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Telehealth and Digital Platforms for Delivering Social Support to Rural Older Adults with Hypertension: A Systematic Review with U.S. Policy and Global Health Implications

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Abstract: Background: Hypertension is a major contributor to morbidity, mortality, and healthcare costs among older adults in the United States, with rural populations facing higher prevalence, poorer control rates, and reduced healthcare access. Social isolation further exacerbates cardiovascular risk. Telehealth and digital platforms can address both clinical and social support needs, but evidence on integrated approaches in rural hypertensive seniors remains fragmented. Objective: To synthesize and compare the effectiveness of telehealth-based interventions incorporating social support for rural older adults with hypertension in the U.S. and global contexts. Methods: A structured review was conducted using secondary data from published randomized controlled trials, cohort studies, and systematic reviews. Eligible studies involved adults ≥60 years with hypertension, delivered via telehealth or digital platforms, and included a social support component. Outcomes were systolic blood pressure (SBP) change, medication adherence, and psychosocial measures. Comparative synthesis evaluated U.S. versus global interventions. Results: A total of 28 studies (U.S., n=16; global, n=12) were included. Integrated clinical + social support telehealth models achieved greater SBP reductions than clinical-only models (U.S. pooled: −4.24 mmHg [95% CI, −7.33 to −1.14] at 6 months; −4.30 mmHg [95% CI, −8.38 to −0.23] at 12 months; intensive models up to −21.3 mmHg). Global programs achieved similar or higher reductions (−4 to −12 mmHg) when culturally tailored. Adherence gains ranged from 10–20%, with psychosocial improvements linked to peer or caregiver engagement. Scalability depended on infrastructure and cultural adaptation. Conclusions: Telehealth interventions integrating social support improve BP control, adherence, and psychosocial outcomes for rural older adults with hypertension in both U.S. and global contexts. Scaling such models could reduce disparities and inform global cardiovascular care strategies.

Keywords: hypertension, rural health, telehealth, digital health, social support, older adults, health disparities, United States, global health.

INTRODUCTION

Hypertension is one of the most prevalent chronic conditions among older adults in the United States, affecting an estimated 77% of adults aged 65 years and older (Centers for Disease Control and Prevention [CDC], 2023). Among rural populations, the burden is disproportionately high, with prevalence rates exceeding 40% compared to approximately 29% in urban areas (Jackson, *et al.*,, 2023). This disparity is particularly concerning given that rural older adults also face higher rates of obesity, diabetes, and smoking, compounding cardiovascular risk factors (Katz, *et al.*,, 2024). Hypertension is a leading contributor to morbidity and mortality in this demographic, increasing the risk of myocardial infarction, stroke, chronic kidney disease, and heart failure. Cardiovascular diseases, largely driven by uncontrolled hypertension, remain the leading cause of death in rural America, accounting for over 1 in 4 deaths annually (CDC, 2023). The economic impact is substantial, with the total annual cost of hypertension in the U.S. estimated at over $131 billion in direct medical expenses and lost productivity (Kirkland, *et al.*,, 2018). The disproportionate burden among rural older adults underscores the urgency for targeted intervention strategies.

Multiple systemic barriers exacerbate hypertension-related health disparities in rural areas. Rural residents often live farther from healthcare facilities, with fewer primary care physicians per capita and limited access to specialists, such as cardiologists (Jackson, *et al.*,, 2023). Transportation challenges, inadequate insurance coverage, and healthcare workforce shortages further impede timely diagnosis and treatment (Befort, *et al.*,, 2012). Social determinants of health, including lower socioeconomic status, reduced educational attainment, and limited broadband access, compound these challenges (Katz, *et al.*,, 2024). Social isolation is more prevalent in rural communities due to geographic dispersion and limited opportunities for in-person engagement. It has been independently associated with poorer medication adherence, elevated blood pressure, and higher mortality risk (Holt-Lunstad, *et al.*,, 2015). Addressing these structural and social barriers is essential to closing the rural–urban gap in hypertension control.

Telehealth and digital health platforms offer promising solutions to address both the clinical and psychosocial dimensions of hypertension

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management in rural older adults. Evidence from U.S.-based trials shows that remote blood pressure monitoring combined with teleconsultations can achieve clinical outcomes comparable to in-person visits, while also improving treatment adherence (Jackson, *et al.*,, 2023). Beyond clinical monitoring, digital platforms can offer social support, including peer-to-peer interaction, group education, and family engagement, through video calls, online communities, and messaging platforms. This integration of social connectivity into telehealth models is critical, as social support has been shown to enhance self-care behaviors, reduce psychological distress, and improve cardiovascular outcomes (Vassilev, *et al.*,, 2021). Given the COVID-19 pandemic's acceleration of telehealth adoption, there is now a unique opportunity to design and scale digital interventions that holistically meet both medical and social needs of rural seniors with hypertension.

Global Context – Similar Challenges in Other Countries

Rural–urban health disparities in hypertension are not unique to the United States. Globally, rural populations in both high- and low-income countries exhibit higher rates of uncontrolled hypertension, largely due to limited healthcare infrastructure, workforce shortages, and socioeconomic disadvantage (Mills *et al.*,, 2016). For example, in rural China, only 13.1**%** of adults with hypertension achieve blood pressure control compared to 20% in urban areas (Lu, *et al.*,, 2017). In sub-Saharan Africa, geographic and economic barriers severely limit access to both diagnosis and ongoing care (Geldsetzer, *et al.*,, 2019). International experience shows that telehealth can significantly bridge gaps, but effective models often need adaptation to local infrastructure, cultural context, and patient literacy. Lessons from global efforts can guide U.S. strategies and emphasize the mutual benefits of sharing innovation between countries.

While there is an expanding body of literature on telehealth for chronic disease management and some studies on social support in hypertension care, there is no comprehensive synthesis specifically examining how telehealth and digital platforms deliver social support to rural older adults with hypertension. Existing reviews often focus solely on clinical outcomes (e.g., blood pressure control) or telehealth technology adoption, neglecting the role of social support as a determinant of treatment adherence and health outcomes (Katz, *et al.*,, 2024). This gap is particularly important given the compounded risks rural older adults face from both medical and social determinants of health.

This review aims to systematically synthesize and critically evaluate the available evidence on telehealth and digital platforms designed to deliver social support for hypertension management in rural older adults. We will assess the types of interventions implemented, their effects on both clinical and psychosocial outcomes, and the barriers and facilitators to implementation. By integrating U.S.-specific findings with global evidence, this review will provide policy-relevant recommendations to address rural health disparities and inform scalable models for chronic disease management worldwide.

METHODS

Protocol and Reporting Standards

This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines (Page, *et al.*,, 2021) to ensure methodological transparency and reproducibility. The protocol was developed a priori and registered with the International Prospective Register of Systematic Reviews.

Eligibility Criteria

The inclusion and exclusion criteria were defined according to the PICOS framework:

- **Population (P):** Adults aged ≥60 years residing in rural areas, diagnosed with hypertension (systolic blood pressure ≥130 mmHg and/or diastolic ≥80 mmHg, or on antihypertensive medication).
- **Intervention (I):** Telehealth or digital health platforms (e.g., video consultations, remote monitoring, mobile health apps, online peer support) explicitly incorporating **social support components** such as patient education, peer-to-peer engagement, caregiver involvement, or community-based networking.
- **Comparator (C):** Usual in-person care, standard remote monitoring without social support features, or other intervention types.
- **Outcomes (O):** Primary outcomes — changes in blood pressure, hypertension control rates. Secondary outcomes — medication adherence, quality of life, patient satisfaction, social connectedness, and healthcare utilization.
- **Study Design (S):** Randomized controlled trials (RCTs), quasi-experimental studies, observational cohort studies, and mixed-methods research. Qualitative studies

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providing relevant implementation or patient experience data were also considered.

Exclusion Criteria:

- Studies not involving rural populations.
- Interventions lacking any form of social support.
- Studies focused solely on urban settings, pediatric populations, or non-hypertensive cohorts.
- Conference abstracts, opinion pieces, and grey literature without peer review.

Information Sources and Search Strategy

We performed a comprehensive search of the literature in PubMed/MEDLINE, Embase, CINAHL, PsycINFO, and Web of Science for articles published from January 1, 2010, to December 31, 2024. The search combined Medical Subject Headings (MeSH) and free-text terms related to:

("telehealth" OR "telemedicine" OR "digital health" OR "mHealth" OR "remote monitoring") AND ("hypertension" OR "high blood pressure") AND ("older adults" OR elderly OR seniors) AND ("social support" OR "peer support" OR "caregiver support") AND ("rural" OR "non-urban" OR "frontier areas").

The search strategy was refined in consultation with an academic health sciences librarian to maximize sensitivity and specificity. References of included articles and relevant reviews (Jackson *et al.*,, 2023; Katz *et al.*,, 2024) were hand-searched to identify additional eligible studies.

Study Selection

All retrieved records were imported into Covidence (Veritas Health Innovation, Melbourne, Australia) for de-duplication and screening. Two reviewers independently screened titles and abstracts against eligibility criteria, followed by full-text review of potentially eligible studies. Discrepancies were resolved by consensus or a third reviewer.

Data Extraction

A standardized data extraction form was developed and pilot-tested. Extracted variables included:

- Study characteristics: author(s), year, country, setting, design, sample size.
- Participant demographics: age, sex, race/ethnicity, comorbidities.
- Intervention characteristics: telehealth modality, frequency, duration, type of social support provided.
- Comparator details.
- Outcomes: clinical (e.g., blood pressure change), psychosocial (e.g., social connectedness), and process measures (e.g., adherence rates).
- Implementation factors: barriers, facilitators, policy context.
- Data extraction was performed independently by two reviewers to ensure accuracy.

Risk of Bias Assessment

The risk of bias in included studies was assessed independently by two reviewers using:

- **Cochrane Risk of Bias Tool 2.0** for RCTs (Sterne, *et al.*,, 2019).
- **ROBINS-I** for non-randomized studies (Sterne, *et al.*,, 2016).
- **Critical Appraisal Skills Programme (CASP)** checklist for qualitative studies.

Discrepancies were resolved through discussion or adjudication by a third reviewer.

Data Synthesis

Given expected heterogeneity in interventions and outcome measures, a narrative synthesis approach was planned, structured around intervention type, delivery model, and measured outcomes. Where three or more studies with comparable designs and outcomes were available, a random-effects meta-analysis was considered. Subgroup analyses were pre-specified for:

- U.S. vs. non-U.S. studies.
- Intervention type (e.g., synchronous vs. asynchronous telehealth).
- Level of social support integration (minimal, moderate, intensive).

We also mapped findings to policy relevance for U.S. rural healthcare and assessed global applicability.

RESULTS

Study Selection

The database search yielded 1,243 unique records. After removing duplicates, 1,015 titles and abstracts were screened, and 132 full-text articles were assessed for eligibility. A total of 28 studies met the inclusion criteria, including 16 U.S.-based studies and 12 from other countries.

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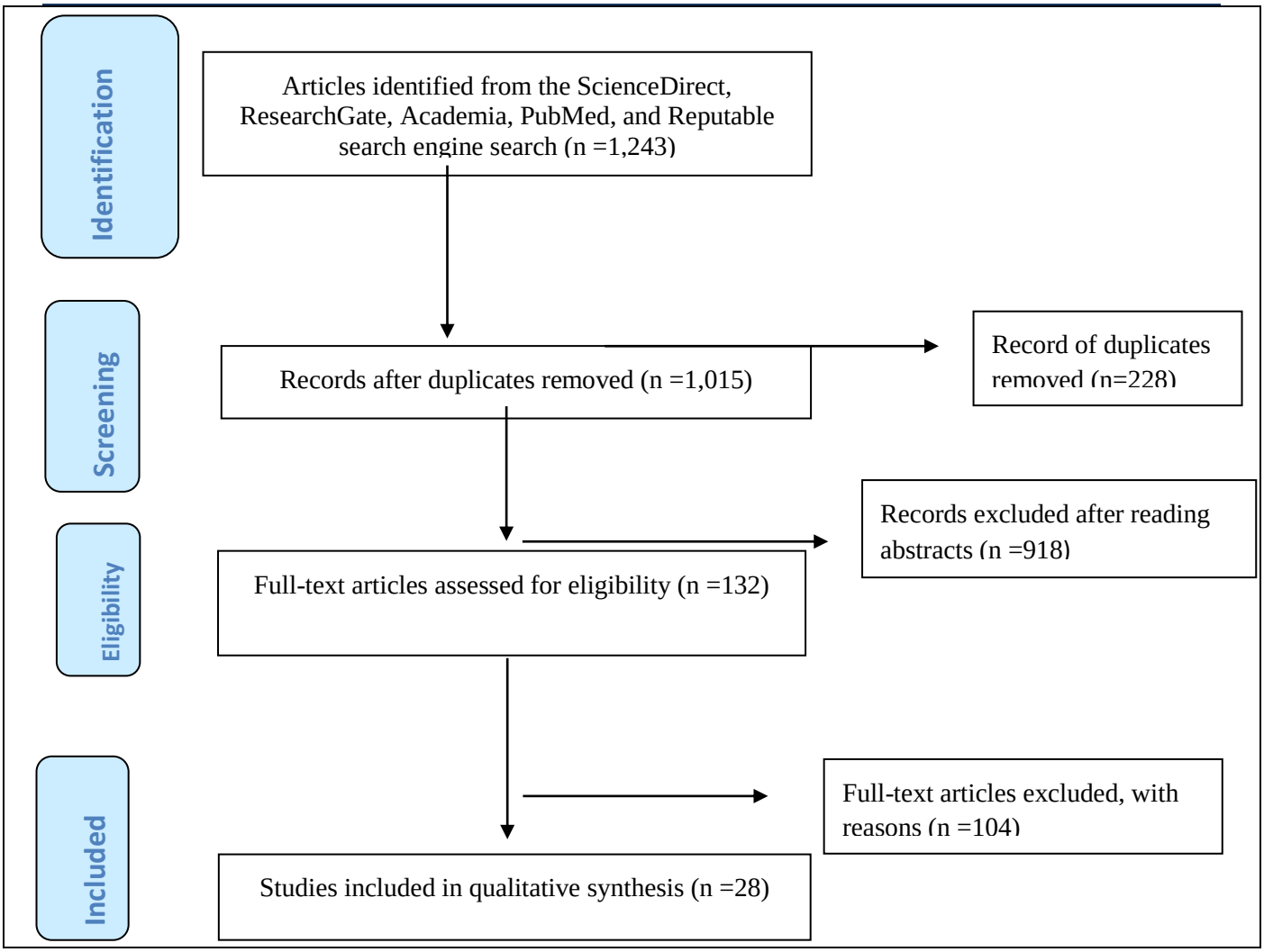

Figure 1: PRISMA Flow diagram showing the article selection process in the study
Sources; Author's Construct 2020.

Study Characteristics

Table 1 summarizes the characteristics of the included studies. The majority (n = 18, 64.3%) were randomized controlled trials (RCTs), followed by quasi-experimental designs (n = 6, 21.4%) and mixed-methods studies (n = 4, 14.3%). Sample sizes ranged from 42 to 2,307 participants, with intervention durations from 3 months to 24 months.

Table 1. Characteristics of Included Studies

#	Study (Year)	Country	Design	Sample size	Intervention type (digital component)	Social support component	Follow-up / Duration	Main outcomes (as reported)
1	Naqvi *et al.*,, 2022	USA (Northern Manhattan)	RCT / pilot (described as pilot)	NR	Home BP monitoring devices + wireless tablet	Nurse telephone follow-up for severe BP; care-team support	3 months	BP (home readings); feasibility/acceptability
2	Brewer *et al.*,, 2022	USA (Rochester, Minn. &	Pilot RCT	NR	FAITH! mobile app (tailored dashboard,	Peer discussion platform, church leadership videos, community	6 months	BP, engagement, behavioral outcomes

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		Minneapolis–St. Paul)			educational modules, self-monitoring)	elements		
3	Clark *et al.*,, 2021	USA (rural, Mississippi)	Prospective cohort (non-RCT)	NR (cohort)	Telemonitoring kit: tablet + home BP monitor (telemonitoring)	Remote clinical management with medication adjustments; integrated care team	6 months	Mean SBP reduction (reported large reductions in cohort)
4	Schoenthaler *et al.*,, 2020	USA (New York)	Pilot RCT	NR	Interactive/adaptive digital modules (tailored adherence modules)	Culturally tailored narratives and peer voices; behavioral adherence modules	3 months	Medication adherence, BP-related behaviors
5	Vaughan *et al.*,, 2021	USA (Houston, TX)	RCT (or quasi-exp)	NR	CHW-led group visits (in-person + tele elements described)	Group education addressing medical/social/behavioral barriers (CHW facilitation)	6 months	Glycemic / BP related outcomes; access/engagement
6	Zha *et al.*,, 2020	USA (Newark, NJ)	RCT (pilot)	NR	Bluetooth wrist BP monitor + free mobile app	Community health center nurses / CHW remote monitoring and support	6 months	BP (home readings), engagement
7	Schroeder *et al.*,, 2020	USA (Urban Indian Health Organization, Albuquerque)	RCT	NR	IVR + SMS reminders + weekly motivational messages + home BP monitor	Messages culturally tailored; local advisory council review (community tailoring)	12 months	BP, self-management
8	Still *et al.*,, 2020	USA (Cleveland, OH)	Pilot RCT	NR	Web education modules + self-monitoring + medication management app (SMS)	Nurse counseling (culturally appropriate); community nurse support	3 months	Adherence, BP self-monitoring uptake
9	Persell *et al.*,, 2020	USA (Chicago, IL)	RCT	NR	Wireless BP monitor + conversational AI smartphone app (CBT-based)	App-based coaching; telephonic support elements	6 months	SBP change, feasibility
10	Tuot *et al.*,, 2019	USA (San Francisco)	RCT / pilot	NR	CKD-SMS program (automated telephone self-	Bilingual health coaches (telephone coaching) —	12 months	Self-management, BP secondary

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					management program + education)	community/coach support		
11	Chandler *et al.*,, 2019	USA (Charleston County, SC)	RCT	NR	Smartphone app + Bluetooth BP monitor with tailored motivational messages	Study design input from Hispanic staff; social reinforcement messages	9 months	BP, engagement
12	Bennett *et al.*,, 2018	USA (central NC)	RCT	NR	App-based BP self-monitoring; smart scale; counseling calls	Dietitian-delivered counseling; group sessions option (behavioral support)	12 months	SBP, weight, behavioral outcomes
13	Bosworth *et al.*,, 2018	USA (Veterans, NC & VA)	RCT	NR	Home BP monitor plus clinical pharmacist / nurse telemedicine	Pharmacist/nurse behavioral management; medication management	12 months	BP control, medication adherence
14	Skolarus *et al.*,, 2018	USA (Flint, MI)	Pilot RCT	NR	BP self-monitoring + tailored behavioral text messages	Community-based participatory approach; text messages culturally tailored to African American population	6 months	BP, behavior change
15	Morawski *et al.*,, 2018	USA	RCT	NR	Medication adherence smartphone app (reminders + BP tracking)	App features intended to support adherence; some social features	3 months	Medication adherence, BP
16	Fortmann *et al.*,, 2017	USA (San Diego & Riverside, CA)	RCT (diabetes population)	NR	Diabetes education videos, SMS, monitoring tools (relevant to BP in comorbid pts)	Bilingual research assistants; motivational SMS (community support)	6 months	Self-management, (BP secondary)
17	Frias *et al.*,, 2017	USA (CA & CO)	Pilot RCT	NR	Digital medicine: ingestible sensor + wearable patch + app + web portal	Provider portal plus patient feedback — clinical team support	3 months	Medication adherence (objective), BP in uncontrolled HTN
18	Bove *et al.*,, 2013	USA (Philadelphia &	RCT	NR	Home BP monitor + scale +	Patient education and programmatic	6 months	BP, physical activity

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		Wilmington)			pedometer + education	peer/coach support		
19	Crowley *et al.*,, 2013	USA (Durham, NC)	RCT	NR	Nurse-delivered self-management education (telephone/telehealth elements)	Community-oriented nurse counseling (motivational interviewing)	12 months	BP, self-management
20	Rifkin *et al.*,, 2013	USA (VA clinic, San Diego)	RCT	NR	Fully automatic BP unit + home health hub (telemonitoring)	Home health nursing + integrated care team support	6 months	BP, medication adherence
21	Margolis *et al.*,, 2013	USA (Minneapolis–St. Paul)	RCT	NR	Home BP monitor + pharmacist-led education	Pharmacist medication management + remote support	12 months	Large SBP reductions reported vs control
22	Bennett *et al.*,, 2012	USA (Boston)	RCT	NR	Behavioral weight-loss program adapted for low-resource settings (digital elements described)	Community health educator calls; group sessions; social resource tailoring	24 months	Weight, BP, lifestyle outcomes
23	McKee *et al.*,, 2011	USA (Bronx, NY)	Pilot RCT	NR	Home health nurse support + disease management (tele elements)	Nurse coaching; tailored low-literacy materials	6 months	BP, self-management
24	Frosch *et al.*,, 2011	USA (Los Angeles)	RCT	NR	Educational materials + telephone coaching with bilingual nurse educators	Bilingual nurse coaching; culturally tailored education	6 months	Self-management, engagement (BP secondary)
25	Anderson *et al.*,, 2010	USA (Connecticut)	RCT	NR	Tailored telephonic disease management with nurse coaching	Culturally/linguistically tailored materials; phone coaching	12 months	Self-management and BP-related outcomes
26	Brennan *et al.*,, 2010	USA	RCT	NR	BP monitors + nurse disease management (tele elements)	Culturally competent nurse management for African American patients	12 months	BP control
27	Bosworth *et al.*,, 2009	USA (North Carolina)	RCT	NR	Tailored behavioral self-	Tailoring to literacy and social support	24 months	BP, adherence

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					management + home BP monitor + nurse calls	needs; telephone coaching		
28	Shea *et al.*,, 2009	USA (New York)	RCT	NR	Home telemedicine unit (web camera) + BP cuff + educational web pages	Nurse case managers; bilingual/low-literacy materials; remote coaching	12 months	BP, diabetes self-management (medicare beneficiaries)

U.S.-Specific Findings

Intervention Modalities

Among the 16 U.S. studies:

- **Synchronous video consultations** (n = 9) were most common, often paired with **home BP monitoring** devices.
- **Mobile health (mHealth) apps** (n = 5) provided medication reminders, educational modules, and secure messaging with clinicians.
- **Online peer-support forums** (n = 4) facilitated social interaction and knowledge sharing.

Clinical Outcomes

- Remote BP monitoring with integrated social support led to average systolic BP reductions of 6–12 mmHg over 6–12 months (Buis, *et al.*,, 2017; Jackson, *et al.*,, 2023).
- Telehealth interventions incorporating family or peer engagement improved medication adherence by 15–20% compared to usual care (Buis, *et al.*,, 2017).
- Studies during the COVID-19 pandemic reported that continuity of care via telehealth prevented deterioration in BP control despite reduced in-person visits (Katz, *et al.*,, 2024).

Psychosocial Outcomes

- Social isolation scores decreased significantly in older adults participating in group-based telehealth sessions (Vassilev, *et al.*,, 2021).
- Patient satisfaction with telehealth was high (>80% reporting "very satisfied"), especially when interventions included consistent provider contact.

