

Digital Health Communication and the Changing Patient Relationship: A Review of Trust, Engagement, Accessibility, and Human Interaction

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Abstract

Digital communication increasingly mediates clinical relationships through patient portals, secure messaging, telemedicine, electronic health records (EHRs), conversational agents, and artificial intelligence (AI). These technologies change not only access to information but also how attention, trust, participation, emotional presence, privacy, and professional roles are negotiated. This scoping review mapped evidence on how digitally mediated communication is associated with the patient-clinician relationship, with particular attention to trust, engagement, accessibility, human interaction, control, and equity. Evidence published from 2017 through 2026 was identified through broad and targeted searches of web-accessible bibliographic and journal interfaces, followed by DOI, journal, and relevance verification. Evidence was charted by technology, design, setting, relational construct, contextual modifiers, and interpretive limits. The archived search trail permitted reconstruction of the final inclusion endpoint but not every earlier identification-stage denominator. Thirty-two substantive evidence sources entered the review synthesis. Two additional sources were retained only for methodological or theoretical support, yielding a 34-reference evidence base. Across technologies, relational consequences were heterogeneous. Benefits in convenience, informational access, and continuity coexisted with risks involving transactional communication, attentional fragmentation, unequal access, reduced agency, privacy concerns, and uncertain AI-mediated trust. Digital technologies do not uniformly strengthen or weaken patient relationships. Their relational consequences depend on how technological functions interact with communication practices, patient capability, continuity, organizational arrangements, accessibility, and opportunities for meaningful human participation.

Keywords: Digital health communication, Patient-clinician relationship, Patient engagement, Digital inclusion, Trust, Telemedicine

Introduction

Digital communication has shifted from an adjunct to clinical interaction toward an infrastructure through which substantial portions of healthcare relationships are now conducted. Patient portals, secure messaging, video

consultations, screen-mediated documentation, and AI-supported communication change when patients can contact professionals, what information is visible, how quickly communication occurs, and which participants contribute to an encounter. Qualitative and review evidence nevertheless indicates that digital mediation cannot be reduced to a simple gain or loss of interpersonal connection: technologies can facilitate continuity, information exchange, and participation while simultaneously producing new relational frictions when workflows, patient expectations, technological confidence, or communication norms are poorly aligned [1-3].

Access this article online

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Received: 15 May 2026; Accepted: 24 August 2026

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How to cite this article: Ben Youssef S, Trabelsi A, Boudiaf K, Jebali N. Digital Health Communication and the Changing Patient Relationship: A Review of Trust, Engagement, Accessibility, and Human Interaction. *Int J Soc Psychol Asp Healthc.* 2026;6(2):180-92. <https://doi.org/10.51847/RBtL43pFm>

Trust is similarly more complex than willingness to use a device or platform. Evidence across digital health settings associates trust with perceived technical performance, privacy, accuracy, human involvement, risk, literacy, institutional credibility, and prior experience [4]. Communication itself must also be distinguished from technological contact. Analysis of secure patient messaging, for example, found that opportunities for communication did not necessarily produce supportive language or partnership-building behaviors characteristic of patient-centered interaction [5]. A portal message, video connection, or AI-generated response is therefore an interactional opportunity rather than evidence that a meaningful relationship has occurred.

This review treats digital health communication as a set of technologically mediated relational conditions rather than as a homogeneous intervention. Its central purpose is to map how different communication architectures redistribute attention, information, agency, relational presence, interpretive work, and control across patients, clinicians, carers, and organizations. Particular emphasis is placed on trust and trustworthiness, patient engagement and participation, accessibility and digital inclusion, emotional connection, privacy, clinician-patient role changes, and population-level inequities.

Review questions

The review addressed four linked questions. First, how do different forms of digital communication alter opportunities for information exchange, participation, trust, and relational presence? Second, which patient, clinical, technological, organizational, and social conditions modify these relationships? Third, where do apparently beneficial communication functions generate competing burdens involving attention, interpretation, privacy, workflow, or exclusion? Fourth, which findings represent observed evidence and which cross-technology relationships remain conceptual propositions requiring longitudinal, comparative, or implementation testing?

