriers but inappropriate for systematic review methodology.

METHODS

Strategy of data synthesis

Electronic databases:
English: MEDLINE (PubMed), Cochrane Library (CENTRAL), Embase, Web of Science, and CINAHL.
Chinese: CNKI (China National Knowledge Infrastructure), Wanfang Data, and SinoMed (CBM).
Supplementary: ClinicalTrials.gov, Chinese Clinical Trial Registry (ChiCTR), and reference lists of included systematic reviews.

Search terms (PCC framework):
Population: "venous thromboembolism"[MeSH] OR "VTE"[tiab] OR "deep vein thrombosis"[tiab] OR "pulmonary embolism"[tiab] OR "post-thrombotic syndrome"[tiab].
Concept: "mobile health"[tiab] OR "mHealth"[tiab] OR "smartphone application"[tiab] OR "WeChat"[tiab] OR "wearable electronic devices"[tiab] OR "remote patient monitoring"[tiab].
Context: "secondary prevention"[tiab] OR "post-discharge care"[tiab] OR "long-term management"[tiab] OR "medication adherence"[tiab].

Limits:
- Dates: January 1, 2015 to January 31, 2026.
- Language: English and Chinese only.
- Exclusions during screening: Telephone-only interventions, paper-based education without digital component, and inpatient-only acute phase studies.

Eligibility criteria

Inclusion criteria (all must be met):
1. Population: Adults (aged ≥18 years) diagnosed with VTE (DVT/PE) via imaging or clinical diagnostic criteria.
2. Phase: Secondary prevention (post-acute treatment, post-discharge, outpatient/community setting).
3. Intervention: Patient-facing mHealth technologies (smartphone apps, WeChat mini-programs/groups, wearable devices, remote platforms). May be part of multimodal care.
4. Study Design: All primary study designs, including RCTs, quasi-experimental, cohort, pre-post studies, case series, and qualitative/mixed-methods studies. Systematic reviews will be screened for references only.
5. Language: English or Chinese full-text publications.

Exclusion criteria (any one of which applies):
1. Population: Focus on primary prevention in high-risk individuals (no VTE diagnosis) or exclusively on acute inpatient management.
2. Intervention: Telephone-only voice calls, paper-based-only education, pure offline consultation, or provider-facing systems (e.g., CDSS) without patient interaction.
3. Publication Type: Conference abstracts, commentaries, editorials, study protocols without results, or animal studies.

4. Language: Non-English/Chinese publications.

Note: Studies using telephone as a supplement to an mHealth core intervention are eligible.

Source of evidence screening and selection Two independent reviewers (the first author and a trained research assistant) will conduct screening at all stages. Stage 1: Title and abstract screening using EndNote for deduplication and initial eligibility assessment (include/exclude/uncertain). Stage 2: Full-text review for potentially eligible records against PCC criteria. Disagreements at any stage will be resolved through discussion or consultation with a third reviewer until consensus is reached. A PRISMA-ScR flow diagram will document the selection process, including numbers of records identified, screened, assessed for eligibility, and included with reasons for exclusion. Grey literature (ClinicalTrials.gov, ChiCTR) and reference lists of included systematic reviews will be hand-searched to supplement database results.

Data management A standardized Excel spreadsheet will be designed for data extraction, pilot-tested with two studies, and refined before formal extraction. Extracted data include: bibliographic information, study characteristics (design, sample size, setting), PCC elements (population demographics, mHealth technology types and features, secondary prevention context), outcomes, and quality assessment results. Two reviewers will independently extract data; discrepancies will be resolved by rechecking original sources. All files (EndNote libraries, Excel extraction tables, PDF full-texts) will be stored in encrypted cloud storage and local hard drive with weekly backups to ensure data security and accessibility.

Language restriction Only English and Chinese publications will be included.

Country(ies) involved China.

Keywords Mobile health; mHealth; venous thromboembolism; VTE; secondary prevention; scoping review; evidence map; WeChat; wearable devices; smartphone applications.

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