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Review article

Tele-Psychiatric Nursing and Remote Monitoring for Schizophrenia Management: An Evidence-Informed Narrative Review

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Abstract

Continuity of care for schizophrenia is challenged by treatment disengagement, delayed recognition of relapse, and barriers to in-person follow-up. This evidence-informed narrative review critically examines tele-psychiatric nursing and digital remote monitoring, distinguishing nurse-delivered care from automated and multicomponent interventions. Targeted searches of publicly accessible PubMed records, publisher websites, and citation links were performed in October 2026 for English-language evidence published no later than December 2025. Randomized trials, longitudinal and qualitative studies, evidence syntheses, and relevant guidance were examined using a design-sensitive narrative matrix; no quantitative meta-analysis or systematic screening counts were undertaken. Small schizophrenia-specific randomized trials suggest benefits of structured telephone nursing for medication-related adherence, attitudes, or quality of life, but effects on self-efficacy and longer-term clinical outcomes are uncertain. Multicomponent digital and community interventions yield context-dependent findings, and a 2025 meta-analysis of 26 randomized studies found no significant pooled effects across major outcomes. Active monitoring with clinical triage appears feasible, whereas passive sensing has heterogeneous measurement and insufficient prospective clinical validation. Important implementation concerns include therapeutic alliance, consent, surveillance-related distress, digital exclusion, staff workload, and response accountability. The evidence supports a hybrid, person-centred model in which nurses interpret monitoring information through dialogue, use explicit escalation pathways, and preserve accessible face-to-face alternatives. Future pragmatic trials should isolate the contribution of nursing support and evaluate independently adjudicated relapse, functioning, safety, equity, and implementation costs.

INTRODUCTION

Schizophrenia is characterized by recurrent psychotic symptoms, functional impairment, and a need for ongoing, person-centred treatment. Even when pharmacotherapy and psychosocial services are available, difficulties with medication use, early detection of deterioration, and access to timely follow-

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up can undermine continuity of care. For community psychiatric nurses, the interval between scheduled appointments represents an important opportunity for proactive support rather than crisis-driven contact. Evidence from telephone-based nursing trials and digital self-management programmes suggests that some activities can be delivered remotely, although the effects depend on intervention design and setting.[1,2,3]

In this review, tele-psychiatric nursing denotes planned nursing assessment, psychoeducation, medication support, therapeutic communication, and follow-up provided at a distance by telephone, video, messaging, or related technologies. Remote monitoring denotes repeated collection of symptom or behavioural data outside the clinic. Active monitoring relies on intentional patient responses, such as symptom questionnaires and sleep reports; passive monitoring derives contextual information from smartphone or wearable sensors. These technologies are related but not interchangeable: monitoring produces information, whereas clinical benefit depends on interpretation and an appropriate response.[4,5,6]

Recent evidence syntheses show both the rapid expansion of schizophrenia-related apps and substantial heterogeneity in clinical outcomes, human support, user engagement, and monitoring methods. Importantly, systematic reviews have reported mixed or non-significant pooled effects even while specific trials showed favourable adherence findings. A nursing-centred synthesis can therefore clarify how monitoring information is converted into therapeutic contact and a documented clinical response, without assuming that all digital interventions share an effect.[7,8,9]

Accordingly, this review examines (1) the roles and outcomes of remote psychiatric nursing interventions; (2) the feasibility and clinical interpretation of active and passive monitoring; (3) the risks and implementation conditions relevant to nursing practice; and (4) priorities for future research in adults with schizophrenia and schizophrenia-spectrum disorders.

METHODS

Review design, purpose, and reporting scope

An evidence-informed narrative review was selected because the purpose was to integrate heterogeneous evidence on clinical nursing activities, technology-enabled monitoring, feasibility, human experience, and implementation rather than to estimate a single pooled treatment effect. The unit of interpretation was the nurse-mediated care pathway linking monitoring information to assessment and response, rather than the device in isolation. The six SANRA domains—topic importance, aims, literature search description, referencing, scientific reasoning, and reporting of relevant endpoint data—informed presentation; no formal SANRA score was calculated.[10]

This article is not presented as a systematic or scoping review. No protocol was prospectively registered, exhaustive database coverage was not attempted, and an auditable record-by-record screening log was not generated. Its claims therefore concern patterns, tensions, and practice implications within the retrieved evidence, not the completeness of all available studies or a graded certainty of effect.