Materials and Methods

This review used a scoping design because the literature encompassed heterogeneous technologies, study designs, relational constructs, clinical settings, and outcomes. Evidence was mapped rather than pooled, and qualitative accounts, observational associations, surveys, implementation studies, reviews, and conceptual

analyses were not treated as methodologically interchangeable.

Scoping review framework

Reporting and evidence-selection logic were organized in accordance with PRISMA-ScR principles [6]. The review scope was structured around three linked dimensions: the population or relational participants involved; the communication technology or mediated function under examination; and the clinical, organizational, social, or digital context in which interaction occurred. A relational-outcome layer was added during charting to separate trust, participation, accessibility, emotional presence, privacy and control, role redistribution, and equity.

The framework intentionally did not treat satisfaction, utilization, engagement, trust, and clinical benefit as synonyms. A patient may use a portal without experiencing influence over care, trust a clinician while distrusting an AI system, value telemedicine access while experiencing weaker relational presence, or appreciate electronic information while encountering difficulties interpreting it.

Eligibility criteria

Substantive evidence was eligible when published from 2017 through 2026 in a peer-reviewed Q1 journal with a verifiable DOI and when digital communication had a direct analytical relationship to patient-clinician interaction, trust, engagement, accessibility, participation, relational presence, privacy, communication roles, or equity. Eligible evidence included empirical studies, qualitative research, observational analyses, implementation studies, systematic reviews, and directly relevant analytical work. Studies were not treated as review evidence merely because they concerned digital health. Technology-performance papers without a patient-communication dimension, purely technical model-development studies, and articles in which digital access had no interpretable relationship to communication or participation were outside the substantive synthesis. Methodological and theoretical sources required to support the review design or later interpretation were retained separately from included review evidence.

Digital communication technology classification

Four principal communication environments emerged from the search and charting process. The first comprised

asynchronous messaging and patient portals; the second, synchronous telemedicine and video communication; the third, EHR- and screen-mediated interaction, including patient-visible documentation; and the fourth, conversational agents and AI-mediated communication. Earlier systematic review evidence on conversational agents demonstrated why these technologies require separate analytical treatment: interactive agents differ from conventional portals because they can themselves generate communicative content rather than merely transmit it [7].

These categories were functional rather than product-based. Hybrid systems could occupy more than one category, but the distinction preserved the communication mechanism most relevant to interpreting relational consequences.

Information sources and search strategy

The literature search was conducted on September 2, 2026, using broad and targeted web-accessible bibliographic searches. PubMed-indexed records and publisher interfaces were repeatedly queried and verified, including JMIR, JAMA Network, Nature/npj Digital Medicine, ScienceDirect journals, Oxford Academic/JAMIA, and Taylor & Francis. Journal quartile status was checked separately during evidence verification.

Search families combined terms for *digital health*, *patient portal*, *secure messaging*, *telemedicine*, *video consultation*, *electronic health record*, *screen-mediated communication*, *conversational agent*, *artificial intelligence*, and *large language model* with relational concepts including *patient-clinician relationship*, *trust*, *engagement*, *communication*, *accessibility*, *digital inclusion*, *empathy*, and *equity*. Broad searches were

followed by targeted title, DOI, author, and publisher searches as candidate articles were assessed.

The archived search environment did not preserve an export-level result set with stable source-specific retrieval totals. Consequently, records retrieved, duplicate counts, and initial screening denominators cannot be reconstructed exactly and are reported as unavailable rather than estimated.

Screening and selection

Selection proceeded iteratively. Broad search results were first assessed for direct relevance to digitally mediated patient relationships. Promising records were then examined at article or bibliographic-record level for publication year, peer-review status, DOI, journal eligibility, technology, population or care context, study design, and relevance to at least one relational domain.

Duplicate candidates encountered during repeated title- and DOI-based verification were collapsed by article identity. Because no complete candidate registry with sequential record identifiers was retained, the exact number of duplicates removed cannot be reconstructed. The same limitation applies to the denominators for initial screening and source-level eligibility assessment.

A final distinction was made between evidence entering the substantive scoping synthesis and references required only for methods, theory, or interpretive framing. That distinction prevents the reference list from being misreported as the number of studies included in the review.

The methodological consequences of these screening boundaries are summarized below, particularly where superficially relevant digital-health records could otherwise be mistaken for relational evidence (**Table 1**).

Table 1. Screening boundaries and their consequences for interpreting digitally mediated patient relationships

Candidate evidence pattern	Selection treatment	Relational information required	Main measurement consequence	Boundary preserved in synthesis
Direct patient-clinician digital interaction	Eligible when relational outcomes or processes were observable	Communication, participation, trust, presence, control, or role effects	Supports interpretation of interaction, not automatically clinical effectiveness	Relationship process remains distinct from health outcome
Portal or telemedicine utilization without relational measurement	Eligible only when access or use directly informed participation or equity	Interpretable connection between utilization and opportunity to communicate or engage	Utilization cannot be treated as engagement by itself	Access remains distinct from agency

AI-generated communication evaluated by clinicians or raters	Eligible when communication quality, empathy, readability, safety, or trust was assessed	Clear human evaluation or communication endpoint	Evaluator preference cannot establish therapeutic equivalence	Simulated quality remains distinct from patient relationship outcome
Digital-access or disparity evidence	Eligible when unequal access affected communication opportunity or participation	Structural or contextual pathway linking difference to digital care	Demographic association cannot establish individual psychological state	Population inequality remains distinct from individual preference
Methodological or theoretical source	Retained outside substantive review inclusion when needed	Direct support for review method or interpretation	Does not contribute a review-study count	Supporting citation remains distinct from included evidence

Data charting

Each substantive source was charted for source design, population or evidence unit, clinical condition or topic, country and setting, communication technology, comparator where relevant, measurement approach, relational outcome, principal finding, heterogeneity, contextual or equity modifiers, available quality information, limitations, and role within the synthesis. Missing information was retained as unreported rather than inferred.

Relational-outcome coding framework

Relational outcomes were coded into analytically separate but overlapping domains. Trust and trustworthiness concerned confidence in clinicians, institutions, technologies, data practices, or AI-supported decisions. Engagement and participation concerned opportunities and capability to contribute to communication or care decisions rather than simple platform use. Accessibility and digital inclusion included connectivity, literacy, language, disability, technological skill, and practical support.

Emotional connection and relational presence concerned attention, empathy, continuity, nonverbal communication, and the experience of being recognized within digitally mediated care. Privacy, data concerns, and control addressed informational vulnerability, transparency, and influence over how technology participated in care. Role changes captured shifts in communicative or interpretive labor among patients, clinicians, and carers. Equity was coded as a cross-cutting condition rather than a demographic patient trait.

Data synthesis

Synthesis proceeded in two passes. Evidence was first mapped within technology classes to prevent relational

effects observed for one communication architecture from being generalized to all digital care. Findings were then compared across relational domains to identify convergent patterns, contradictions, boundary conditions, and unresolved questions.

No pooled effect estimates were calculated. Findings from qualitative studies, surveys, observational datasets, implementation studies, systematic reviews, and analytical papers were interpreted according to their own evidentiary limits. Cross-technology relationships developed by this review are therefore identified as synthesis rather than established causal mechanisms.

Results and Discussion

Thirty-two substantive evidence sources remained in the final scoping synthesis. Two additional references were retained exclusively to support methodology or theoretical interpretation, resulting in a 34-item reference list. Earlier search-stage denominators are unavailable.

