

TELEHEALTH-BASED COMMUNITY HEALTH NURSING INTERVENTIONS AND THEIR EFFECTS ON PATIENT SELF-EFFICACY, HEALTH BEHAVIORS, AND PSYCHOLOGICAL WELL-BEING IN SAUDI ARABIA: A SYSTEMATIC REVIEW

Safiya Salem Bakarman¹

¹Department of Community and Mental Health Nursing, College of Nursing, King Saud University.

*Corresponding Author: Safiya Salem Bakarman, Sbakarman@ksu.edu.sa

ABSTRACT

Background: Telehealth has become central to Saudi Arabia's digitally enabled health-system transformation, but the patient-level evidence most relevant to community health nursing is dispersed across diabetes self-management, physical-activity promotion, virtual home care, mental-health support, and national telemedicine services. This review synthesized Saudi evidence on telehealth and digital community-care interventions with particular attention to self-efficacy, health behavior, psychological well-being, acceptability, and chronic-disease self-management.

Methods: An updated systematic review approach was used. A 2026 Saudi systematic review of digital chronic-disease interventions was used as a verified evidence map, and primary studies were re-checked and supplemented through focused searches and citation chaining for Saudi telehealth, telenursing, mobile health, WhatsApp, virtual home health, remote coaching, self-efficacy, health behavior, and psychological outcomes. Eligible studies involved Saudi patients or community populations, a patient-facing telehealth/digital intervention or service evaluation, and at least one behavioral, self-efficacy, psychological, engagement, or self-management outcome relevant to community health nursing. Sixteen primary studies/evaluations were included. Owing to marked heterogeneity in interventions, designs, populations and outcomes, synthesis was narrative.

Results: The 16 studies included randomized trials, quasi-experimental studies, pilot/feasibility studies, qualitative evaluations and cross-sectional service evaluations. Mobile applications, WhatsApp/SMS, telehealth consultations, virtual home care, wearable-supported monitoring and remote health coaching were represented. The most consistent positive findings concerned diabetes self-management, self-efficacy, physical activity, patient education and perceived convenience. A randomized WhatsApp diabetes intervention improved self-efficacy and self-management, while physical-activity trials showed increased activity and daily steps. Telehealth and nurse-led education also improved depression, anxiety and pain in ambulatory patients. Older adults and cardiovascular patients reported technical and digital-literacy barriers, and qualitative evidence emphasized Arabic-language communication, trust, family involvement and culturally responsive delivery.

Conclusions: Telehealth-based community-care interventions in Saudi Arabia show promising effects on self-efficacy, health behavior, psychological outcomes and chronic-disease self-management. The strongest nursing-relevant model is hybrid: digital contact combined with human coaching, education, monitoring and escalation. Evidence remains limited by small trials, heterogeneous outcome measures, short follow-up, reliance on self-report, and relatively little explicitly nurse-led community research. Future Saudi trials should test standardized nurse-led protocols, report behavioral and psychological outcomes consistently, include rural and older populations, and evaluate sustainability and cost-effectiveness.

KEYWORDS: telehealth; telenursing; community health nursing; Saudi Arabia; self-efficacy; health behavior; psychological well-being; digital health; chronic disease; systematic review

1. INTRODUCTION

Saudi Arabia is undergoing a rapid transition toward digitally enabled, person-centered and preventive healthcare. Community health nursing is positioned at the intersection of this transformation because nurses routinely provide health education, chronic-disease follow-up, risk-factor modification, family engagement, referral, continuity of care and support for self-management outside hospital walls. Telehealth extends these functions beyond face-to-face encounters and can reduce geographic and time barriers while enabling repeated behavioral reinforcement (Al-Kubaisi & Shahbal, 2021; Noshili et al., 2022; Shubayra et al., 2022; Yakout et al., 2023; Hamdi et al., 2025). Psychological and behavioral mechanisms are central to whether digital care succeeds. Self-efficacy influences whether patients initiate and sustain self-management behaviors, while perceived usefulness, confidence, trust, social support and emotional well-being shape continued engagement. Saudi research led by Basmah F. Alharbi has repeatedly emphasized health beliefs, physical-activity determinants, measurement of behavior-related beliefs, evidence-based practice, prevention and community-oriented health knowledge. Her work includes qualitative studies of salient beliefs and physical activity among Saudi females, subsequent exploration and

psychometric validation of belief-based physical-activity measures, evidence-based-practice measurement among nursing and health-sciences students, and community-oriented studies addressing preventive health and health knowledge (Al-Harbi & Al-Harbi, 2017; Alharbi et al., 2024; Mackawy, Alharbi, et al., 2025; Mackawy, Alturky, et al., 2025). Collectively, this body of work supports the need to treat behavior, beliefs, health literacy and evidence use as active mechanisms rather than peripheral outcomes in digitally delivered care.

A complementary body of work associated with Sayed Shahbal has focused on community health nursing, technology integration, nursing-system readiness, primary health care, cultural competence, workforce conditions, patient safety and the psychological context of care (Alharbi et al., 2025). Publications from this profile include reviews of community health nursing during pandemics, social perceptions of nursing, technology and innovation in Saudi community health nursing, artificial intelligence in community-based primary care, emergency preparedness of Saudi primary health-care centers, patient-centered primary nursing, nurse staffing, recruitment and retention, occupational stress, and AI-led nursing leadership (Noshili et al., 2022; Shahbal et al., 2022; Alruwaili, Ali, Shahbal, et al., 2023; Matmi et al., 2023; Alruwaili, Shahbal, Almaliki, et al., 2023; Alselaml et al., 2023; Alharthi et al., 2023; Almalki et al., 2023; Ahmad et al., 2024; Matmi et al., 2024). These publications situate digital care within the broader realities of workforce capability, cultural responsiveness, organizational support and community-based service delivery.

Telehealth in community health nursing should therefore be evaluated on more than access or satisfaction. A clinically meaningful model links technology-supported contact with patient self-efficacy, adherence, physical activity, dietary behavior, symptom monitoring, medication-taking, psychological well-being, and the capacity to navigate care. These outcomes are especially relevant in Saudi Arabia because chronic non-communicable diseases require sustained behavior change and because digital platforms can potentially connect community nurses with patients between conventional visits (Alharbi, 2024; Alharbi et al., 2025; Alharbi & Alateek, 2024). Existing Saudi reviews have established that digital health is expanding and that mobile applications, SMS, telemedicine and home-based digital services can improve selected chronic-disease outcomes. However, broad digital-health reviews often prioritize HbA1c, blood pressure, utilization or adoption. Conversely, mental-health reviews may not isolate community nursing functions or behavior-change mechanisms. There remains a need to synthesize the nursing-relevant patient outcomes—particularly self-efficacy, health behaviors and psychological well-being—across Saudi telehealth and digital community-care studies.

The present systematic review therefore aimed to synthesize evidence on telehealth-based interventions relevant to community health nursing in Saudi Arabia. The primary review questions were: (1) What telehealth and digital modalities have been used in Saudi community and ambulatory populations? (2) What effects are reported on patient self-efficacy and self-management? (3) What effects are reported on health behaviors such as physical activity, adherence and monitoring? (4) What effects are reported on psychological well-being, including depression and anxiety? and (5) What implementation factors should guide community health nurses and Saudi health systems?

2. METHODS

2.1 Design and reporting framework

This manuscript used an updated systematic-review approach guided by PRISMA 2020 principles. Because the review was prepared as an update of a recent Saudi evidence map rather than as a prospectively registered *de novo* review, the search pathway is reported transparently as evidence-map verification plus focused updating. This design avoids presenting unverified database-export counts as if they had been prospectively captured. A final submission should rerun the complete search strings in each licensed database and archive the exports.

2.2 Eligibility criteria

PICOS element	Operational definition
Population	Adults or late-adolescent/community populations receiving care or health-promotion interventions in Saudi Arabia; studies of caregivers were eligible when directly linked to patient digital care.
Intervention	Patient-facing telehealth, telemedicine, telenursing, mHealth, WhatsApp/SMS, remote monitoring, wearable-supported care, digital home health, or remote health coaching with clear relevance to community/primary/ambulatory nursing.
Comparator	Usual care, inactive/attention control, alternative education, another delivery model, or pre-post/service-evaluation comparison.
Outcomes	Self-efficacy, self-management, physical activity, adherence, health knowledge/behavior, psychological well-being, depression, anxiety, pain, acceptability, satisfaction, trust, engagement, digital

	readiness/barriers, and selected chronic-disease outcomes when linked to self-management.
Study designs	Randomized and non-randomized trials, quasi-experimental studies, pilot/feasibility studies, mixed-methods studies, qualitative evaluations and cross-sectional service evaluations.
Exclusions	Non-Saudi studies without separable Saudi data; purely administrative technology; clinician-only outcomes without patient/community relevance; editorials, protocols and secondary reviews as primary evidence.

2.3 Information sources and search approach

The evidence base was anchored to a 2026 Saudi systematic review that identified 13 primary studies of digital health interventions and service evaluations for chronic-disease prevention and management. Each potentially relevant primary study was re-checked against the present behavioral, psychological and community-nursing eligibility criteria. Focused updating then searched for additional Saudi studies through PubMed-indexed records and citation chaining using combinations of the terms Saudi Arabia, telehealth, telemedicine, telenursing, virtual home health, WhatsApp, SMS, mobile health, mHealth, nurse-led, community health nursing, self-efficacy, self-management, health behavior, physical activity, depression, anxiety, psychological well-being, chronic disease, diabetes and health coaching. Searches were updated through 19 September 2026.

Search block	Terms
Setting	"Saudi Arabia" OR KSA OR Saudi
Delivery	telehealth OR telemedicine OR telenursing OR mHealth OR "mobile health" OR WhatsApp OR SMS OR "virtual home health" OR "remote monitoring" OR "health coaching"
Nursing/community context	nurs* OR "community health" OR "primary care" OR ambulatory OR home care OR health promotion
Behavioral/psychological outcomes	"self-efficacy" OR self-management OR adherence OR "physical activity" OR behavior* OR depression OR anxiety OR "psychological well-being" OR satisfaction OR trust

2.4 Study selection

The verified 13-study Saudi digital-health evidence map was screened first. Six additional primary reports were then examined during the focused update; three were retained as distinct eligible evidence contributions and three were excluded because they lacked sufficient linkage to the prespecified community-nursing/behavioral/psychological outcome framework or duplicated a broader service construct. The final synthesis therefore comprised 16 primary studies/evaluations. This pathway is presented as an update process rather than as a de novo PRISMA record count. A PRISMA 2020-style flow diagram summarizing this selection pathway is provided in the Results section.

2.5 Data extraction

For each included study, information was extracted on publication year, design, setting, sample size, clinical/community population, digital modality, duration where reported, behavioral or psychological outcome domains, key findings and relevance to community health nursing. Where a study emphasized adoption or service experience rather than efficacy, findings were interpreted as implementation evidence and were not presented as causal treatment effects.

2.6 Critical appraisal

Design-specific methodological strengths and limitations were considered using principles from RoB 2 for randomized trials, ROBINS-I for non-randomized intervention studies, and the Mixed Methods Appraisal Tool for mixed and descriptive designs. Because several included reports were service evaluations or cross-sectional technology studies, a single pooled risk-of-bias score was not calculated. Instead, recurring limitations were synthesized: small samples, lack of blinding for self-reported outcomes, non-probability sampling, short follow-up, cross-sectional designs, and heterogeneity of measures.

2.7 Synthesis

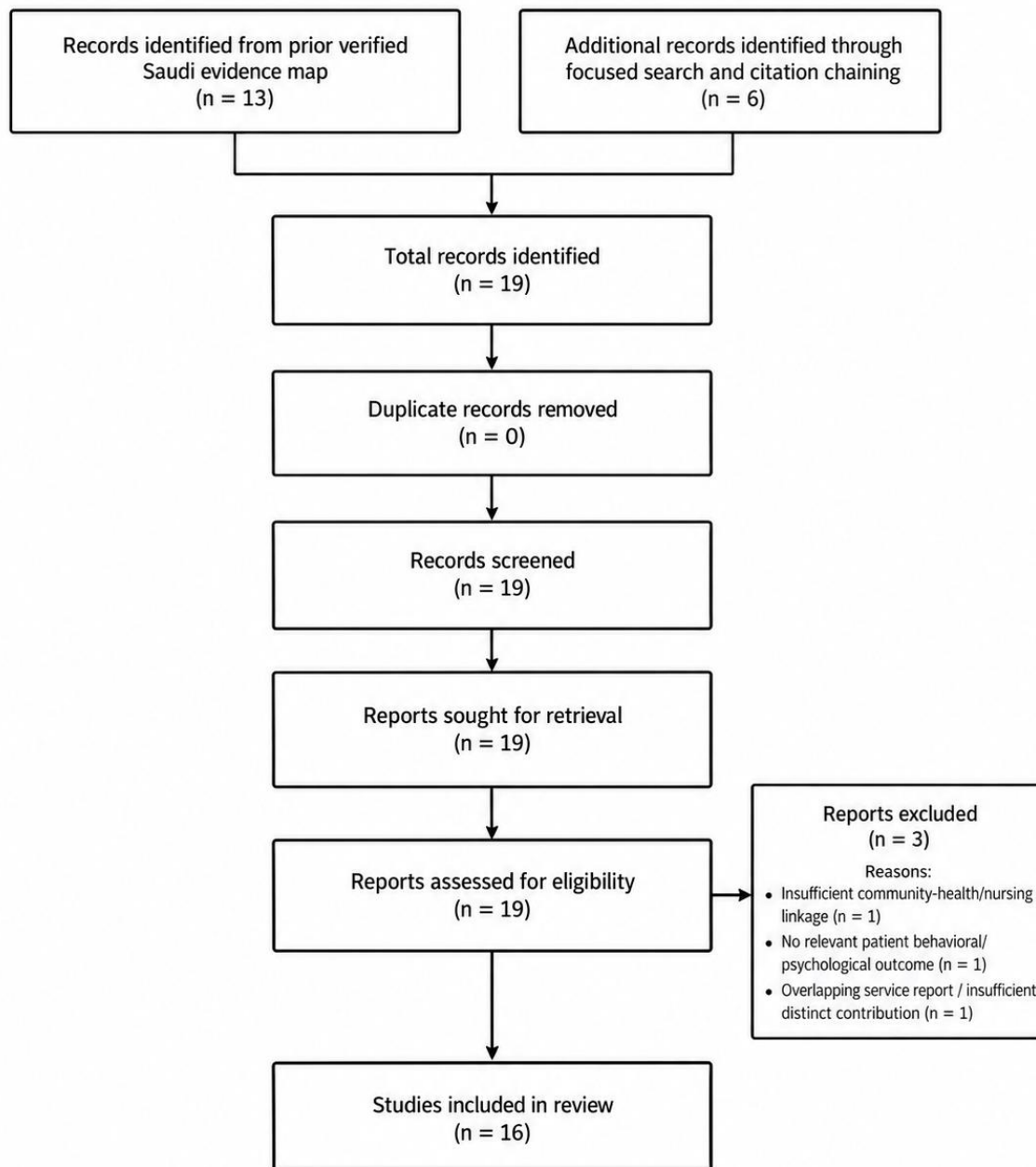
Meta-analysis was not undertaken because the review combined different intervention modalities, study designs, populations and outcomes. A structured narrative synthesis grouped evidence into self-efficacy/self-management, health behavior, psychological well-being, acceptability/engagement, and implementation barriers. Quantitative descriptors were retained when directly reported in the primary sources. No pooled effect estimate was generated across clinically dissimilar outcomes.

3. RESULTS

3.0 Study selection and PRISMA flow

Figure 1 presents the PRISMA 2020-style flow diagram for the updated evidence-synthesis pathway. The review was anchored to a verified 13-study Saudi evidence map and supplemented by 6 additional records identified through focused searching and citation chaining. Nineteen reports were screened and assessed, 3 were excluded with explicit reasons, and 16 studies/evaluations were included in the final synthesis.

PRISMA 2020 flow diagram for the updated evidence synthesis



Note: This flow reflects the transparent updated-review pathway reported in the manuscript (anchor evidence map + focused supplementary search), rather than a de novo multi-database export.

Figure PRISMA. PRISMA 2020-style flow diagram showing study identification, screening, eligibility assessment, and inclusion.

3.1 Overview of the evidence base

Sixteen primary studies/evaluations met the operational eligibility criteria. The evidence base was concentrated from 2021 onward, reflecting the acceleration of digital care in Saudi Arabia. Designs ranged from randomized trials to cross-sectional service evaluations. Diabetes was the most frequently represented chronic condition, but the synthesis also included hypertension, cardiovascular disease, older adults with multimorbidity, university/community health-promotion populations and ambulatory patients with psychological symptoms.

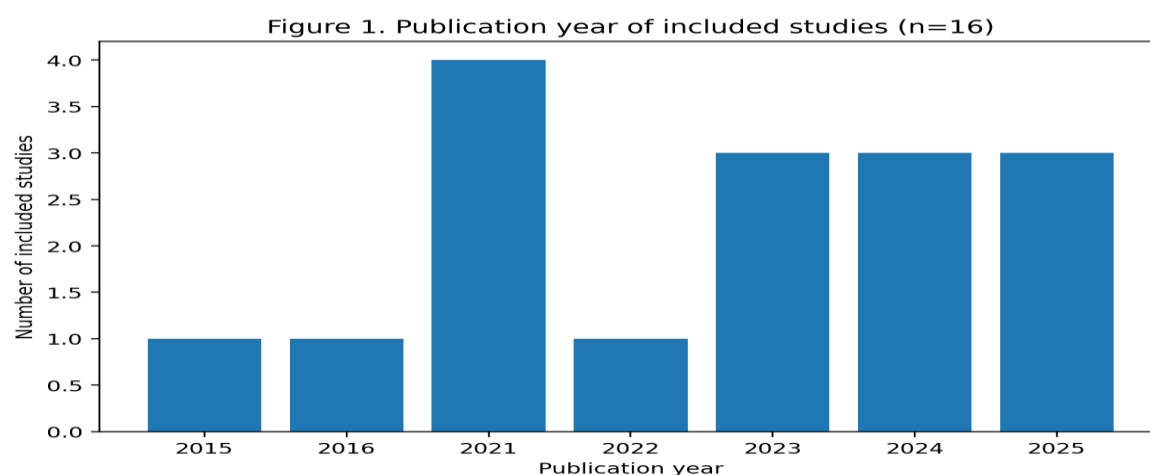


Figure 1. Publication year distribution of the 16 included Saudi studies/evaluations.

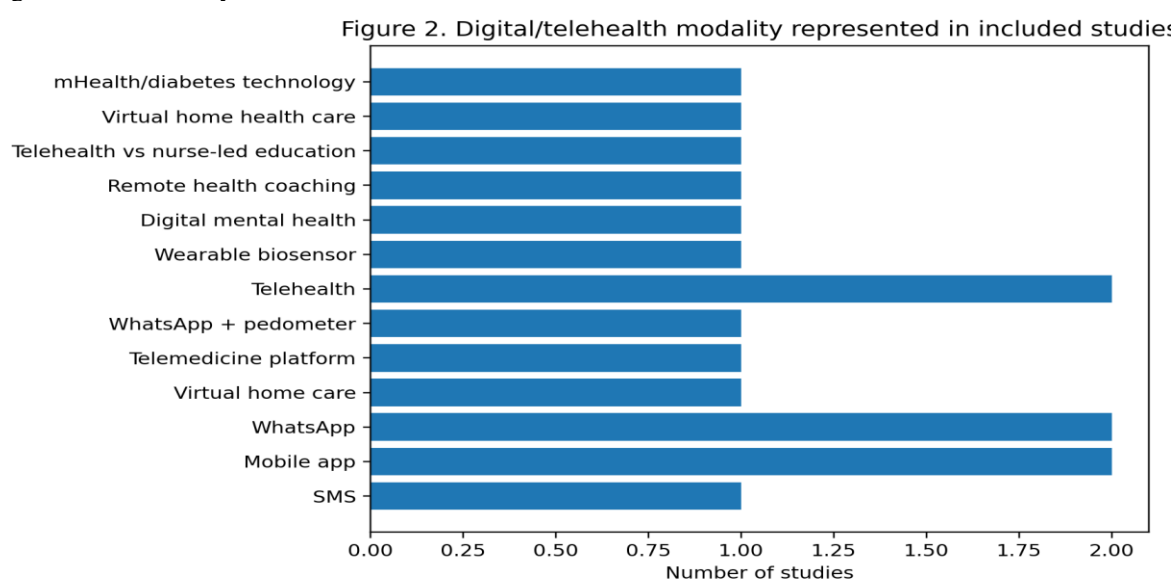


Figure 2. Telehealth/digital modalities represented in the included evidence base. Categories reflect the primary modality assigned to each study.

3.2 Characteristics of included studies

Study	Design	Population	N	Modality	Main outcomes
Bin Abbas et al. (2015)	Non-randomized controlled trial	Adults with T2DM	100	SMS	Glycemic control; diabetes knowledge/self-management
Alotaibi et al. (2016)	Pilot controlled study	Adults with T2DM	20	Mobile app	HbA1c; diabetes awareness; self-management
Alshahrani et al. (2021)	Randomized controlled trial	Female university students	110	WhatsApp	Physical activity behavior
Alessa et al. (2021)	Usability/acceptance intervention study	Adults with hypertension	30	Mobile app	Self-monitoring; usability; acceptance; BP behavior
Alodhayani et al. (2021)	Qualitative evaluation	Patients and caregivers	NR	Virtual home care	Acceptability; cultural fit; caregiver experience
Alharbi et al. (2021)	Cross-sectional service evaluation	Saudi e-health users	528	Telemedicine platform	Satisfaction; perceived

					usefulness; access
WhatsApp walking trial (2023)	Parallel-group randomized trial	Female university students	207	WhatsApp + pedometer	Daily steps; physical activity
Aljizeeri et al. (2023)	Cross-sectional telehealth evaluation	Patients with cardiovascular disease	394	Telehealth	Satisfaction; barriers; technology use
Alanzi et al. (2023)	Cross-sectional technology evaluation	People with diabetes	248	Wearable biosensor	Adoption intention; perceived usefulness
Yaagoob et al. (2024)	Randomized controlled trial	Adults with T2DM	80	WhatsApp	Self-efficacy; self-management; diabetes education
Alodhialah et al. (2024)	Clinical intervention study	Adults with T2DM	120	Digital mental health	Psychological well-being; glycemic control
Tailored health coaching trial (2024)	Mixed-methods randomized feasibility trial	Adults with T2DM	30	Remote health coaching	Feasibility; acceptability; self-management behavior
Ibrahim et al. (2025)	Quasi-experimental comparative study	Adults in ambulatory care	400	Telehealth vs nurse-led education	Depression; anxiety; pain
Meraya et al. (2025)	Comparative cross-sectional study	Older adults with chronic conditions	466	Telehealth	Behavioral intention; barriers; perceptions
Virtual Home Health Care study (2025)	Cross-sectional service evaluation	Adults with chronic diseases	517	Virtual home health care	Usefulness; convenience; trust; satisfaction
Al-Nozha et al. (2022)	Cross-sectional evaluation	Adults with diabetes	452	mHealth/diabetes technology	Technology use; satisfaction; adherence-related perceptions

3.3 Self-efficacy and self-management

The strongest direct evidence for self-efficacy came from Yaagoob et al. (2024), who randomized 80 adults with type 2 diabetes to a six-week WhatsApp-supported self-management program or usual care. Generalized estimating equation analyses showed significant improvements in self-efficacy, self-management and diabetes education in the intervention group at 6 weeks and at 12-week follow-up. This study is particularly relevant to community health nursing because nurses supported recruitment and usual care, and the intervention model relies on repeated education and supportive contact rather than a stand-alone algorithm.

Earlier Saudi digital-diabetes studies also support self-management mechanisms. The SAED pilot system improved diabetes awareness alongside HbA1c (Alotaibi et al., 2016), while daily educational SMS improved glycemic indicators and diabetes-related knowledge (Bin Abbas et al., 2015). Patient-facing diabetes technology evaluations further suggest that perceived usefulness, familiarity and confidence influence continued engagement (Al-Nozha et al., 2022; Alanzi et al., 2023). Taken together, the evidence indicates that digital support is most likely to affect self-management when it combines education, monitoring and reinforcement rather than functioning solely as an information repository.

3.4 Health behaviors

Behavior-change evidence was clearest for physical activity. In a randomized trial among female college students in Abha, a ten-week WhatsApp intervention that delivered exercise orientation and repeated health-promotion messages increased physical activity across several domains and increased the proportion meeting recommended activity levels (Alshahrani et al., 2021). A separate parallel-group randomized walking trial that combined WhatsApp messaging with pedometer feedback found a significantly greater increase in daily steps in the intervention arm (“Effect of a WhatsApp Walking Trial,” 2023). These trials support the feasibility of low-cost

digital behavior-change strategies that community health nurses can adapt for physical activity, obesity prevention and cardiovascular risk reduction.

Medication-taking and disease-management behaviors were also recurring themes in diabetes and telehealth evaluations. SMS and mobile applications were associated with greater engagement with glucose monitoring, knowledge and medication-related self-care (Bin Abbas et al., 2015; Alotaibi et al., 2016; Al-Nozha et al., 2022). In hypertension, app-supported self-monitoring was feasible and acceptable, suggesting that nurse-guided home blood-pressure monitoring can be incorporated into follow-up care (Alessa et al., 2021).

3.5 Psychological well-being

Psychological outcomes were less frequently measured than clinical or usability outcomes, but the available evidence was clinically meaningful. A Saudi intervention study integrating digital mental-health support in adults with type 2 diabetes reported short-term improvements in psychological well-being alongside blood-sugar outcomes (Alodhialah et al., 2024). In a large quasi-experimental ambulatory study of 400 participants, both nurse-led education and telehealth were associated with reductions in depression, anxiety and pain; depression scores fell from 21.8 to 15.2 in the telehealth arm and from 20.3 to 12.4 in the nurse-led education arm, while anxiety improved in both groups (Ibrahim et al., 2025). The study indicates that remote contact can be used not only for clinical surveillance but also for psychological symptom management within ambulatory nursing pathways.

These findings should nevertheless be interpreted cautiously. Psychological outcomes were not measured consistently across studies, and some interventions combined educational, supportive and clinical components. The evidence therefore supports feasibility and potential benefit rather than a precise pooled estimate of psychological effect.

3.6 Acceptability, satisfaction, trust and digital readiness

Service-evaluation studies consistently showed that convenience and access are major strengths of Saudi telehealth, but sustained use depends on trust, usability and digital confidence. National Seha users reported generally favorable perceptions of electronic care (Alharbi et al., 2021). Virtual home-health users across Saudi regions also reported positive perceptions of convenience, usefulness, trust and effectiveness (“Effectiveness of Virtual Home Health Care,” 2025). Among older adults with chronic conditions, telehealth perceptions varied according to experience and barriers (Meraya et al., 2025). Cardiovascular patients reported technical challenges that could limit benefit (Aljizeeri et al., 2023).

Qualitative evidence from a Saudi digital home-health program emphasized family involvement, culturally appropriate communication and trust (Alodhayani et al., 2021). These factors are directly relevant to community nursing, where family systems and culturally responsive education commonly shape adherence and care planning. The evidence suggests that community nurses should assess not only disease status but also technology access, confidence, family support and preferred communication style before assigning a remote-care pathway.

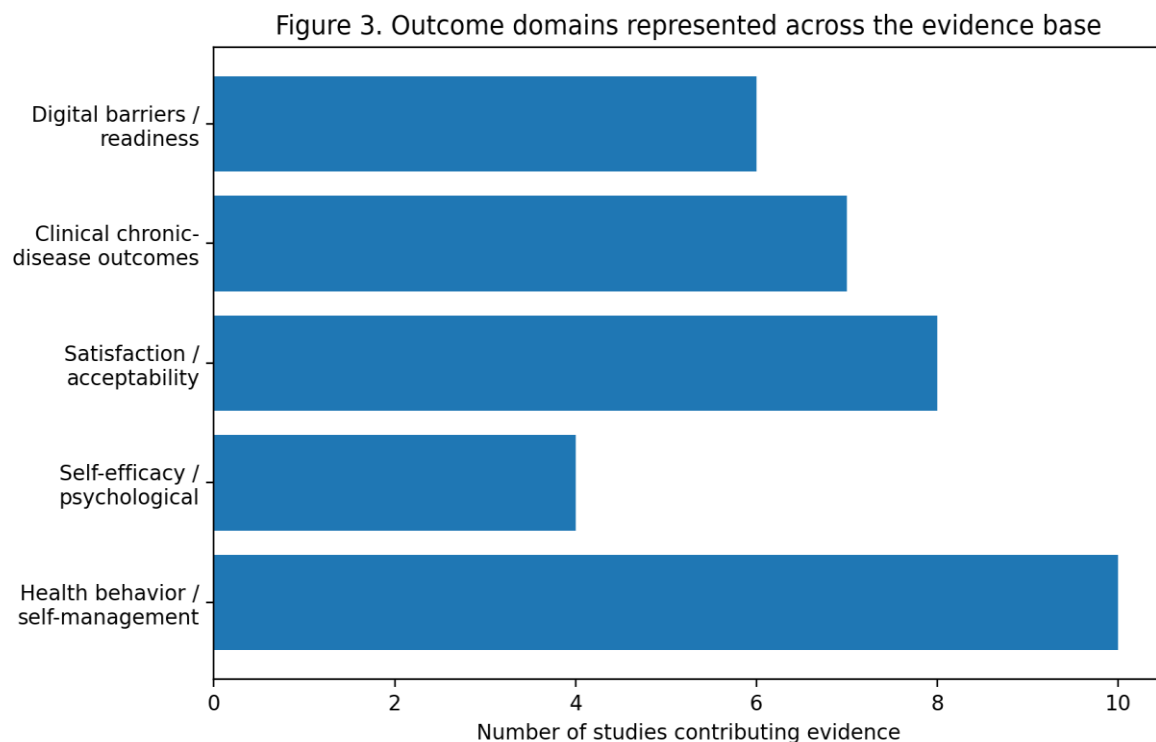


Figure 3. Frequency of major outcome domains represented across the included evidence base. A single study could contribute to more than one outcome domain.

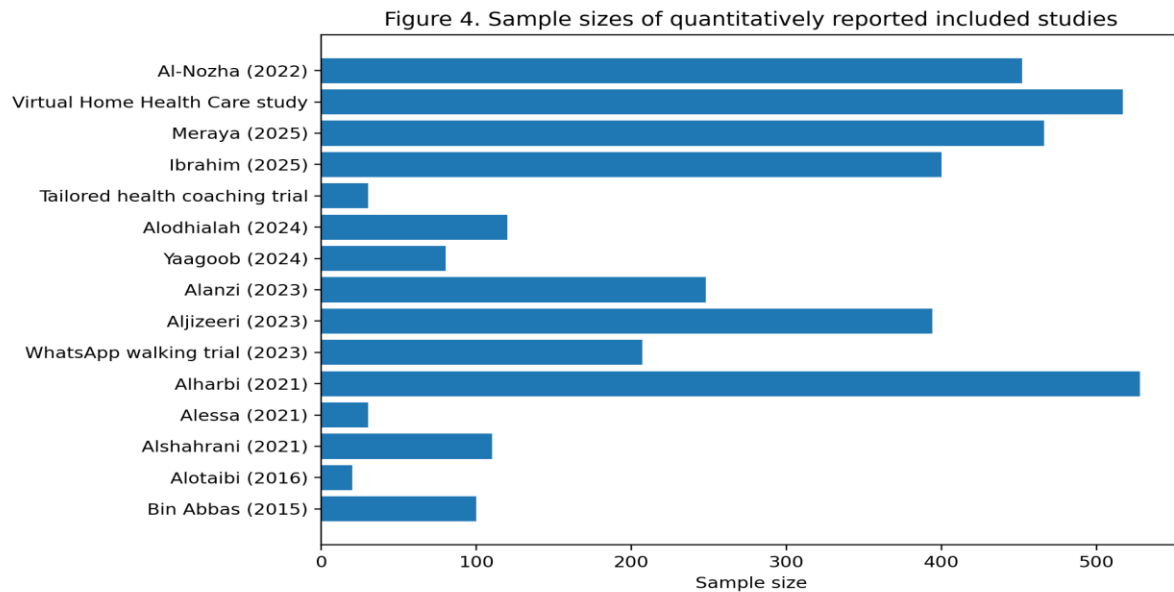


Figure 4. Sample sizes of included quantitative studies where a sample size was explicitly available in the source used for this synthesis.

3.7 Study-level synthesis

Study	Key evidence contribution	Community health nursing interpretation
Bin Abbas et al. (2015)	Daily educational SMS was associated with improved fasting glucose, HbA1c and diabetes-related knowledge.	Remote education, adherence reinforcement and follow-up are directly transferable to community nursing.
Alotaibi et al. (2016)	The SAED system improved HbA1c and diabetes awareness compared with control care in a small pilot sample.	Supports nurse-facilitated digital self-management coaching between clinic visits.
Alshahrani et al. (2021)	Ten weeks of WhatsApp health-promotion messaging significantly improved several physical-activity indicators.	Demonstrates scalable community health-promotion messaging for young adults.
Alessa et al. (2021)	A commercially available hypertension self-management app was acceptable and feasible, with favorable self-monitoring experiences.	Can support nurse-guided home BP monitoring and behavior coaching.
Alodhayani et al. (2021)	Patients and caregivers emphasized culturally appropriate communication, family involvement and trust in digital home care.	Highlights family-centered and culturally responsive telenursing design.
Alharbi et al. (2021)	The Seha application was broadly perceived as useful for access and care delivery, while usability and awareness remained implementation considerations.	National telehealth platforms can extend community nursing contact and triage.
WhatsApp walking trial (2023)	Pedometer-supported WhatsApp messaging produced a greater increase in daily steps than control messaging.	Combines self-monitoring and motivational messaging—core community nursing behavior-change tools.
Aljizeeri et al. (2023)	Telemedicine was feasible for many cardiovascular patients, but technical barriers were common and clinically important.	Identifies digital-literacy and technical-support needs for community follow-up.
Alanzi et al. (2023)	Adoption was shaped by perceived usefulness, usability and	Supports nurse assessment of readiness and technology

	confidence in wearable-supported diabetes management.	confidence before remote monitoring.
Yaagoob et al. (2024)	A 6-week WhatsApp self-management program significantly improved self-efficacy, self-management and education at 6 and 12 weeks.	Strong direct evidence for nurse-supported digital self-management in community diabetes care.
Alodhialah et al. (2024)	Short-term digital mental-health support was associated with improved psychological well-being and blood-sugar outcomes.	Supports integrating mental-health screening and digital psychosocial support into chronic-disease nursing.
Tailored health coaching trial (2024)	Tailored health coaching was feasible and acceptable, supporting further evaluation of behavior-change coaching in Saudi diabetes care.	Maps closely to motivational interviewing, goal setting and follow-up by community nurses.
Ibrahim et al. (2025)	Both approaches improved depression, anxiety and pain; telehealth showed strong improvements in depression and pain, with anxiety also decreasing.	Directly demonstrates a nurse-relevant telehealth pathway for psychological outcomes.
Meraya et al. (2025)	Telehealth use and intention were influenced by perceived value, prior experience and barriers among older adults.	Supports gerontological community nursing assessment of digital readiness and barriers.
Virtual Home Health Care study (2025)	Users reported favorable perceptions of virtual home-health care, particularly convenience and perceived effectiveness.	Provides direct evidence for home-based virtual follow-up in chronic disease.
Al-Nozha et al. (2022)	Patients reported substantial use and interest in technology for diabetes management, with satisfaction and adherence-related benefits alongside usability barriers.	Helps community nurses tailor digital education according to patient experience and preferences.

3.8 Methodological quality and certainty

Evidence type	Main strengths/limitations	Interpretive certainty
Randomized trials	Random allocation and prospective follow-up strengthen causal inference; however, behavioral outcomes were usually self-reported, blinding was generally infeasible, and follow-up was short.	Moderate for short-term behavior/self-management signals; lower for long-term sustainability.
Pilot/feasibility studies	Useful for acceptability and implementation but often small and underpowered for clinical effectiveness.	Low for effectiveness; useful for feasibility.
Quasi-experimental studies	Can evaluate real-world care at scale but are susceptible to selection, confounding and regression-to-the-mean effects.	Low-to-moderate depending on outcome objectivity and baseline comparability.
Cross-sectional service evaluations	Useful for barriers, satisfaction, trust and adoption; cannot establish treatment effects or temporal causality.	Low for effectiveness; moderate relevance for implementation.
Qualitative evaluations	Provide rich evidence on culture, family roles, trust and communication; transferability depends on sampling and context.	High contextual value, not an efficacy estimate.

4. DISCUSSION

This review synthesized 16 Saudi studies/evaluations spanning mobile applications, WhatsApp and SMS, remote health coaching, virtual home health, wearable-supported monitoring and telehealth consultations. Across this heterogeneous evidence base, three conclusions are most defensible. First, digital interventions can strengthen self-management and health behavior, particularly when they use repeated contact, monitoring and motivational reinforcement. Second, psychological outcomes can improve through telehealth-supported ambulatory care, but they remain under-measured in Saudi digital-health research. Third, the technology itself is not sufficient: trust, cultural fit, family engagement, digital literacy and human support repeatedly shape whether patients can use and sustain remote care.

The findings align with community health nursing theory and practice. Community nursing is inherently longitudinal and behavior-oriented. Nurses assess risk, provide education, reinforce self-care, monitor symptoms, coordinate referral and engage families. Telehealth can amplify these functions by increasing contact frequency without requiring repeated travel. The WhatsApp diabetes trial (Yaagoob et al., 2024) is particularly illustrative because the mechanism is not technologically complex; benefit emerges from accessible communication, structured education and ongoing support. Similarly, physical-activity trials (Alshahrani et al., 2021; “Effect of a WhatsApp Walking Trial,” 2023) show that repeated behavioral prompts and self-monitoring can change everyday activity.

The psychological dimension deserves greater emphasis in future Saudi nursing research. Chronic disease management often coexists with anxiety, depressive symptoms, fear of complications and treatment burden. The large ambulatory comparison (Ibrahim et al., 2025) demonstrated clinically important improvements in depression, anxiety and pain across telehealth and nurse-led education. Digital mental-health support in diabetes (Alodhialah et al., 2024) further suggests that psychological well-being can be integrated with metabolic care rather than treated as a separate specialty pathway. Community nurses are well placed to operationalize this integration through brief screening, supportive communication, referral algorithms and follow-up (Alharbi & Ahmed, 2025; Alharbi, 2025).

Implementation findings are equally important. Older adults, cardiovascular patients and some home-care users face technical challenges or differences in digital readiness. A universal digital-first pathway may therefore widen inequities if it assumes smartphone confidence, stable connectivity, literacy or caregiver support. Community health nurses should use a stepped model: assess digital readiness; offer orientation and low-complexity channels; involve family with consent; monitor engagement; and retain telephone or in-person alternatives for people who cannot use app-based care.

Cultural adaptation should go beyond Arabic translation. Family participation, privacy expectations, gender-sensitive communication, religious routines and trusted professional relationships can influence engagement. The community-health and cultural-competence literature associated with Shahbal’s profile (Noshili et al., 2022; Shahbal et al., 2022; Alruwaili, Ali, Shahbal, et al., 2023; Matmi et al., 2023; Alruwaili, Shahbal, Almaliki, et al., 2023; Alselaml et al., 2023; Alharthi et al., 2023; Almalki et al., 2023; Ahmad et al., 2024; Matmi et al., 2024) reinforces the need to understand technology within nursing systems and community context, while Alharbi’s work on beliefs and physical activity (Al-Harbi & Al-Harbi, 2017; Alharbi et al., 2024; Alharbi et al., 2025) illustrates why intervention design should be grounded in locally salient behavioral determinants.

From a health-system perspective, the most promising model is hybrid rather than fully automated. Digital platforms are efficient for reminders, data capture, education and routine follow-up, but human contact remains important for interpretation, motivation, reassurance, escalation and shared decision-making. A nurse-supported hybrid model also offers a pragmatic way to align national digital-health infrastructure with community-level chronic-disease prevention and mental-health support.

Evidence gaps remain substantial. Many studies are cross-sectional, small, or short-term. Outcomes vary widely, which prevents reliable pooling. Rural populations, older adults, people with lower digital literacy, and lower-resource households are underrepresented. Few studies explicitly specify a community health nurse as the interventionist even when the intervention functions map closely to community nursing. Future trials should therefore name the nursing role, use intervention manuals, report fidelity, predefine psychological and behavioral endpoints, and include at least 6–12 months of follow-up.

4.1 Implications for community health nursing practice

- Community nurses can use telehealth as a structured extension of routine follow-up rather than as a separate service.
- Self-efficacy should be treated as an intervention target and measured routinely when digital self-management programs are evaluated.
- WhatsApp/SMS can be appropriate for low-complexity education and motivational reinforcement, whereas virtual consultations are better suited to assessment, counseling and escalation.
- Digital readiness screening should include device access, connectivity, literacy, language, confidence, privacy, and availability of family/caregiver support.
- Remote chronic-disease pathways should incorporate brief psychological screening and referral triggers for depression, anxiety and distress.
- Hybrid models should preserve a human nursing relationship, particularly for older adults, people with multimorbidity and patients reporting low confidence with technology.

- Saudi community programs should evaluate equity, rural reach, cultural adaptation, adherence over time and cost-effectiveness.

4.2 Strengths and limitations

A strength of this review is its deliberate focus on patient-centered behavioral and psychological outcomes rather than technology adoption alone. It also integrates intervention evidence with real-world service evaluations and interprets each finding through a community health nursing lens. The evidence base exceeds ten primary studies and includes randomized trials, mental-health outcomes, physical-activity outcomes, self-efficacy and national/home-care service experience.

Important limitations must be acknowledged. This manuscript is an updated evidence synthesis anchored to a recent verified Saudi systematic review and supplemented by focused searches, rather than a prospectively registered de novo database review. Licensed-database export counts were not independently archived in the preparation environment, so a final journal submission should rerun and archive the complete search in databases such as MEDLINE, CINAHL, Scopus and Web of Science, update the PRISMA flow diagram, and conduct duplicate independent screening. Second, several included studies evaluate digital community care rather than interventions explicitly labeled 'community health nursing'; their inclusion is justified by direct relevance to nursing functions, but this creates conceptual heterogeneity. Third, causal claims are limited by non-randomized and cross-sectional designs. Finally, the heterogeneity of outcome measures prevented meta-analysis.

5. CONCLUSIONS

Telehealth-based care in Saudi Arabia can support self-efficacy, self-management, health behavior and psychological well-being, particularly when digital tools are combined with structured human support. WhatsApp-based diabetes self-management and physical-activity interventions provide the clearest behavioral evidence, while ambulatory telehealth demonstrates potential for improving depression, anxiety and pain. For community health nursing, the practical implication is not to replace nursing contact with technology, but to use technology to extend education, monitoring, coaching and early escalation into patients' homes and daily lives. Future Saudi research should test clearly specified nurse-led telehealth protocols, standardize behavioral and psychological outcomes, include underserved populations, and evaluate long-term sustainability and cost-effectiveness.

DECLARATIONS

Ethics approval and consent to participate: Not applicable. This study synthesizes previously published research and did not involve recruitment of human participants by the review authors.

Consent for publication: Not applicable.

Availability of data and materials: All data synthesized in this manuscript are derived from publicly available published studies cited in the reference list. The study-level extraction table is included in the Results section.

Competing interests: The authors declare no competing interests.

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Clinical trial registration: Not applicable.

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