Review questions and operational concepts

Four linked questions guided the synthesis: What clinical outcomes have been associated with remotely delivered psychiatric nursing for schizophrenia? How have active self-report and passive sensing been used to identify deterioration, and what level of clinical validation exists? What features of nursing contact, therapeutic

alliance, safety, and service organization may modify effects? What research and implementation conditions are needed before remote monitoring can be integrated responsibly into routine community care?

Tele-psychiatric nursing was defined as a planned intervention in which a nurse performs or coordinates assessment, therapeutic communication, psychoeducation, medication review or adherence support, coping interventions, referral, or longitudinal follow-up through telephone, video, or asynchronous channels. Telepsychiatry and general digital interventions were considered adjacent categories when they provided evidence relevant to the nursing pathway, but were not automatically labelled nurse-led. Active monitoring requires patient-provided symptom or experience reports; passive monitoring uses device-derived behavioural or physiological signals. Medication adherence, drug attitude, symptom severity, relapse, hospitalization, functioning, quality of life, and engagement were treated as distinct outcomes.[1,2,4,6]

Information sources and literature-search approach

Focused literature identification was carried out in October 2026 using publicly accessible PubMed bibliographic records, original journal and publisher webpages, and backward/forward citation clues from relevant trials and reviews. Eligibility was capped at material first made publicly available through 31 December 2025; the later review-preparation date does not extend the publication window. Searches combined population terms (schizophrenia, psychosis, schizophrenia-spectrum disorders), delivery terms (telenursing, telepsychiatry, telephone nursing, telehealth, SMS, digital intervention), monitoring terms (smartphone, ecological momentary assessment, passive sensing, digital phenotyping, early warning signs), and care or outcome terms (medication adherence, relapse, hospitalization, recovery, therapeutic alliance, implementation). Searches were iterative and topic-oriented; no exhaustive Boolean export, complete retrieval denominator, or study-level screening log was maintained.

For clarity, the following expression is illustrative for a future systematic update, not a record of an executed search: (schizophrenia OR psychosis OR schizophrenia-spectrum) AND (telenursing OR telepsychiatry OR telehealth OR telephone OR smartphone OR "remote monitoring" OR "digital phenotyping") AND (nursing OR adherence OR relapse OR implementation). It does not establish the number of studies retrieved or screened in the present review. Full-text findings were considered where accessible, with title, abstract, DOI, bibliographic details, and journal year cross-checked against PubMed or publisher metadata as available. A direct, authenticated Scopus database export was not performed; articles appearing in journals indexed by Scopus should not be mistaken for evidence of a database-specific Scopus search.

Eligibility, relevance, and evidence selection

Priority was given to English-language peer-reviewed work in adults with schizophrenia or schizophrenia-spectrum conditions: randomized or quasi-experimental studies testing remote clinical interventions; prospective studies of monitoring and relapse-related signals; qualitative and mixed-methods implementation studies involving service users or clinicians; and systematic reviews or authoritative guidance that contextualized primary results. Mixed-diagnosis severe-mental-illness and early-psychosis studies were used as indirect evidence where relevant; their results were not attributed to schizophrenia-specific nurse-led care. Reports confined to unrelated disorders, commentary without usable clinical or conceptual contribution, duplicate descriptions of identical findings,

and first publications after 2025 were not used to support the empirical conclusions.

Relevance was assessed against the review questions and against whether a paper identified an intervention component, implementation mechanism, clinically interpretable outcome, or methodological limitation. Experimental studies informed intervention effects; qualitative studies informed acceptability and organizational mechanisms; evidence syntheses informed the consistency of outcomes across heterogeneous interventions. This was a purposive evidence set; there was no independent dual screening or exhaustive full-text eligibility assessment, and counts of identified, excluded, or included records are not reported.

Evidence charting and critical interpretation

For each central empirical paper, a descriptive evidence matrix captured publication year, setting and country, population and diagnosis, study design, sample size when reported, nursing versus non-nursing delivery, technology modality, human support, comparator, follow-up, endpoint definitions, direction of findings, and the most salient limitations. Narrative review and methodological papers were charted for review scope, included evidence, heterogeneity, and methodological warnings. Where accessible, claims were checked against abstracts or published full text, and numeric study estimates were reported only when documented in the source.