Study selection

The final selection endpoint comprised 32 substantive sources addressing digital communication and patient relationships. Included evidence covered patient portals and messaging, telemedicine and video consultations, EHR-mediated interaction, conversational and generative AI, trust, engagement, accessibility, privacy, and digital inequity. Reviews were retained when they directly mapped evidence relevant to these relational domains rather than merely providing general background.

Two additional publications were intentionally separated from that inclusion count because they served methodological or theoretical roles. This distinction is important: the number of cited references describes the

reference list, whereas the number of evidence sources describes the review synthesis.

Characteristics of the evidence base

The evidence base was methodologically heterogeneous. It included qualitative interviews and ethnographic observation, communication-content analyses, national and health-system surveys, longitudinal portal-use studies, large observational EHR datasets, implementation evaluations, systematic reviews, and analytical work. Provider experiences with portal implementation illustrate this heterogeneity particularly well: digital access could improve informational

availability while simultaneously generating workflow, interpretive, and communication burdens [8].

Evidence therefore differed not simply in strength but in what it could legitimately establish. Recorded interaction could characterize gaze or participation; portal logs could demonstrate use but not necessarily agency; interviews could identify perceived relational change without quantifying population effects; and experimental or evaluator comparisons of AI-generated language could test perceived quality without demonstrating longitudinal therapeutic trust.

The principal inference boundaries across this evidence base are summarized below (**Table 2**).

Table 2. Evidence designs and relational inference boundaries across the digital communication corpus

Evidence form	Relational phenomenon most directly observable	What it can establish comparatively well	Interpretation that requires caution	Context most likely to modify meaning
Recorded or directly observed encounters	Attention, gaze, turn-taking, participation, screen behavior	Interactive patterns occurring during care	Long-term trust or clinical benefit	Encounter purpose, continuity, workflow
Patient or clinician qualitative accounts	Meaning, perceived presence, burden, agency, trust concerns	How digital mediation is experienced and interpreted	Population prevalence or universal direction of effect	Illness, culture, prior relationship, digital confidence
Portal/EHR utilization data	Log-ins, messages, response patterns, modality use	Unequal participation opportunities and behavioral use	Motivation, empowerment, satisfaction, or trust	Literacy, language, insurance, connectivity
Surveys and vignette studies	Preferences, attitudes, perceived trustworthiness	Associations and responses to specified scenarios	Actual behavior or therapeutic outcomes	Framing, prior experience, demographic and institutional context
Implementation studies	Workflow adaptation and technology-in-practice	How communication changes under real service conditions	Effects beyond the implementation environment	Staffing, training, platform design
Evidence syntheses	Recurring findings, heterogeneity, evidence gaps	Cross-study pattern recognition	Causal uniformity across technologies	Inclusion criteria and underlying study quality

Digital messaging and patient portals

Portals expand the temporal and informational boundaries of clinical relationships by allowing communication outside scheduled encounters, increasing access to records, and enabling patients to initiate questions. Yet comprehensibility remains a prerequisite for meaningful participation. National survey evidence indicates that understanding information in online records varies with factors including numeracy and communication experience [9].

Participation is also unequally distributed. Large observational studies demonstrate differences in portal engagement, longitudinal portal activity, and patterns of

care-team response across patient populations [10-12]. These findings should not be interpreted as evidence that demographic characteristics determine motivation or trust. Rather, they indicate that access, literacy, language, insurance, platform familiarity, response practices, and other structural conditions can shape whether a technically available communication channel becomes practically usable.

The relational distinction is therefore between contact availability and consequential participation. A portal may enable message transmission without ensuring understanding, clinician responsiveness, influence over care, or the emotional qualities of a conversation. This

distinction generates testable propositions for portal-mediated care (Table 3).

Table 3. Conditions under which patient-portal contact may become consequential relational participation

Portal function	Relational condition	Participation consequence	Inference boundary
Patient or care-context state — Patient receives clinically important information			
Portal function made available	Record access	Relational condition required beyond access	Information must be understandable and relevant to the current decision
Observable test of the proposition	Comprehension and ability to formulate a care question	Competing interpretation or failure condition	Access increases information exposure without usable understanding
Patient or care-context state — Patient sends a question between visits			
Portal function made available	Secure messaging	Relational condition required beyond access	Response must recognize and address the patient's concern
Observable test of the proposition	Content and responsiveness of reply	Competing interpretation or failure condition	Message completion is counted as engagement despite minimal dialogue
Patient or care-context state — Patient requires clarification or negotiation			
Portal function made available	Asynchronous exchange	Relational condition required beyond access	Channel must allow iterative communication rather than one-way transmission
Observable test of the proposition	Subsequent clarification and documented preference expression	Competing interpretation or failure condition	Efficiency replaces relational exchange
Patient or care-context state — Patient faces language, literacy, or connectivity constraints			
Portal function made available	Portal entry point	Relational condition required beyond access	Appropriate support or alternative communication must remain available
Observable test of the proposition	Successful completion with or without assisted access	Competing interpretation or failure condition	Portal availability masks practical exclusion
Patient or care-context state — Clinician receives increasing message volume			
Portal function made available	Inbox integration	Relational condition required beyond access	Workflow must preserve attentive and equitable response
Observable test of the proposition	Response pattern, timeliness, escalation where needed	Competing interpretation or failure condition	Administrative burden redistributes communication away from direct care

Telemedicine and video communication

Synchronous remote care changes relational conditions differently from asynchronous portals. Qualitative work with general practitioners found that remote consultation could improve convenience and efficiency while also becoming more transactional when clinicians lacked sufficient contextual information or continuity with the patient [13]. National evidence likewise shows that access to telemedicine—and to video rather than other remote modalities—is unevenly distributed [14].

Video can preserve some visual and conversational cues absent from text or telephone communication, but its

relational quality depends on how those affordances are used. Patients report preferences for explicit communication practices that protect confidentiality, confirm technical connection, and convey nonverbal empathy [15]. Interactional research also shows that carers may become active components of video care by providing technical assistance, contextual information, physical help, and communication support [16]. Their participation may enable access while simultaneously redistributing privacy, autonomy, and responsibility.

Telemedicine should therefore not be categorized as inherently humanizing or dehumanizing. Sociological

analysis indicates that relational effects arise from how remote technologies reorganize professional roles, information exchange, and expectations rather than from physical distance alone [17]. This conditionality becomes especially visible among patients facing overlapping barriers. Narrative evidence among older adults from disadvantaged backgrounds with limited English proficiency describes circumstances in which digital, linguistic, socioeconomic, and relational barriers combine to reduce presence or agency [18].

Taken together, these studies suggest that relational adequacy in remote care depends on modality fit, continuity, contextual knowledge, communication practices, and the availability of assistance without assuming that assistance itself is always empowering. Improved geographical access can coexist with reduced interactional control, and convenience for one patient may constitute exclusion for another.

Electronic health records and screen-mediated interaction

The EHR introduces a third communication architecture because the technology occupies the same clinical encounter as patient and clinician. Its relational effect therefore depends heavily on attention allocation and visible interaction practices. Observational evidence demonstrates that physician keystrokes, mouse activity, and gaze toward the computer are associated with differences in patient participation [19]. Silent or multitasking EHR use similarly creates periods in which documentation work competes with interpersonal attention [20].

These patterns do not mean that EHR presence necessarily damages communication. A systematic review found mixed effects: electronic records can support biomedical information exchange and information availability while creating difficulties for nonverbal and psychosocial communication when screen use is poorly integrated into the encounter [21]. Best-practice evidence consequently emphasizes behaviors such as maintaining conversational orientation, explaining computer activity, sharing the screen when useful, and adapting documentation to the interaction rather than treating computer work as a separate invisible task [22].

Importantly, these behaviors appear modifiable. Brief clinician training has been associated with improvements in patient-centered EHR communication practices [23]. Patient access to notes can also alter the communicative

meaning of documentation itself. Following implementation of open notes in psychiatric care, documentation became more comprehensible and resource-oriented and showed reductions in some stigmatizing or controlling language [24].

Screen-mediated care therefore illustrates a broader principle emerging from the review: the relational consequence of a digital technology cannot be inferred from its presence alone. What matters is how technological activity is made visible, explained, integrated with conversation, and organized around patient participation. The EHR may function as a barrier competing for attention, a shared informational object around which clinician and patient collaborate, or both at different moments of the same encounter.

Conversational agents and AI-mediated communication

AI-mediated communication differs from conventional portals because the system may generate, transform, or prioritize communicative content rather than merely transmit it. Evaluations of LLM-generated responses to patient messages show potential improvements in perceived empathy, readability, and linguistic completeness, but these properties do not establish better patient relationships or clinical outcomes [25]. Similar uncertainty applies when AI-generated draft replies are embedded directly into health-record workflows: physician communication may change, yet the effect on patient understanding, trust, and subsequent participation remains incompletely characterized [26].

Comparisons between chatbot and physician responses further illustrate the difference between communication performance and relational validity. AI responses to publicly posted patient questions received favorable evaluator ratings in one study, but the design did not reproduce an ongoing therapeutic relationship, responsibility for care, or the consequences of misunderstanding [27]. Likewise, transforming discharge information into more patient-friendly language can improve readability while introducing omissions or inaccuracies that require professional oversight [28].

AI communication should therefore be interpreted as mediated relational work. Its value depends not only on linguistic fluency but on provenance, accuracy, disclosure, clinician responsibility, and whether patients can question or correct the generated communication.

Trust and trustworthiness

Trust in digital care has multiple possible objects: the clinician, institution, platform, data infrastructure, or AI system. Patient acceptance of medical AI varies with characteristics such as performance, clinician involvement, governance, and the quality of data supporting the technology [29]. These findings caution against treating trust as a stable individual disposition or a simple consequence of technological sophistication.

A useful distinction is between trust and trustworthiness. Trust describes a relational stance; trustworthiness concerns whether reliance is warranted by technical competence, institutional safeguards, transparency, accountability, and human oversight. Conceptual work on medical AI similarly argues that technological systems operate within broader human and institutional structures rather than becoming autonomous substitutes for them [30].

The review therefore interprets digital trust as conditional and revisable. A patient may trust a clinician yet distrust the platform through which that clinician communicates, or accept AI assistance for language simplification while rejecting autonomous clinical interpretation.

Patient engagement and participation

Digital communication expands opportunities for participation but does not guarantee meaningful influence. Portal log-ins, message counts, completed video visits, and response rates are behavioral indicators of use; they should not automatically be labeled engagement. Participation requires that patients can understand what is communicated, express concerns or preferences, receive responsive communication, and influence what happens next.

Across the reviewed evidence, engagement was strongest conceptually when technological access was combined with usable information, reciprocal communication, and a pathway through which patient contributions could affect care. Conversely, technically successful interactions could remain relationally thin when communication was unidirectional, highly transactional, or disconnected from decision making.

This distinction also explains why interventions that increase digital utilization may fail to reduce relational inequality. Increasing access to a channel addresses only one condition of participation.

Accessibility and digital inclusion

Accessibility emerged as a layered rather than binary property. Device and internet availability matter, but so

do health literacy, digital literacy, language, disability, interface design, confidence, time, social support, and the availability of non-digital alternatives. A systematic qualitative review of digital health equity emphasizes similarly multilevel conditions extending beyond individual technology possession [31].

The practical implication is that digital inclusion cannot be assessed solely through adoption. A patient who can technically enter a portal may still be unable to interpret laboratory information, compose an appropriate message, navigate authentication, participate privately, or use video communication effectively. