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Predicting and preventing non-adherence in mobile digital health studies: a focused pilot systematic scoping review

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Context: Sustained adherence to an intervention or data collection protocol as intended remains a challenge in mobile digital health studies. Also, reports often miss a concise definition of intended use and mix adherence to digital-component use with adherence to target-behavior. We, therefore, map recent work on predicting and preventing non-adherence across digital intervention and data-collection studies to clarify the phenomenon of adherence and use in future digital health studies.

Methods: We conducted an OSF-registered focused pilot systematic scoping review (osf.io/eaz7w) of PubMed/MEDLINE records published from 2024 to May 2026. The pilot tests eligibility criteria, screening procedures, AI-assisted decision support, and the coding framework before a broader review extending the technology scope, databases, and publication years. Eligible studies examined mobile app, smartphone, mHealth, or wearable interventions or data-collection systems and substantively addressed prediction or prevention of non-adherence, engagement, dropout, attrition, churn, retention, or sustained use. Two reviewers independently screened titles/abstracts. After a 25-record human-only calibration phase, separate LLM tools provided decision support only; final decisions remained human. AI use will be reported per PRISMA-trAIce (tool use, human oversight, performance evaluation, deviations, limitations). Full texts are coded into a 2x2 matrix crossing prediction vs prevention with intervention vs data-collection designs, and by adherence type (component vs target-behavior; intended vs actual). Prediction algorithms are identified and prevention strategies are coded using established behavior change techniques.

Results: The search identified 537 records on 21 May 2026. After duplicate removal, 536 records were screened; 334 advanced to full-text review and 202 were excluded. Independent pre-resolution screening decisions showed substantial agreement on advancement to full-text review (Cohen's kappa=0.72, 95% CI 0.66-0.77). Seventy-four disagreements were resolved by consensus; no third reviewer was required. The 25-record calibration subset clarified cases where adherence was reported but not substantively analyzed. LLM support retained all human-included calibration records but over-included, supporting use as high-sensitivity decision support rather than replacement for human screening. Full-text coding will be completed before ISRII 2026.

Conclusions: Preliminary results show substantial recent literature on prediction and prevention of non-adherence in mobile/wearable health studies. The final synthesis will map evidence clusters across intervention and data-collection contexts and identify gaps in reporting intended-vs-actual and component-vs-behavior adherence.

Implications: Findings will inform transparent reporting and the design of digital intervention and data-collection studies that anticipate and prevent non-adherence over time and at scale.

Suggested submission type: Poster; **Suggested topics:** Mobile health; Wearables; User Engagement & Design; Machine Learning and Artificial Intelligence; Passive Sensing; Implementation Science.