Formal Cochrane RoB 2, ROBINS-I, CASP, and GRADE scoring was not undertaken across the complete corpus, and no numeric quality score is implied. Instead, study interpretation considered design-specific concerns: allocation and intervention contamination in trials; selection, confounding, missing sensor data, temporal leakage, and external validation in prediction work; transferability and reflexivity for qualitative studies; and overlap of included primary trials across prior reviews. Small samples, brief observation periods, unblinded patient-reported outcomes, multicomponent interventions, and mixed-diagnosis samples were explicitly considered when deciding how strongly to phrase the conclusions.[6,8,11]

Synthesis strategy, reporting, and methodological safeguards

Results were synthesized through a convergent thematic structure: (1) remotely delivered nursing and treatment continuity; (2) active symptom monitoring and clinical response; (3) passive sensing and prediction; and (4) engagement, therapeutic alliance, ethical issues, and implementation. The Discussion contrasts positive, null, and inconclusive findings, examines differences in intervention content and comparators, and derives cautious practice and research implications. Effect sizes were not pooled because intervention mechanisms, comparator conditions, outcomes, and follow-up periods were heterogeneous, and source selection was not exhaustive. Review-level sample totals are not added to primary-study samples, preventing double counting.

A PRISMA flow diagram is not supplied because no reproducible search-export and screening denominators were maintained. The conceptual care-pathway figure is explicitly labelled as a proposed practice model rather than a validated protocol. Reference citations follow Vancouver numerical order using genuine superscript formatting, with citation numbers placed after sentence punctuation. The proposed recommendations are interpretive and have not been evaluated as one intervention package.

Table 1. Search framework and transparent eligibility boundaries

Element	Operational approach	Boundary or caveat
Evidence sources	Public PubMed records, journal/publisher webpages, and citation links	No authenticated Scopus export or comprehensive all-database search
Publication window	Literature publicly available through 31 December 2025; search preparation October 2026	2026-first-published studies excluded
Population	Adults with schizophrenia/schizophrenia-spectrum; some early psychosis or mixed severe-mental-illness cohorts	Indirect populations labelled explicitly
Interventions and exposures	Nurse telephone/video/SMS support, supported apps, active symptom reporting, passive sensors	Monitoring alone is not equated with clinical intervention
Outcomes and settings	Medication adherence, relapse, symptoms, functioning, patient experience, implementation; inpatient/community settings	Outcome constructs not collapsed into one measure
Selection and assessment	Purposive inclusion; study-design-sensitive critical reading and evidence charting	No dual screening, formal pooled risk-of-bias scores, meta-analysis, or PRISMA counts

RESULTS

Nurse-led remote follow-up and medication support

Direct evidence for psychiatric nursing is provided by a randomized trial involving 45 participants with schizophrenia. Uslu and Buldukoglu evaluated a two-month telephone intervention focused on problem-solving and medication use, reporting better voluntary medication continuation, belief in necessity of medication, and adherence than routine care. The small sample and limited duration restrict inference about sustained clinical improvement or relapse prevention, but it suggests that the content of structured nurse contact merits evaluation separately from the telephone delivery channel.[1]

In another schizophrenia-specific randomized study, 64 individuals received a telenursing intervention or control care. The intervention improved attitudes toward medication and quality of life; differences in self-efficacy were not statistically significant. The divergent outcomes reinforce the need to assess quality of life, medication attitudes, and self-efficacy separately.[2]

A trial of 120 outpatients with schizophrenia or bipolar disorder found that nurse-delivered telephone calls and text messages increased the odds of medication adherence at six months (odds ratio 4.11, P=.007). As the population included more than one diagnosis, the reported estimate applies to a mixed severe-mental-illness sample, not to schizophrenia alone. A separate meta-analysis across mental disorders likewise provides indirect, not disorder-specific, evidence for telemedicine and adherence.[3,12]

Community programmes may combine professional support with family or lay supporters. The rural China LEAN randomized trial (n=278) integrated mobile reminders, education, early-warning monitoring, lay health support, and links to clinical services. Six-month medication adherence was 0.61 in the intervention group versus 0.48 in the control group; relapse and rehospitalization were lower. An extended implementation also showed improved adherence and selected clinical outcomes, although functioning did not clearly improve. Because these were multicomponent interventions within a particular rural care system, the observed

outcomes cannot be attributed to reminders or nursing contact alone.[13,14]

Active monitoring, early warning signs, and clinical response

Active digital monitoring offers a means of tracking sleep, mood, suspiciousness, medication difficulties, stress, and individually identified warning signs between visits. The EMPOWER cluster-randomized feasibility trial combined daily smartphone self-monitoring with peer support and clinical triage. Its principal contribution was evidence about feasibility, acceptability, and service processes; favourable exploratory relapse estimates should not be interpreted as definitive treatment effects from a trial not powered for efficacy. The trial also recorded app-related adverse events, including one serious event; safety surveillance is therefore important even when feasibility criteria are met.[4]