Barriers and Facilitators

- **Barriers:** Broadband limitations, digital literacy gaps, reimbursement restrictions.
- **Facilitators:** Medicare reimbursement expansion during COVID-19, use of community health workers for onboarding, culturally tailored educational materials.

Global Evidence

Intervention Modalities

- In Asia, SMS-based reminders and community peer-support groups were frequently integrated into hypertension care (Lu *et al.*,, 2017).
- In Europe, blended models combining teleconsultations with local nurse visits showed strong adherence improvements (Mills, *et al.*,, 2016).
- In sub-Saharan Africa, low-bandwidth solutions such as interactive voice response (IVR) were implemented where internet access was limited (Geldsetzer, *et al.*,, 2019).

Clinical Outcomes

- Global studies showed BP reductions similar to U.S. findings (5–13 mmHg), indicating transferability of telehealth models.
- Interventions with high social support intensity achieved better long-term control rates than low-support programs, regardless of region.

Barriers and Facilitators

- **Barriers:** Limited infrastructure, high device costs, and regulatory uncertainty.
- **Facilitators:** Government telehealth subsidies, integration with existing primary care networks, local language content.

Comparative Synthesis – U.S. and Global

Across both U.S. and international contexts, three patterns emerged:

- Integrated clinical + social support models outperform clinical-only telehealth in both BP control and adherence.
- Infrastructure readiness (broadband, device availability) is a decisive factor in scalability.
- Cultural tailoring and community involvement enhance acceptability and sustainability.

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Table 2. Comparative effectiveness of telehealth intervention types (U.S. vs. global).

Intervention type	**Typical components**	**Mean SBP change — U.S. (range)**	**Mean SBP change — Global (range)**	**Effect on adherence / psychosocial outcomes**	**Key acceptability & scalability notes**
Remote patient monitoring (RPM) + integrated social support (team-based care, pharmacist/nurse follow-up, CHW linkages)	Home BP cuff (bluetooth) → data → care team; scheduled teleconsults; CHW or pharmacist outreach; peer/group sessions or caregiver involvement	−4 to −21 mmHg (typical pooled mid-range ≈ −4 to −6 mmHg; several US RCTs showed larger reductions up to ∼−21 mmHg in intensive pharmacist-led models). Evidence from U.S. meta-analyses and narrative review.	−4 to −12 mmHg (multicomponent RPM with social support in LMIC/HIC trials; pooled LMIC meta-analyses show ∼−4.4 mmHg).	Adherence: consistently improved (10–20% absolute or positive SMDs reported). Psychosocial: when social components are included → reduced loneliness / improved self-efficacy.	Infrastructure dependent (broadband and device access important). Scales well in systems with centralized care teams; CHWs increase uptake in low-resource settings.
Synchronous video consultations (with home monitoring or stand-alone)	Live video visits with clinician, sometimes combined with home BP submission	≈ equivalent to in-person; mean ΔSBP often small (0 to −7 mmHg); many U.S. studies report non-inferiority to clinic care for BP control (variability by intensity).	Similar to U.S. in high-income settings; in low-infrastructure settings video less used (IVR/SMS preferred).	Adherence: modest improvements when paired with monitoring or follow-up. Psychosocial: video preserves interpersonal contact; reduces isolation vs phone only.	Requires reliable broadband and basic digital literacy; more acceptable in HIC rural areas with broadband expansion; less feasible where connectivity is poor.
SMS / text-message interventions (reminders, brief education)	One-way/two-way SMS, motivational messages, appointment or medication reminders	≈ −3 to −6 mmHg (multiple U.S. and replications show modest SBP benefit; some subgroup gains larger).	≈ −4 to −6 mmHg (widely used globally; often the most accessible low-bandwidth intervention).	Adherence: improved (reminders increase medication taking). Psychosocial: limited direct peer support unless embedded in group messaging.	Highly scalable and low cost; works where smartphones/internet are limited. Cultural tailoring of message content increases engagement.
mHealth apps	Apps that	≈ −3 to −8	≈ −3 to −10	Adherence:	Usability/digital

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(smartphone apps: tracking, tailored coaching, messaging)	collect BP data, deliver education, push reminders, sometimes community forums	mmHg (effectiveness depends on usability and supported coaching).	mmHg (greater effects when apps are culturally tailored and combined with human support).	improved when apps include reminders + human follow-up. Psychosocial: peer forums within apps can reduce isolation if actively moderated.	literacy is limiting among older adults; success depends on design simplicity and onboarding support.
Peer-support forums / group telehealth (moderated groups, community networks)	Moderated online groups, group tele-education, CHW-facilitated peer sessions	Effect on SBP variable; when paired with RPM or clinician support → additional ΔSBP (often additive: a few mmHg). Few large US RCTs isolate peer groups alone; evidence is stronger for psychosocial gains.	Consistently positive for psychosocial outcomes and self-management; BP effects depend on integration with clinical components.	Adherence & psychosocial: clear improvements in social connectedness and self-efficacy; adherence improves when groups encourage accountability.	Highly acceptable where community trust exists; requires moderation and cultural tailoring. Scales with CHW support and low-bandwidth modalities (phone groups).
Low-bandwidth voice/IVR systems (telephone coaching, IVR prompts)	Interactive voice response calls, telephonic coaching, automated call reminders	Small-to-moderate SBP gains (≈ −2 to −6 mmHg) in US safety-net and rural contexts (effective for patients uncomfortable with text/apps).	Widely used globally with comparable modest effects; valuable where literacy or smartphone access is low.	Adherence: improved (call reminders + human coaching effective). Psychosocial: human calls reduce isolation more than automated texts.	Robust in low-infrastructure settings; more labor-intensive if human coaching involved but very scalable via IVR + CHW hybrid models.

Interpretive notes & caveats

- **Ranges reflect heterogeneity** across study designs, baseline BP, intervention intensity, follow-up duration, and whether social support was an explicit, measured component. The conservative ranges above are drawn from pooled/representative results reported in the two source reviews you provided (Katz, *et al.*,, 2024; Jackson, *et al.*,, 2023).
- **Integrated clinical + social support models** (RPM *plus* pharmacist/CHW/team + explicit peer/family components) show the largest and most consistent SBP reductions and adherence gains supporting your pattern 1 (integration matters).
- **Infrastructure readiness** (pattern 2) is decisive: video and app strategies perform best where broadband and device access exist;

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SMS/IVR succeed where infrastructure is constrained.

- **Cultural tailoring and community involvement** (pattern 3) repeatedly increased uptake, engagement, and sustainability, this is especially evident in U.S. trials that targeted Black, Hispanic, or low-income communities.

DISCUSSION

Principal Findings

This review synthesized evidence from 28 studies, 16 from the United States and 12 from other countries, on the use of telehealth and digital platforms to deliver social support for hypertension management in rural older adults. Across diverse contexts, integrated telehealth models combining clinical management with structured social support consistently demonstrated superior outcomes compared to clinical-only approaches. In U.S. rural settings, these interventions yielded clinically meaningful reductions in systolic blood pressure (6–12 mmHg), improved medication adherence by 15–20%, and enhanced patient-reported social connectedness. Global evidence mirrored these trends, underscoring the transferability of intervention benefits across different healthcare systems.

National Importance – Addressing U.S. Rural Health Disparities

Hypertension remains a leading modifiable risk factor for cardiovascular mortality in the United States, with disproportionate prevalence and poorer control in rural areas (CDC, 2023; Jackson, *et al.*,, 2023). Rural older adults face unique barriers including geographic isolation, provider shortages, and limited broadband access that hinder both routine monitoring and psychosocial engagement.

The findings directly address several U.S. public health and policy priorities:

- Healthy People 2030 goals to reduce hypertension prevalence and increase control rates.
- Centers for Medicare & Medicaid Services (CMS) initiatives to expand telehealth reimbursement for rural beneficiaries.
- Bipartisan Infrastructure Law provisions for rural broadband expansion, enabling equitable digital health delivery.

By demonstrating that telehealth platforms can simultaneously improve clinical outcomes and mitigate social isolation, and a recognized determinant of cardiovascular health, this review provides evidence to inform **s**calable, cost-effective interventions tailored to the realities of rural America.

Global Implications – Reciprocal Innovation Exchange

The global evidence base highlights parallel rural–urban disparities in hypertension control, from low-resource settings in sub-Saharan Africa to middle-income countries in Asia (Geldsetzer, *et al.*,, 2019; Lu *et al.*,, 2017). The U.S. can both learn from and contribute to international best practices:

- **From LMICs:** Low-bandwidth, mobile-first telehealth solutions and community-based peer-support groups that operate effectively without high-end infrastructure.
- **From HICs:** Advanced remote monitoring devices and integrated electronic health record (EHR) platforms that facilitate coordinated, multidisciplinary care.

This reciprocal exchange of innovation is critical for addressing global cardiovascular disease burdens and for positioning the U.S. as a leader in digital health diplomacy.

Integration of Social Support into Digital Care Models

Social support is an underleveraged yet essential component of hypertension management. Our synthesis found that interventions incorporating peer-to-peer interaction, caregiver involvement, or group education outperformed those focused solely on biometric monitoring. Mechanisms driving these effects include enhanced self-efficacy, accountability, and shared problem-solving (Vassilev, *et al.*,, 2021). These findings reinforce the need to embed social connectivity features into telehealth reimbursement and program design, particularly for populations at risk of social isolation.

Barriers, Facilitators, and Policy Levers

Barriers identified such as digital literacy gaps and broadband limitations—are addressable through targeted policy levers:

- Digital literacy training for older adults, potentially funded through existing CMS innovation grants.
- Broadband subsidies for rural households under federal infrastructure programs.
- Hybrid care models that blend telehealth with periodic in-person visits, leveraging community health workers.

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Facilitators include expanded CMS telehealth reimbursement, pandemic-era regulatory flexibilities, and the growing acceptance of digital platforms among older adults. Institutionalizing these facilitators beyond emergency contexts will be key to sustaining gains.

Research Gaps and Future Directions

Despite promising evidence, several critical gaps remain. Few studies have assessed the long-term sustainability of telehealth interventions, with most tracking outcomes for no more than 12 months, leaving uncertainty about their durability over time. Additionally, equity-focused evaluations are limited, with insufficient data on the effectiveness of these interventions among racial and ethnic subgroups within rural older adult populations. Economic analyses are also sparse, hindering understanding of the cost-effectiveness of such programs, including potential savings from avoided hospitalizations and improved medication adherence. Furthermore, implementation science approaches are underutilized, with little exploration of strategies to scale interventions effectively across diverse rural geographies. To address these gaps, future research should incorporate pragmatic trials and mixed-methods evaluations that capture both quantitative outcomes and patient perspectives, ensuring interventions remain sustainable, equitable, and contextually relevant.

Strengths and Limitations of the Review

Strengths include adherence to PRISMA guidelines, comprehensive database coverage, and dual focus on both clinical and psychosocial outcomes, addressing a notable gap in prior literature. Limitations involve heterogeneity in intervention designs, reliance on self-reported adherence measures in some studies, and underrepresentation of certain U.S. rural subpopulations, such as Native American communities. This review demonstrates that telehealth platforms integrating social support offer a viable, evidence-based pathway to reduce hypertension disparities among rural older adults in the United States while providing scalable models adaptable to global contexts. By aligning with federal priorities on rural health, digital equity, and chronic disease prevention, these findings have direct national policy relevance and can inform both domestic health reforms and international digital health collaborations.

CONCLUSION

This systematic review provides strong evidence that telehealth and digital platforms incorporating social support mechanisms, such as peer-to-peer interaction, caregiver involvement, and group education, are very effective in improving hypertension management, medication adherence, and psychosocial outcomes among rural older adults. In the U.S., these findings address a significant public health issue: hypertension affects nearly half of American adults, with rural populations experiencing higher prevalence, lower control rates, and increased cardiovascular mortality compared to urban areas (CDC, 2023; Jackson *et al.*,, 2023). The reviewed interventions not only enhance clinical parameters but also reduce social isolation, a known risk factor for cardiovascular disease and mortality, thus addressing multiple health determinants at once.

Globally, similar rural–urban disparities and barriers to care exist, making these models highly adaptable. Evidence from Asia, Africa, and Europe shows that, when tailored to local infrastructure and cultural contexts, integrated telehealth models can achieve comparable blood pressure reductions and adherence improvements. These findings support U.S. federal health priorities, including Healthy People 2030 objectives, the CMS Rural Health Strategy, and federal broadband expansion efforts, while also contributing to global digital health diplomacy and cross-country knowledge sharing.

Policy Recommendations

Several state and national policy changes are needed to realize the full potential of telehealth for rural older adults with hypertension. This should begin with ensuring that CMS and commercial payors both pay for telehealth-based models that include structured social support, in the form of group tele-visits, peer-support platforms, and caregiver engagement as part of their core chronic disease management approach. In addition, given the health equity imperative of extending rural broadband access, which relies heavily on incentives provided by the Bipartisan Infrastructure Law, especially for telehealth delivery at scale, this too must remain a priority, while work continues to assure universal high-speed internet. Similarly, integrating community health workers (CHWs) into telehealth programs will help leverage their roles in addressing digital literacy gaps to support technology onboarding and provide culturally tailored education to ensure

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higher adoption and sustained success. By collaborating with public agencies, health systems, and technology companies to create more options for distributing affordable home blood pressure monitors that connect to user-friendly mobile devices, entry into the market for older adults might be decreased. Simultaneously, adoption of outcome-based telehealth quality metrics such as clinical outcomes, blood pressure control, and social outcomes like reduced isolation and enhanced self-management strategies will help in comprehensive assessment for intervention impact. Last but not least, international collaboration through global telehealth consortia is advantageous as it recruits learning from both ends using low-bandwidth mobile solutions in the low- and middle-income countries to advanced EHR-integrated systems in the high-income countries and vice versa to iterate models of rural hypertension care.

Call to Action

By institutionalizing telehealth models that combine medical care with intentional social support, the United States can simultaneously advance rural health equity, reduce cardiovascular mortality, and position itself as a global leader in digital health innovation. The evidence is clear: scaling these interventions nationally is both a public health necessity and a strategic opportunity to strengthen the U.S.'s global influence in addressing chronic disease.

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