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PHARMACIST-LED TELEPHARMACY AND REMOTE COUNSELLING IN INDIA AND LMICS 2020–2026: A SYSTEMATIC REVIEW OF OUTCOMES, IMPLEMENTATION, AND EQUITY

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ABSTRACT

Pharmacist-led Telepharmacy and remote counselling expanded rapidly after 2020, driven by pandemic-era service redesign and wider adoption of telehealth platforms. Evidence suggests potential benefits for medication adherence, safety, and access, but implementation, equity, and outcome measurement remain heterogeneous across India and other LMICs. To systematically map and synthesize evidence from 2020–2026 on the effects, implementation factors, and equity outcomes of pharmacist-led Telepharmacy and remote patient counselling in India and comparable LMIC settings. Placeholder numbers — replace with your extracted results before submission: X studies met inclusion criteria (Y studies from India), comprising N participants and M implementation reports. Across included studies, pharmacist-led Telepharmacy interventions were associated with improvements in medication adherence in most controlled studies (standardized mean difference or relative improvement to be reported), reductions in DRPs or medication errors in several implementation evaluations, and mixed effects on readmissions. Patient satisfaction and acceptability were generally high where measured, but access and equity findings highlighted a persistent digital divide (rural, low-literacy, and low-income groups underrepresented). Heterogeneity in intervention models, outcome measures, and study quality limited pooled estimates for some outcomes. Cost-effectiveness, and prioritize implementation studies that address di Pharmacist-led Tele

pharmacy and remote counselling show promise for improving adherence, medication safety, and patient satisfaction in India and LMIC contexts, but evidence is limited by heterogeneity and gaps in equity-focused reporting. Future research should standardize core outcomes, evaluate digital access, training, and regulatory barriers to support scalable, equitable Telepharmacy services.

KEYWORDS: Tele pharmacy; pharmacist-led counselling; remote patient counselling; medication adherence; implementation; India; LMIC; digital health.

INTRODUCTION

Telepharmacy, defined as the delivery of pharmaceutical care and pharmacy services at a distance through telecommunications and digital technologies, has become a vital extension of telehealth and a transformative force in pharmacy practice.[1] It enables pharmacists to provide structured medication counselling, prescription review, medication therapy management (MTM), remote monitoring, and clinical consultations, thereby expanding their role from product-centered dispensing to clinical, patient-facing care. Since 2020[2], the adoption of telepharmacy has accelerated worldwide, particularly in India and other LMICs, where it has supported outpatient counselling, discharge reconciliation, chronic disease follow-up, and adverse event monitoring.[3] Early implementation during the COVID-19 pandemic demonstrated feasibility and high patient acceptability, while also exposing challenges in infrastructure, regulation, and equity that continue to shape scale-up. Telepharmacy operates through synchronous models such as real-time video or phone counselling, and asynchronous models like secure messaging or recorded sessions, each suited to different patient needs.[4] Pharmacist-led counselling and remote monitoring further enhance adherence, detect and resolve drug-related problems, and support transitions of care. In India and LMICs, where access to healthcare remains uneven, telepharmacy offers a pathway to extend pharmacist expertise into underserved areas.[5] Yet, evidence on effectiveness, cost, and equitable access remains fragmented, underscoring the need for a systematic review to inform policy, training, and service design.

Scope for this review

- Interventions included: pharmacist-led Telepharmacy services (synchronous or asynchronous), remote medication counselling, MTM via telehealth, pharmacist-supervised remote medication review, and pharmacist-led remote monitoring.[6]

- Interventions excluded: automated systems without pharmacist clinical input, purely dispensing logistics without clinical counselling.[7]
- Geographic focus: India and LMICs (World Bank classification at time of search).[8]
- Timeframe: 2020-01-01 to 2026-06-15.

Objectives:

Primary objective: To synthesize evidence (2020–2026) on the effectiveness of pharmacist-led Telepharmacy and remote counselling in India and LMICs for improving medication-related outcomes.

Secondary objectives:

- Map Telepharmacy implementation models, technologies, and service workflows.
- Identify barriers and facilitators to implementation (infrastructure, training, regulation, reimbursement).
- Assess equity and access outcomes (digital divide, rural/urban differences, socioeconomic and literacy impacts).
- Summarize economic or resource-use data where available.

PICOS / Scoping specification:

Table 1: Scoping Specification.

Element	Specification
Population (P)	Patients receiving pharmacist-led Telepharmacy or remote counselling (all ages; outpatient, post-discharge, community settings) in India and LMICs.
Intervention (I)	Pharmacist-led Telepharmacy: remote medication counselling, MTM via telehealth, medication reconciliation, and remote monitoring with pharmacist interventions.
Comparator (C)	Usual care (in-person counselling), other remote models, or no comparator (for descriptive/implementation studies).
Outcomes (O)	Primary: medication adherence. Secondary: DRPs/medication errors, hospital readmissions/healthcare utilization, patient satisfaction/acceptability, access metrics (reach, uptake), cost/resource use, equity indicators.
Study designs (S)	RCTs, quasi-experimental, cohort, cross-sectional, implementation evaluations, qualitative and mixed-methods studies, and policy/grey literature.
Timeframe	2020-01-01 to 2026-06-15.
Setting	India and LMICs (extract country and setting details during data extraction).

Adherence to reporting standards

- Use PRISMA-SCR if the aim is mapping and describing the field (implementation, models, equity).

- Use PRISMA 2020 (and PRISMA-P for protocol) if conducting a full systematic review with planned quantitative synthesis. Include the completed PRISMA checklist as an appendix and state in Methods that the checklist is provided.

Eligibility criteria

Population: Patients of any age who received pharmacist-led remote services (counselling, MTM, medication reconciliation, remote monitoring) in India or LMICs (World Bank classification).[9] Interventions must be explicitly pharmacist-led and delivered remotely (synchronous or asynchronous). Examples: telephone/video counselling, pharmacist-led MTM via telehealth, pharmacist-supervised electronic medication review, pharmacist-initiated remote monitoring.[10] Exclude automated systems without pharmacist clinical input and purely dispensing/logistics activities without counselling. Comparator: Usual care (in-person counselling), alternative remote models, or no comparator (for descriptive/implementation studies).[11]

Outcomes

- Primary: medication adherence (validated scales, refill data, electronic monitoring).
- Secondary: drug-related problems (DRPs) and medication errors; hospital readmissions and healthcare utilization; patient satisfaction and acceptability; access and equity indicators (uptake, rural/urban differences, digital literacy); cost and resource use.[12]

Study designs include randomized controlled trials, cluster RCTs, quasi-experimental studies, controlled/uncontrolled before-and-after studies, cohort studies, cross-sectional studies, qualitative and mixed-methods implementation studies, and relevant policy/grey literature (program reports, evaluations). Exclude editorials and single-case reports unless they provide unique implementation details. Timeframe and language: Publications and reports dated 2020-01-01 to 2026-06-15. Include English language studies; note non-English studies and translate if resources permit.

Information sources and search strategy:

Databases and grey literature: Search PubMed/MEDLINE, Scopus, Web of Science, Embase (if available), Google Scholar, and INDMED. Search grey literature sources, including Ministry of Health and Family Welfare (MOHFW) reports, state health portals, WHO regional reports, NGO program evaluations, conference proceedings, and preprint servers (medRxiv, Research Square).

Search approach: Combine controlled vocabulary (MeSH/Emtree) and keywords for Telepharmacy, telemedicine, telehealth, pharmacist, remote counselling, medication therapy management, MTM, medication reconciliation, plus country filters (India; LMIC country names). Apply date limits 2020-01-01 to 2026-06-15. Document full search strings and exact search dates for each source in an appendix.

Adaptation for local repositories. For INDMED and state portals, use simplified keyword searches and targeted site searches (e.g., "Telepharmacy India", "pharmacist counselling telemedicine") and hand search reference lists of included studies and relevant reviews.

Study selection and screening

Screening process: Two reviewers independently screen titles and abstracts using pre-piloted eligibility criteria. Full texts are retrieved for records judged potentially eligible. Two reviewers independently assess full texts; disagreements are resolved by discussion or third-reviewer adjudication.

Record keeping and reporting. Use a reference manager (e.g., EndNote, Zotero) to deduplicate records and a screening tool (e.g., Rayyan) to track decisions. Record reasons for exclusion at full-text stage and present the selection process in a PRISMA flow diagram with counts for: records identified, duplicates removed, screened, full texts assessed, excluded (with reasons), and included studies.

Pilot testing: Pilot the screening form on a sample of 50 records to ensure consistent application of inclusion criteria; refine forms as needed and document changes.

Data extraction and management

Data extraction form Use a standardized, piloted extraction form (Excel/Distiller SR) with the following fields: Study ID; citation; year; country; setting (urban/rural; hospital/community); study design; sample size; population characteristics (age, sex, comorbidities); intervention description (modality: synchronous/asynchronous; platform; frequency; pharmacist role); comparator; outcomes measured and measurement tools; effect estimates and measures of variance; follow-up duration; implementation details (training, SOPs, funding); equity indicators (rural/urban, SES, digital literacy); cost/resource data; funding and conflicts of interest; notes.

Extraction process: Two reviewers independently extract data for each included study; discrepancies are reconciled by consensus or a third reviewer. For missing or unclear data, contact study authors once; document attempts and responses.

Data management: Store extracted data in a secure, version-controlled spreadsheet. Maintain a master file linking study IDs to full texts and extraction sheets. Preserve raw extraction notes for audit and reproducibility.

Risk of bias assessment and certainty of evidence:

Risk of bias tools

- Randomized trials: ROB 2.[13]
- Nonrandomized intervention studies: ROBINS-I.[14]
- Observational cohort/case-control: Newcastle-Ottawa Scale (NOS) where applicable.
- Qualitative and mixed-methods: CASP or MMAT as appropriate.

Assessment process: Two reviewers independently assess the risk of bias; resolve disagreements by discussion or a third reviewer. Present domain-level judgments and overall risk for each study in a summary table and traffic-light figure.

Certainty of evidence: Apply GRADE to key quantitative outcomes (adherence, readmissions) if meta-analysis is performed; otherwise, provide narrative certainty statements (high/moderate/low/very low) based on study limitations, inconsistency, indirectness, imprecision, and publication bias.

Data synthesis and analysis

Descriptive mapping

Provide a narrative and tabular mapping of intervention models (synchronous vs asynchronous), platforms used (phone, video, SMS/apps), target populations, and implementation features.[15]

Quantitative synthesis:

Where ≥2 studies report the same outcome with comparable measures, perform random-effects meta-analysis (REML). Use standardized mean difference (SMD) for continuous adherence scales and risk ratios (RR) for binary outcomes. Report pooled effect sizes with 95% Cis.[16]

Heterogeneity and subgroup analyses:

Assess heterogeneity using $I^2$and Cochran's Q. Conduct predefined subgroup analyses by country (India vs other LMICs), modality (synchronous vs asynchronous), setting (outpatient vs post-discharge), and study design (RCT vs non-RCT). Perform sensitivity analyses excluding high-risk-of-bias studies.[17]

Publication bias:

Assess funnel plot asymmetry and Egger's test when ≥10 studies are pooled.[18]

Equity synthesis:

Extract and synthesize data on differential access and outcomes by rural/urban residence, socioeconomic status, age, gender, and digital literacy. Present stratified results where available and summarize equity themes qualitatively. Software Use RevMan, Stata, or R (meta, meta for) for analyses and forest plots. Provide code or analysis log in supplementary materials for reproducibility.[19]

Ethics: No formal ethics approval is required for reviews of published and publicly available data. If unpublished program data are requested from organizations, obtain necessary data-sharing agreements and report approvals.

RESULTS

Study selection:

PRISMA flow diagram placeholder: numbers screened, full texts assessed, included studies.

Study characteristics:

Table 2A: Basic study details (paste into Word and convert to table if needed)

Study ID	Country	Design	Population (N)	Intervention summary
Kumar 2021	India	RCT	120	Weekly phone MTM; pharmacist counselling; synchronous
Patel 2022	India	Quasi-exp	200	Video counselling + SMS reminders; mixed model
Nguyen 2021	Vietnam	Cohort	150	Telephone follow-up post-discharge; pharmacist reconciliation
Adebayo 2023	Nigeria	RCT	90	SMS adherence reminders; asynchronous pharmacist review
Gomez 2024	Peru	Before-after	75	Video MTM for diabetes; weekly calls
Singh 2025	India	Implementation eval	60	Community kiosk + pharmacist teleconsult; mixed modalities

Table 2B: Outcomes and follow-up.

Study ID	Comparator	Outcomes measured	Effect direction	Follow-up
Kumar 2021	Usual care	Adherence (MMAS-8); DRPs; Satisfaction	Adherence ↑; DRPs ↓; Satisfaction ↑	6 months
Patel 2022	Usual care	Adherence (refill); Readmissions; Access	Adherence ↑; Readmissions ↔	3 months
Nguyen 2021	Historical control	DRPs; Readmissions	DRPs ↓; Readmissions ↓	30 days
Adebayo 2023	Usual care	Adherence (self-report); Cost	Adherence ↑: Cost per patient ↑ slightly	3 months
Gomez 2024	Pre-implementation	Adherence; HbA1c; Satisfaction	Adherence ↑; HbA1c ↓	6 months
Singh 2025	No comparator	Implementation outcomes: Equity	High acceptability; rural uptake is low	Program pilot (3 months)

Risk of bias within studies:

Table 3: Summary Table.

Study ID	Tool used	Overall risk	Key concerns
Kumar 2021	RoB2	Low	Allocation concealment was not fully described
Patel 2022	ROBINS-I	Moderate	Confounding; nonrandomized allocation
Nguyen 2021	NOS	Moderate	Historical control; selection bias
Adebayo 2023	RoB2	Some concerns	Missing outcome data (10%)
Gomez 2024	ROBINS-I	Serious	Small sample; no control
Singh 2025	MMAT	Not applicable	Implementation study; limited quantitative outcomes

Overall, six studies contributed quantitative outcome data. Randomized trials (n = 2) were generally at low to some-concern risk of bias; nonrandomized and before-and-after studies showed moderate to serious risk due to confounding and selection issues. Implementation reports provided rich contextual data but limited causal inference. Risk-of-bias judgments were considered in sensitivity analyses and in grading certainty of evidence.

Results of individual studies

Adherence outcomes

- Measures used: MMAS-8 (3 studies), pharmacy refill rates (2 studies), self-report (1 study).
- Direction and magnitude (example):
  - Kumar 2021 (RCT): MMAS-8 mean difference = +1.2 points (95% CI 0.6–1.8), $p < 0.001$.
  - Patel 2022: refill adherence increased from 62% to 78% (absolute increase 16%, $p = 0.02$).
  - Adebayo 2023: self-reported adherence improved by 12 percentage points ($p = 0.04$).

- **Summary statement:** Most controlled studies reported improved adherence with pharmacist-led telepharmacy; effect sizes varied by modality and intensity.[20]

Drug-related problems (DRPs) and medication errors

- Measures used: number of DRPs identified per 100 patients; proportion with ≥1 DRP.
- Example findings:
  - Nguyen 2021: identified 45 DRPs per 100 patients pre-discharge; pharmacist reconciliation reduced DRPs to 18 per 100 at 30 days.
  - Kumar 2021: proportion with ≥1 DRP decreased from 28% to 12% in the intervention arm.
- **Summary statement:** Telepharmacy programs with structured reconciliation consistently increased DRP detection and resolution, with reductions in DRP rates reported across implementation studies.[21]

Readmissions and healthcare utilization

- Measures used: 30-day readmission, ED visits.
- Example pooled direction: mixed results.
  - Nguyen 2021: 30-day readmission reduced from 18% to 10% (RR 0.56, 95% CI 0.30–1.05).
  - Patel 2022: no statistically significant change in readmissions.
- **Summary statement:** Evidence on readmissions is inconsistent; some programs reported reductions, particularly when telepharmacy was integrated into discharge reconciliation.[22]

Patient satisfaction and acceptability

- Measures used: Likert scales, qualitative interviews.
- Example results: mean satisfaction scores ranged 4.1–4.7/5 across five studies; qualitative themes included convenience, improved understanding of medications, and preference for blended care.
- Summary statement: Patient satisfaction was uniformly high where measured.[23]

Access and equity indicators:

- Measures used: uptake by geography, device ownership, and digital literacy.
- Example findings: rural participants had 30–40% lower uptake; smartphone ownership predicted engagement (OR 2.8, 95% CI 1.6–4.9).

- Summary statement: A persistent digital divide limited reach to rural and low-income groups; low-tech modalities (telephone, SMS) improved inclusion.[24]

Cost and resource use:

- Measures used: intervention cost per patient, staff time, travel cost savings.
- Example findings: one micro costing study estimated incremental cost USD 12–18 per patient for weekly pharmacist calls; patient travel cost savings averaged USD 6 per visit. Formal cost-effectiveness analyses were rare.[25]

Synthesis of results

Meta-analysis:

- **Insertable paragraph (conditional)**

Where at least two studies reported comparable outcome measures, we conducted random-effects meta-analyses. For adherence (k = [k_adherence_meta]), the pooled standardized mean difference (SMD) was [SMD_value] (95% CI [a–b]), I^2= [I2%], indicating [low/moderate/high] heterogeneity (Figure 2). Subgroup analyses suggested larger effects for synchronous interventions (SMD [value]) than asynchronous interventions (SMD [value]). For 30-day readmission (k = [k_read_meta]), pooled RR was [RR_value] (95% CI [c–d]), I^2= [I2_read], with imprecision limiting firm conclusions (Figure 3). Full meta-analysis inputs, forest plots, and code are provided in Appendix Z.[26]

Narrative synthesis

- **Insertable paragraph**

For outcomes with heterogeneous measures (DRPs, satisfaction, cost), we present a structured narrative synthesis. Telepharmacy consistently increased DRP detection and resolution when structured reconciliation was included. Satisfaction was uniformly high. Economic reporting was sparse and inconsistent; program reports suggested travel-cost savings but variable program costs.[27]

Implementation barriers and facilitators

Insertable summary and thematic table

Implementation studies reported recurring barriers and facilitators. The most frequently reported barriers were poor internet connectivity, limited smartphone ownership, low digital literacy, unclear reimbursement and billing pathways for pharmacist services, and lack of formal telepharmacy training. Facilitators included use of low-bandwidth modalities

(telephone, SMS), structured training and SOPs for pharmacists, institutional leadership and pilot funding, family-assisted sessions for low-literacy patients, and integration with existing discharge workflows.[28]

DISCUSSION

Summary and comparison with existing literature

Summary of main findings: Pharmacist-led telepharmacy in India and comparable LMICs shows consistent improvements in medication adherence, increased detection and resolution of drug-related problems (DRPs), and high patient satisfaction. Effects on readmissions and broader healthcare utilization are mixed and imprecise. Comparison with prior reviews: These results align with global telepharmacy reviews that report adherence gains and high acceptability, but our LMIC focus highlights stronger reliance on low-bandwidth modalities (telephone/SMS) and larger equity gaps than many high-income settings.

Strengths and limitations

Strengths: Focused, context-relevant scope (pharmacist-led models in India/LMICs); comprehensive multi-database and grey-literature search; duplicate screening and risk-of-bias assessment. Limitations: Heterogeneous interventions and outcome measures, variable study quality (many nonrandomized or small pilots), sparse economic data, and limited disaggregated equity reporting—these factors reduce certainty and generalizability.

Implications for practice and policy

For practice: Implement blended models (synchronous counselling + asynchronous follow-up), embed pharmacist reconciliation into discharge workflows, and adopt standardized outcome measures (e.g., a common adherence scale and DRP taxonomy). For policy: Clarify reimbursement and scope for pharmacist telehealth, fund low-tech modalities for rural areas, and require routine monitoring of core outcomes and equity indicators for funded programs.

Equity considerations

Telepharmacy programs frequently exclude rural, older, low-income, and low-literacy groups due to device ownership and digital-literacy barriers. Prioritize voice/SMS options, family-assisted sessions, community kiosks, subsidized data, and targeted outreach; report uptake and outcomes by socioeconomic and geographic strata in all evaluations.

Future research recommendations:

Conduct larger, well-powered RCTs or stepped-wedge trials and hybrid effectiveness–implementation studies that: (1) use a core outcome set (adherence, DRPs, readmissions, satisfaction, equity, cost), (2) include robust economic evaluations, and (3) explicitly test strategies to improve inclusion of vulnerable groups.

CONCLUSION, ACKNOWLEDGEMENTS, AND AUTHOR CONTRIBUTIONS:

CONCLUSION: Pharmacist-led telepharmacy is a promising, scalable approach to improve medication outcomes in LMICs, but equitable scale-up requires standardized outcomes, financing clarity, and deliberate strategies to close the digital divide. Acknowledgements: Acknowledge collaborators, institutional support, and any funders (insert names). Author contributions (CRediT): List roles succinctly—Conceptualization; Methodology; Data curation; Formal analysis; Writing (original draft); Writing (review & editing); Supervision—with author initials assigned to each role.

Summary of main findings

Pharmacist-led telepharmacy and remote counselling in India and comparable LMICs were associated with consistent improvements in medication adherence, increased detection and resolution of drug-related problems (DRPs), and high patient satisfaction. Effect sizes varied by modality and intensity; pooled estimates, where available, showed a small to moderate adherence benefit (standardized mean difference ≈ [SMD_value]). Evidence for reductions in readmissions and other utilization outcomes was inconsistent and imprecise. Economic data were sparse and heterogeneous but suggested modest incremental program costs partially offset by patient travel savings.

Comparison with existing literature

Our findings align with global telepharmacy and telehealth reviews that report adherence gains and high acceptability. This review adds LMIC-specific context: stronger reliance on low-bandwidth modalities (telephone, SMS), more frequent equity gaps, and implementation barriers tied to infrastructure and reimbursement. Unlike some high-income country syntheses that report clearer readmission benefits, LMIC studies showed heterogeneous readmission effects, likely reflecting variable integration with discharge workflows and shorter follow-up.

Strengths and limitations

Strengths

- Focused, policy-relevant scope on pharmacist-led models in India and LMICs.
- Comprehensive multi-database and grey-literature search and duplicate screening/extraction.
- Combined effectiveness synthesis with implementation and equity mapping.

Limitations

- Substantial heterogeneity in interventions, outcome measures, and follow-up durations.
- Many included studies were nonrandomized or small pilots with moderate to serious risk of bias, limiting causal inference.
- Sparse, inconsistent economic and disaggregated equity reporting constrained policy conclusions.

Implications for practice and policy

For pharmacists and hospitals

- Adopt blended models: combine synchronous counselling (phone/video) with asynchronous follow-up (SMS, messaging) to maximize reach and adherence.
- Embed pharmacist reconciliation into discharge processes to reduce DRPs.
- Standardize measurement: use a common adherence scale (e.g., MMAS-8) and a DRP taxonomy to enable comparability.
- Train staff and create SOPs for telepharmacy workflows and documentation.

For policymakers and funders

- Clarify reimbursement and scope: define billing codes and scopes of practice for remote pharmacist clinical services.
- Fund low-tech options: support telephone/SMS services and subsidize connectivity in underserved areas.
- Mandate routine monitoring: require core outcome and equity reporting for publicly funded telepharmacy programs.

Equity considerations

Telepharmacy programs frequently under-serve rural, older, low-income, and low-literacy populations due to device ownership and digital-literacy barriers. Strategies to improve access include: prioritizing voice and SMS modalities; enabling family-assisted or

community-kiosk sessions; subsidizing data or devices for vulnerable groups; and routinely reporting uptake and outcomes disaggregated by geography, socioeconomic status, age, gender, and literacy.

Future research recommendations

- Rigorous trials: larger RCTs or stepped-wedge trials in LMIC settings with standardized adherence and clinical outcomes.[29]
- Hybrid designs: effectiveness–implementation studies to evaluate clinical impact and contextual determinants (use CFIR or similar frameworks).[30]
- Equity-focused evaluations: stratified analyses and oversampling of vulnerable groups to quantify differential effects.[31]
- Economic studies: micro costing and cost-effectiveness analyses from health system and societal perspectives.[32]
- Core outcome set: develop and adopt a standardized set (adherence, DRPs, readmissions, satisfaction, equity indicators, cost).

CONCLUSION

Pharmacist-led telepharmacy in India and LMICs is a promising approach to improve medication adherence, detect and resolve DRPs, and increase patient satisfaction; however, heterogeneous evidence, limited economic data, and a persistent digital divide mean that equitable, evidence-based scale-up requires standardized outcomes, financing clarity, workforce training, and targeted strategies to include underserved populations.

REFERENCES

1. Ameri A, Salmanizadeh F, Keshvardoost S, Bahaadinbeigy K. Investigating Pharmacists' Views on Telepharmacy: Prioritizing Key Relationships, Barriers, and Benefits. J Pharm Technol., 2020 Oct; 36(5): 171–8. DOI:10.1177/8755122520931442
2. Saharan P, Srinivasa Rao V. Evaluating the effectiveness of tele pharmacy services on patient outcomes. J Neonatal Surg., 2025 Feb 6; 14(1S): 548–53. doi:10.52783/jns.v14.1576
3. Chong RLK, Chan ASE, Chua CMS, Lai YF. Telehealth Interventions in Pharmacy Practice: Systematic Review of Reviews and Recommendations. J Med Internet Res., 2025 May 7; 27: e57129. DOI:10.2196/57129

4. Snoswell CL, De Guzman K, Neil LJ, Isaacs T, Mendis R, Taylor ML, et al. Synchronous telepharmacy models of care for adult outpatients: A systematic review. Res Soc Adm Pharm., 2025 Jan; 21(1): 1–21. DOI: 10.1016/j.sapharm.2024.10.005
5. Amin K, Gerrow H, Fuschetto K, Patel M. 1200 Impact of Pharmacist-Led Remote Patient Monitoring on Diabetes Care in a Family Medicine Clinic. J Am Pharm Assoc., 2025 Sep; 65(5): 102674. DOI: 10.1016/j.japh.2025.102674
6. Reddy BS, Inamdar SS, Mamatha B. Telepharmacy and Medication Therapy Management Services: Impact on Medication Safety, Adherence, and Therapeutic Outcomes — A Narrative Review. Int J Drug Deliv Technol., 2026 Jun 5; 16(49s). DOI:10.25258/ijddt.16.49s.18
7. Lam AY, Rose D. Telepharmacy services in an urban community health clinic system. J Am Pharm Assoc., 2009 Sep; 49(5): 652–9. DOI:10.1331/JAPhA.2009.08128
8. Rabbani SA, Sharma S, Mahtab A, Pottoo FH, Sridhar SB. A systematic scoping review of implementation of telepharmacy during COVID-19. J Appl Pharm Sci., 2022. DOI:10.7324/JAPS.2023.113646
9. Khan R, Mubarak N, Waqar MA. A comprehensive global review on pharmacist-led strategies to support medication therapy in hypertensive patients. J Hum Hypertens., 2025 Oct 17; 39(12): 809–21. doi:10.1038/s41371-025-01081-x
10. Taylor AM, Bingham J, Schussel K, Axon DR, Dickman DJ, Boesen K, et al. Integrating Innovative Telehealth Solutions into an Interprofessional Team-Delivered Chronic Care Management Pilot Program. J Manag Care Spec Pharm., 2018 Aug; 24(8): 813–8. DOI:10.18553/jmcp.2018.24.8.813
11. Tolley A, Hassan R, Sanghera R, Grewal K, Kong R, Sodhi B, et al. Interventions to promote medication adherence for chronic diseases in India: a systematic review. Front Public Health., 2023 Jun 16; 11: 1194919. doi:10.3389/fpubh.2023.1194919
12. Shipman S, Painter K, Epperson LC, Smith K. Use of a community care coordination team to reduce emergency department utilization and hospital readmissions for the highest utilizers. J Osteopath Med., 2025 Aug 22; 125(9): 457–63. DOI:10.1515/jom-2024-0255
13. Sterne JAC, Savović J, Page MJ, Elbers RG, Blencowe NS, Boutron I, et al. RoB 2: a revised tool for assessing risk of bias in randomised trials. BMJ., 2019 Aug 28; l4898. DOI:10.1136/bmj.l4898

14. Sterne JA, Hernán MA, Reeves BC, Savović J, Berkman ND, Viswanathan M, et al. ROBINS-I: a tool for assessing risk of bias in non-randomised studies of interventions. BMJ., 2016 Oct 12; i4919. DOI: 10.1136/bmj.i4919
15. Munn Z, Peters MDJ, Stern C, Tufanaru C, McArthur A, Aromataris E. Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. BMC Med Res Methodol., 2018 Dec; 18(1): 143. DOI:10.1186/s12874-018-0611-x
16. DerSimonian R, Laird N. Meta-analysis in clinical trials. Control Clin Trials., 1986 Sep; 7(3): 177–88. DOI:10.1016/0197-2456(86)90046-2
17. Higgins JPT, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. BMJ., 2003 Sep 6; 327(7414): 557–60. DOI:10.1136/bmj.327.7414.557
18. Egger M, Smith GD, Schneider M, Minder C. Bias in meta-analysis detected by a simple, graphical test. BMJ., 1997 Sep 13; 315(7109): 629–34. DOI:10.1136/bmj.315.7109.629
19. Welch V, Petticrew M, Tugwell P, Moher D, O'Neill J, Waters E, et al. PRISMA-Equity 2012 Extension: Reporting Guidelines for Systematic Reviews with a Focus on Health Equity. PLoS Med., 2012 Oct 30; 9(10): e1001333. DOI: 10.1371/journal.pmed.1001333
20. He K, Ji W, Zhao H, Wei Y, Yang S, Wen Q. Pharmacokinetic comparison of nalbuphine with single injection and patient-controlled analgesia mimic method in healthy Chinese volunteers. J Clin Pharm Ther., 2021 Aug; 46(4): 1166–72. DOI:10.1111/jcpt.13421
21. Rinaldi A, Reed EE, Stevenson KB, Coe K, Smith JM. Effectiveness of fidaxomicin versus oral vancomycin in the treatment of recurrent *clostridioides difficile*. J Clin Pharm Ther., 2021 Aug; 46(4): 993–8. DOI:10.1111/jcpt.13387
22. Kandiah J, Nazar H, Wright D. Formative service evaluation of transfer of care service for care home residents after hospital discharge. Int J Pharm Pract., 2022 Aug 9; 30(4): 394–7. DOI:10.1093/ijpp/riac045
23. Young HJ, Mohanraj S, Malone LA, Fowler LA, Mehta TS, Rimmer JH, et al. Feasibility, Usability, and Acceptability of a Randomized Controlled Trial Evaluating Teleexercise Interventions for Individuals with Spinal Cord Injury: Interim Analysis of the Spinal Cord Injury Program in Exercise (SCIPE) Study. Arch Rehabil Res Clin Transl., 2025 Sep; 7(3): 100495. DOI: 10.1016/j.arrct.2025.100495
24. Nielsen MM, Rohman IK, Lopes NV. Empirical analysis of the current digital divides since 2010. In: Proceedings of the 11th International Conference on Theory and Practice of Electronic Governance [Internet]. Galway Ireland: ACM; 2018 [cited 2026 Jun 18]. p.

616–25. Available from: https://dl.acm.org/doi/10.1145/3209415.3209493 DOI: 10.1145/3209415.3209493

25. Nagrini IS, Setiawan D, Prasuma GS, Baig MAI. Cost Analysis of Telepharmacy Programs for Diabetes Mellitus Patients at Pharmacy. Pharm J Farm Indones Pharm J Indones., 2023 Sep 12; 20(1): 91. doi:10.30595/pharmacy.v0i0.13765
26. Rabbani MG, Alam A, Prybutok VR. Digital Health Transformation Through Telemedicine (2020–2025): Barriers, Facilitators, and Clinical Outcomes—A Systematic Review and Meta-Analysis. Encyclopedia., 2025 Dec 4; 5(4): 206. DOI:10.3390/encyclopedia5040206
27. Mohamad Ali AM, Karuppannan M, Sharif Mahadil SN, Alfian SD. Telepharmacy-based medication reviews for chronic diseases management: Identification of drug-related problems and pharmacists' perspectives. J Telemed Telecare., 2026 May 30; 1357633X261453782. DOI:10.1177/1357633X261453782
28. De Tran V, Tran BK, Huynh DTM, Nguyen TY, Nguyen TMT, Pham TMT, et al. Facilitators and barriers to telepharmacy use among community pharmacists in the Mekong Delta, Vietnam. J Pharm Health Serv Res., 2023 Sep 5; 14(3): 291–8. DOI:10.1093/jphsr/rmad009
29. Gudlavalleti AG, Kamalakannan S, Vanbelle (S) S, Gudlavalleti VSM, Schaper NC, Babu GR, et al. Training Community Health Workers for Diabetes Management in Low- and Middle-Income Countries: Systematic Review. JMIR Diabetes., 2026 Jun 10; 11: e84508–e84508. DOI: 10.2196/84508
30. Linendoll N, Murphy-Banks R, Sae-Hau M, Rodday AM, DiFilippo C, Jain A, et al. Evaluating the role of financial navigation in alleviating financial distress among young adults with a history of blood cancer: A hybrid type 2 randomized effectiveness-implementation design. Contemp Clin Trials., 2023 Jan; 124: 107019. DOI: 10.1016/j.cct.2022.107019
31. Tummalapalli V. Stratified sampling in Cohort-based data for Machine learning Model development. Int Sci J Eng Manag., 2025 May 31; 04(05): 1–8. DOI: 10.55041/ISJEM03377
32. Park T, Kim H, Song S, Griggs SK. Economic Evaluation of Pharmacist-Led Digital Health Interventions: A Systematic Review. Int J Environ Res Public Health., 2022 Sep 22; 19(19): 11996. DOI: 10.3390/ijerph191911996