A randomized trial comparing the cognitive-behavioural Actissist app with the active ClinTouch monitoring control in early psychosis found no significant between-group advantage on the total PANSS score at 12 weeks (172 participants in the intention-to-treat analysis). The absence of superiority over active monitoring plus usual care does not establish that either app is ineffective relative to no digital support. Nonetheless, comparable improvement across arms and absence of serious app-related reactions provide useful information about feasibility and safety in the studied setting.[15]

For nurses, an early-warning pathway requires a personalized baseline, agreed symptom thresholds, verification of concerning changes through therapeutic contact, assessment of immediate safety, and a documented escalation plan involving the multidisciplinary team. An automated alert requires clinical verification; conversely, no alert must not be interpreted as evidence of clinical stability. Digital responses should support shared decisions and timely access to care rather than substitute for diagnostic judgment.[4,16]

Passive sensing and relapse prediction

Digital phenotyping can derive data from movement, phone use, geolocation, activity, and sleep-related sensors. In a longitudinal, three-site study involving participants in the United States and India, anomalies detected through smartphone data were more frequent around relapse periods; the reported rate was 2.12 times higher in the preceding month than in relapse-free periods. Although the observations were collected longitudinally, the anomaly models were evaluated retrospectively; clinical accuracy and utility require prospective external validation.[5]

A 2025 systematic review of passive monitoring methods identified 203 articles involving people with psychosis or schizophrenia; accelerometry, smartphones, sleep-duration estimates, and sedentary behaviour were frequent data sources or features. Data completeness thresholds, preprocessing, and analytic methods varied substantially. A second review specifically examining smartphone monitoring apps highlighted similar diversity in study duration, engagement, comparisons, and implementation. Heterogeneous methods limit comparison of model performance and translation of digital signals into reproducible clinical decisions.[6,7]

A crucial distinction is that individual-level predictive accuracy is not equivalent to a demonstrated reduction in hospitalization or relapse. Prospective trials must establish clinically meaningful thresholds, false-alert rates, equity across patient groups, and the response capacity of services receiving alerts. If nurses are assigned to interpret alerts, services must resource training, protected response time, and governance explicitly.[6,17]

Engagement, therapeutic alliance, and implementation

Psychiatric nursing depends on interpersonal trust, a collaborative formulation of distress, respect for autonomy, and therapeutic consistency. Patient interviews about the ClinTouch app indicate that monitoring can support self-reflection and awareness of symptoms, yet users do not experience every monitoring prompt as beneficial. A 2025 implementation synthesis of 150 studies across psychosis and bipolar disorder identified accessible design, human support, fit with patient needs, and provision of devices as facilitators, while digital poverty, intervention complexity, privacy fears, and workflow mismatch were barriers.[11,18]

The views of clinicians reinforce these concerns. Interviews with 59 mental health professionals identified perceived value in early detection but also worries about data accuracy, responsibilities for responding, privacy, therapeutic relationships, and workload. An implementation-focused analysis of interviews with multidisciplinary staff identified role clarity, technical support, training, and local champions as practical conditions for adoption. These concerns make nurse time for reviewing and acting on alerts an explicit implementation cost, not a cost-free by-product of the app.[16,17]

Medication-focused reviews have described the potential of digital psychoeducation, reminders, and supportive contact, but pooled trials of digital health interventions are not uniformly positive. In a 2025 meta-analysis of 26 randomized trials (n=2481), there were no statistically significant pooled effects across the examined symptoms, functioning, quality-of-life, and adherence outcomes, with substantial risk-of-bias concerns. Because the pooled trials tested heterogeneous digital interventions rather than nursing-only care, their null average result constrains broad claims of superiority without disproving every specific nursing approach.[8,9]

Table 2. Selected empirical studies informing tele-psychiatric nursing and schizophrenia care

Study / design	Population and delivery	Principal finding and interpretation
Uslu & Buldukoglu, 2020; RCT [1]	45 patients with schizophrenia; two-month nurse telephone problem-solving intervention	Improved medication beliefs and adherence versus routine care; short duration and small sample.
Seki Oz et al., 2024; RCT [2]	64 patients with schizophrenia; telenursing follow-up	Improved drug attitudes and quality of life; self-efficacy difference non-significant.
Schulze et al., 2019; RCT [3]	120 people with schizophrenia or bipolar disorder; nurse calls and SMS	Higher odds of medication adherence at six months; mixed-diagnosis sample.
Xu et al., 2019; RCT [13]	278 community patients with schizophrenia; lay support, SMS and service linkages	Adherence 0.61 vs 0.48; lower relapse/rehospitalization; multicomponent rural programme.
Gumley et al., 2022; feasibility cluster RCT [4]	73 randomized schizophrenia-spectrum service users; active symptom monitoring + peer support + triage	Feasibility and acceptability demonstrated; not designed for definitive efficacy inference.
Bucci et al., 2024; RCT [15]	172 adults with early psychosis; Actissist versus active ClinTouch monitoring	No significant advantage on primary psychosis outcome; monitored comparator was active.
Cohen et al., 2023; longitudinal [5]	US/India smartphone active and passive monitoring	Pre-relapse behavioural anomalies associated with relapse; model requires prospective validation.
Ball et al., 2025; qualitative [17]	59 mental health professionals; remote-monitoring implementation views	Privacy, trust, clinical responsibility and workload concerns affect implementation.

Table 3. Remote interventions, nursing functions, and outcome measures

Intervention component	Core nursing functions	Suggested patient and service outcomes
Synchronous phone/video support	Review symptoms, medication experiences, adverse effects, rapport, safety, coping and care goals	Medication adherence; therapeutic alliance; satisfaction; missed appointments; response time
Asynchronous SMS or app reminders	Individualize reminders; assess acceptability; respond to non-adherence; avoid punitive surveillance	Adherence measurement; engagement; medication concerns; privacy-related withdrawal
Active app-based symptom monitoring	Agree personalized early warning signs; verify alerts; arrange triage and shared action plans	Relapse rate; time to response; crisis presentations; false positives; monitoring burden
Passive smartphone/wearable sensing	Explain consent and sensor limits; interpret trend with clinical context; check concerning changes	Data completeness; patient consent; predictive calibration; false-alert burden; equitable access
Family and caregiver connection	Seek patient agreement; coach supporters; monitor caregiver strain; coordinate multidisciplinary care	Shared decisions; rehospitalization; caregiver burden; continuity of care

DISCUSSION

Why selected positive trials coexist with null pooled effects

A central interpretive problem is that the term digital intervention encompasses different therapeutic ingredients: supportive nurse telephone calls, SMS reminders, automated self-management modules, peer-assisted programmes, app-based symptom reporting, and passive sensors. It is scientifically inappropriate to assume these mechanisms exert the same effect. The 2025 meta-analysis of 26 randomized trials involving 2,481 participants found no statistically significant pooled improvement across the reported clinical and functioning outcomes, and its risk-of-bias assessment raised substantial concerns. These pooled findings do not refute every positive nursing trial; rather, they show that consistent benefit across heterogeneous digital interventions remains unestablished.[1,2,8]

The smaller trials by Uslu and Buldukoglu and Seki Oz and colleagues tested interventions with recognizable nursing content: structured problem solving, follow-up, and engagement with the meaning of medication use. Their effects were evident for proximal behavioural and patient-reported endpoints rather than established hard outcomes such as sustained prevention of admission. The absence of a significant self-efficacy effect in the latter trial also shows that improving attitudes, confidence, and symptoms are not interchangeable processes. A more conservative hypothesis is that tailored nursing communication can change particular components of treatment engagement under favourable conditions, while durable downstream clinical effects remain uncertain.[1,2]

Comparators also matter. An app assessed against ordinary care measures a different contrast from a therapeutic app compared with an active monitoring app. Where comparator participants receive prompts, clinical attention, or self-observation, both groups may experience benefit, narrowing the between-group difference. The Actissist trial illustrates this interpretive issue. Rather than dismissing a null primary outcome, reviews should examine the intensity and content of both arms, the baseline stability of participants, follow-up duration, and whether the selected endpoint was plausibly modifiable by the intervention dose.[8,15]

Medication adherence as a nursing process, not merely a reminder outcome

Medication non-adherence in schizophrenia can arise from side effects, ambivalence, limited insight, stigma, forgetfulness, treatment access, financial constraints, and difficulties negotiating treatment decisions. Automated reminders may address forgetting but are poorly matched to adverse effects, distrust, or personal preferences without opportunities for explanation and shared problem solving. Nurse-delivered contact offers a mechanism for eliciting the reason behind missed doses and arranging multidisciplinary review without assuming that greater medication-taking is an end in itself. In the telephone-nursing trials, the clinical content is therefore at least as important as the telephone or messaging channel.[1,2,9]

The LEAN rural China study combined lay support, mobile messaging, monitoring, and referral links; it should be interpreted as a community-support package rather than as proof that SMS alone prevents relapse. Its adherence gains occurred in a specific organizational context with lay supporters and service connections. Similarly, telemedicine studies in mixed psychiatric samples do not establish schizophrenia-specific effects. For nursing research, the critical question is which elements - individualized problem solving, therapeutic continuity, family involvement where consented, medication counselling, or rapid escalation - account for improvement, and how much professional time they require.[3,13,14]

Future evaluations should define adherence using valid and feasible measures, preferably combining patient-reported experience with refill, appointment, or other objective indicators where ethically appropriate. Self-report can reflect social desirability, and app engagement cannot substitute for verified medication use. Quality of life, shared decision-making, side-effect burden, and patient-defined recovery should be assessed alongside adherence so that an intervention does not appear successful solely because a numerical adherence measure has increased.[2,8]

Early warning signs: a pathway from observation to timely care

Remote reporting of disturbed sleep, stress, anxiety, suspiciousness, or medication difficulties can produce longitudinal information that episodic clinic visits may miss. Yet data collection by itself is not relapse prevention. A potentially effective pathway requires identifying meaningful person-specific changes, validating them through conversation, deciding whether the findings warrant closer assessment, and mobilizing assistance in time. The EMPOWER intervention made this pathway explicit by combining smartphone self-monitoring, peer support, and clinical triage. EMPOWER supports further testing of an integrated monitoring-and-response model; as a feasibility cluster trial, it cannot establish a definitive relapse-prevention benefit.[4]

Alerting systems create two opposing clinical risks. False positives may provoke unnecessary anxiety or staff workload and contribute to alert fatigue. False negatives may create false reassurance when a patient is deteriorating without using the app or without producing a detectable digital pattern. Some patients may reduce reporting during illness exacerbations; missing observations may therefore be informative rather than random. For nursing practice, a stable digital trace should never overrule a concerning clinical history or family report offered with patient consent. A predefined escalation pathway, including service hours and emergency alternatives, is a clinical requirement rather than a software feature.[4,6,16]

Evaluation should distinguish four levels of evidence: feasibility and data completeness describe whether monitoring runs; sensitivity, calibration, and false-alert

burden describe whether alerts are analytically credible; time from alert to contact describes service response; independently adjudicated relapse, hospitalization, functioning, and perceived recovery describe clinical benefit. A favourable measure at one level does not establish benefit at the next. Prospective comparative trials must link an alert to the nurse action it triggered, and then to an outcome, before claiming a meaningful advantage from monitoring.[4,5,6]

Passive sensing and the gap between prediction and clinical usefulness

Passive smartphone and wearable signals may capture changes in sleep, movement, location diversity, or phone use without frequent questionnaires. These streams may be appealing for people who find repeated symptom reports burdensome, but their interpretation is difficult: a reduction in mobility could indicate psychotic deterioration, physical illness, an altered work pattern, a broken phone, or deliberate withdrawal from tracking. The association between digital anomalies and subsequent relapse reported in prospective observational work is a valuable hypothesis-generating finding, yet it does not validate a deployable diagnostic alarm.[5,7]

A review of 203 passive-data studies exposed major differences in preprocessing, data-quality checks, feature engineering, missing-data handling, and models. In a separate review, the growth of schizophrenia-monitoring apps was accompanied by limited external replication. Consequently, high apparent performance in one dataset may not transfer across countries, devices, treatment regimens, or illness stages. Robust evaluations need within-person baselines, external cohorts, transparent denominator and missingness reporting, prespecified thresholds, calibration, and subgroup performance. The relevant comparison is not whether a model recognizes abnormality in hindsight, but whether its deployment adds value beyond appropriate routine follow-up.[6,7]

From a nursing perspective, algorithm outputs should be treated as prompts for contextual inquiry, not as diagnoses. Data dashboards ought to show trends, confidence and missingness in accessible formats; the nurse needs a route to document why an alert was confirmed, dismissed, or escalated. Real-world evaluations should account for staff time, patient burden, and response delays alongside model performance.[16,17]

A person-centred nurse-mediated service model

Taken together, the evidence provides a rationale for proposing a hybrid approach in which tele-psychiatric nursing extends, rather than replaces, established therapeutic relationships. At enrollment, nurses should assess symptoms, relapse history, strengths, recovery priorities, comorbidity, cognitive and digital accessibility needs, sensory or language barriers, and patient preferences for telephone, messaging, video, or face-to-face contact. Joint planning should clarify what is monitored, which data are optional, the purpose of monitoring, who can access the data, when staff will respond, and when the patient should use ordinary crisis services instead. This is a proposed operational model extrapolated from intervention and implementation findings, not a clinically validated protocol.[11,16,18]

During follow-up, a structured check-in can cover medication experiences, sleep, early warning signs, nutrition and physical health, functioning, supportive relationships, and the patient's own goals. When monitoring identifies a concern, the nurse should contact the patient where feasible, compare observations against that person's baseline and narrative, review immediate safety, document the interpretation, and coordinate timely

psychiatric or multidisciplinary assessment. Information sharing with family or other supporters should depend on the patient's authorization and relevant safeguarding or emergency rules. Routine medication changes remain within the appropriate prescriber's scope.[1,4,19]

The proposed pathway requires explicit service ownership; a dashboard does not monitor or respond to itself. Protocols must identify the staff member responsible for alerts, contingency coverage during leave and weekends, tolerable response intervals, escalation options, documentation and handover, and periodic audit of missed alerts. Nurse supervision, ongoing clinical training, and adequate protected time are necessary for credible implementation. Staff interviews show that uncertainty about roles and expected workload is a significant barrier to uptake.[16,17]

1 ASSESS	2 AGREE	3 MONITOR	4 VERIFY	5 RESPOND
Symptoms, preferences, literacy, risk and access	Shared monitoring goals, consent and response hours	Phone contact, symptom report and optional sensors	Nurse reviews alerts, context, safety and patient account	Document, support, escalate or arrange in-person care

Figure 1. Proposed nurse-mediated remote-monitoring pathway (conceptual framework; not a tested clinical protocol)

Therapeutic alliance, recovery, and co-designed monitoring

The therapeutic relationship is not only a vehicle for delivering digital tools; it may be a determinant of their acceptability and effectiveness. A service user who experiences repeated app requests as surveillance may disclose less or disengage, whereas a jointly selected short check-in can support autonomy and reflection. Interviews with people using ClinTouch described symptom awareness and acceptability but involved a small sample, limiting transferability. Larger implementation syntheses emphasize accessibility, supportive human contact, and fit with personal priorities. From a recovery-oriented nursing perspective, meaningful dialogue is a more relevant goal than maximising daily logins.[11,18]

Recovery-oriented nursing also requires attention to social participation, stigma, family relationships, and life goals beyond positive symptoms. Digital interventions risk narrowing care to measurable indicators while overlooking subjective distress and social needs. Choosing a patient-reported goal - maintaining education, employment, relationships, sleep routines, or confidence in daily living - can make monitoring more relevant while preserving the person's right to decline a particular device or sensor. WHO guidance on community mental health stresses person-centred and rights-based services; its principles provide a normative frame for digital care even though they do not establish efficacy of any specific app.[11,19]

Consent, information governance, safety, and digital equity

Passive location traces, communication metadata, and detailed daily patterns can reveal intimate information unrelated to the clinical question. Consent should be specific, understandable, voluntary, and revocable; patients should be able to select which measures are collected, whether caregivers can see them, and whether lower-tech care remains available. Retention periods, encryption, vendor access, secondary data use, data transfer, and accountability after a privacy breach require organizational policies, not simply a statement that an application is secure. Particular caution is warranted where monitoring itself increases distress or suspiciousness; technology should be reviewed or discontinued when its harms outweigh expected benefits.[11,17,19]

Digital exclusion is multidimensional. It involves phone ownership and cost, connectivity, data plans, literacy, disability, language, shared devices, unstable housing, and whether the technology remains usable during symptom exacerbation. App-only follow-up could amplify inequity when people at greatest risk of disengagement have the least reliable access. Phone calls, face-to-face clinics, assisted access, and family or community support with consent should therefore remain genuine alternatives. Studies should report who was not recruited, who stopped using the technology, and whether outcome advantages differ by socioeconomic or clinical circumstances.[8,18,19]

Clinical safety also includes human factors. Repeated alerts may generate workload without improving decisions, while poorly defined monitoring hours could be interpreted by patients as guaranteed emergency surveillance. Consent discussions must describe limits to responsiveness; organizations should test both false-positive and false-negative scenarios, monitor adverse effects, and maintain conventional crisis arrangements. Continuous data collection must not be presented as continuous clinical surveillance or guaranteed emergency response.[4,6,16]

Relevance to Indonesian psychiatric nursing services

The usefulness of this literature for Indonesia depends on continuity across hospital discharge, primary care, community services, and families. Participatory action research from Pekanbaru identified patient readiness, a supportive environment, and sustained community care as components of a psychiatric nursing continuity model. As locally developed participatory evidence rather than a trial of telemonitoring, it informs a contextual proposal to integrate digital contact with discharge planning, consent-based family involvement, and day-to-day functioning.[20]

A feasible adaptation might begin with low-bandwidth nurse telephone follow-up after discharge, an agreed individual relapse-warning checklist, accessible medication counselling, and clear referral links to community mental health services. Optional messaging or app-based monitoring could be introduced after evaluating privacy, access, staffing and documentation requirements. Local pilot studies must establish acceptability and operational costs, and they should test whether interventions reduce missed follow-up or promote recovery without transferring excessive unpaid care work to relatives. These components remain proposals requiring local feasibility, safety and effectiveness testing.[16,19,20]

Priorities for future research and service evaluation

Randomized trials should distinguish the independent contribution of nurse-led contact from automated reminders or symptom measurement. Factorial or carefully designed comparative studies could test whether individualized nurse response adds benefit to identical digital monitoring. Investigators should publish intervention manuals, delivery fidelity, professional competencies, actual contact time, and contamination across treatment arms. Adequately powered multicentre trials with longer follow-up should prespecify patient-important primary outcomes, use standardized relapse definitions and independent adjudication, and record functioning, adverse events, quality of life, therapeutic alliance, and costs.[4,8,15]

Monitoring studies must report missingness, algorithm version and updating, out-of-sample and external validation, calibration, pre-specified alert thresholds, positive predictive value in realistic relapse prevalence, false-alert

burden per patient-month, and documented clinician action after alerts. Implementation research should incorporate co-design with service users and nurses, accessibility testing, qualitative experience, time-and-motion assessment, data-governance review, and economic evaluation. A valuable evidence programme will determine not only whether remote technologies can measure change but whether they support equitable, trustworthy, nurse-mediated actions that improve recovery.[6,7,16,18]

Table 4. Recommended reporting items for future intervention studies

Domain	Minimum reporting considerations
Population and context	Diagnosis, illness stage, comorbidity, digital access, care setting, family involvement and exclusion criteria
Intervention fidelity	Nurse competencies, contact frequency/duration, therapeutic content, escalation protocols and clinician time
Monitoring technology	Active/passive modalities, devices, privacy controls, missingness, algorithm version and alert thresholds
Comparator and follow-up	Usual or active control care, co-interventions, engagement attrition and clinically meaningful follow-up
Clinical and safety outcomes	Adherence, relapse definitions, hospitalization, functioning, service-user experience, adverse events, false alarms
Equity and costs	Recruitment representativeness, accessibility, device provision, digital literacy, workload and economic costs

Limitations

This is a purposive narrative review, not a registered systematic review. Its literature identification used accessible PubMed records and publisher sources rather than a comprehensive, reproducible multi-database export; direct authenticated Scopus retrieval, two independent reviewers, full eligibility counts, and formal risk-of-bias assessment of every study were not performed. Consequently, publication and selection bias cannot be ruled out and a PRISMA study-count flowchart would be misleading. Critical appraisal was design-sensitive but descriptive, and no formal certainty rating or pooled effect estimate was derived. The review also integrates direct schizophrenia-specific intervention trials with mixed-diagnosis and early-psychosis evidence, qualitative interviews, feasibility studies and prior reviews, each of which answers a different question. Some primary studies are also represented in the cited reviews; study totals must therefore not be combined as independent cohorts. Digital technologies evolve rapidly, and work published after 2025 is excluded by design. Context-specific ethical and service-model recommendations are informed in part by expert interpretation and guidance rather than proven intervention effects.

CONCLUSION

Tele-psychiatric nursing offers a way to extend care continuity through structured medication support, therapeutic contact, psychoeducation, and follow-up between clinic visits. Selected randomized studies demonstrate benefits for medication-related attitudes or adherence, while blended digital systems show promise for monitoring early warning signs. However, current evidence does not support assuming that standalone apps or passive sensors reliably prevent relapse or improve all clinical outcomes. The proposed hybrid model combines remote information with consent-based nursing assessment, accountable escalation, equitable access, and in-person alternatives; it has not yet been validated as a complete pathway. Future adequately powered trials should determine whether these hybrid models improve recovery, reduce relapse, and remain safe and sustainable in routine psychiatric nursing services.

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