

INPLASY

Healthcare-Team-Supported Digital Symptom Monitoring and Management in Adults With Cancer: A Systematic Review and Meta-analysis

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ADMINISTRATIVE INFORMATION

Support - This review received no external financial, institutional, commercial, or charitable support and no sponsorship. The review team conducted the searching, screening, data extraction, risk-of-bias assessment, evidence-certainty assessment, analysis, interpretation, and reporting independently.

Review Stage at time of this submission - Completed but not published.

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 9 October 2026 and was last updated on 9 October 2026.

INTRODUCTION

Review question / Objective Among adults with cancer, do digital symptom or toxicity monitoring and management pathways that transmit patient-reported information to a healthcare team for a defined clinical response, compared with usual or standard care, attention or waiting-list control, digital monitoring without team reporting, or another active implementation component, improve overall symptom burden, fatigue, pain, global quality of life, MSAS total score, and clinically interpretable toxicity or hospitalization outcomes?

Condition being studied Cancer-related symptom burden, treatment-related toxicity, patient-reported outcomes, quality of life, and supportive oncology care delivered through healthcare-team-supported digital monitoring or management pathways.

METHODS

Participant or population Adults aged 18 years or older with a confirmed cancer diagnosis, any cancer type, stage, or treatment setting. Eligible studies included patients receiving chemotherapy, radiotherapy, oral anticancer therapy, immunotherapy, postoperative care, or other oncology treatment or follow-up.

Intervention An electronic patient-reported outcome system, mobile application, web-based platform, tablet, interactive voice response system, or automated telephone system that collects symptoms, treatment toxicity, function, or quality-of-life data and transmits the information to a nurse, physician, oncology clinician, or multidisciplinary healthcare team. The pathway had to define at least one team responsibility, such as alert review, feedback, education, triage, follow-

up, supportive treatment, referral, or treatment adjustment.

Comparator Eligible comparators were usual or standard care, attention or waiting-list control, digital symptom monitoring without team reporting or response, or another active implementation component. Active internal comparisons were analyzed separately from usual-care comparisons because they estimate the incremental value of reporting, education, or response rather than the total effect of establishing a digital pathway versus usual care.

Study designs to be included Randomized controlled trials, cluster-randomized trials, and randomized pilot or feasibility trials were eligible. Non-randomized studies were excluded from the prespecified evidence synthesis. Conference abstracts, protocols, registrations, ongoing studies, and duplicate reports or duplicate cohorts were excluded as independent evidence.

Eligibility criteria Studies were eligible when they enrolled adults with cancer; evaluated a digital system that collected symptoms, toxicity, function, or quality-of-life information; transmitted the information to a healthcare professional or healthcare team; described a defined team review or response responsibility; and used a randomized comparison. Studies were excluded when they evaluated education or self-management without a team response pathway, simple electronic-versus-paper completion, lifestyle, mindfulness, or exercise as the core intervention, non-randomized designs, abstracts, protocols, registrations, ongoing studies, or duplicate cohorts.

Information sources PubMed, Embase, Scopus, Web of Science Core Collection, and the Cochrane Library were searched from database inception to 13 September 2026. The search covered cancer, digital patient-reported or symptom monitoring, and healthcare-team response. The search identified 64,962 records: 8,520 from PubMed, 21,343 from Embase, 13,422 from Scopus, 8,240 from Web of Science, and 13,437 from the Cochrane Library. After removal of 30,001 duplicate records, 34,961 records were screened and 1,384 full-text reports were assessed; 30 eligible reports were included.

Main outcome(s) The primary outcome was overall symptom burden, defined as a prespecified overall or multisymptom score, symptom change score, or area-under-the-curve summary measured at the principal post-intervention or end-of-intervention time point. When multiple options

were available, the assessment closest to the end of the intervention and the clearest healthcare-team response pathway were prioritized.

Additional outcome(s) Secondary outcomes were fatigue, pain, global quality of life, MSAS total score, and clinically interpretable treatment-related toxicity or hospitalization outcomes. Adjusted effects, trajectory slopes, area-under-the-curve estimates, and outcomes contributed by only one study were reported separately when they were not compatible with the primary pooled estimand. Grade 3 or higher treatment-related toxicity and grade 3-4 immune-related adverse events were reported as single-study risk ratios and were not pooled across studies.

Quality assessment / Risk of bias analysis

Methodological quality and risk of bias were assessed independently by two reviewers using the Cochrane Risk of Bias 2 tool for randomized trials. The assessment covered the randomization process, deviations from intended interventions, missing outcome data, outcome measurement, and selection of the reported result. Each reviewer documented signalling responses, domain-level judgements, the likely direction of bias, and the supporting information from the report. Disagreements were resolved by discussion and consensus; unresolved disagreements were adjudicated by a third reviewer. Risk-of-bias judgements were considered when interpreting pooled estimates and GRADE certainty. Four reports were judged at overall high risk of bias and 26 raised some concerns.

Strategy of data synthesis

Analyses were performed in R using the meta and metafor packages. Restricted maximum-likelihood random-effects models were used. Hedges' g was used when instruments differed within an outcome domain, and mean difference was used for the common MSAS total scale. We reported pooled effects with 95% confidence intervals, I-squared, tau-squared, Cochran's Q, and prediction intervals. Leave-one-out and Hartung-Knapp sensitivity analyses were performed. Outcomes with one contributing study were described without a pooled estimate; two-study strata were treated as exploratory.

Subgroup analysis Studies were described by comparator type (usual or limited-response comparator versus active internal comparison), healthcare-team response pathway (protocolized versus limited or optional response), cancer group, and outcome domain. Breast-cancer, mixed-cancer, and lung-cancer strata were described.

Strata with fewer than three studies were not interpreted using formal interaction tests or formal heterogeneity inference.

Sensitivity analysis Leave-one-out analyses were performed for the primary overall symptom-burden pool. Hartung-Knapp-adjusted confidence intervals were compared with the primary REML results. Influential studies were identified without mechanically excluding any prespecified study. Formal small-study or publication-bias tests were not performed because each outcome included fewer than 10 studies.

Country(ies) involved China.

Keywords cancer; oncology; digital health; electronic patient-reported outcomes; ePRO; symptom monitoring; symptom management; healthcare-team response; nurse-led care; telehealth; mobile application; quality.

Contributions of each author

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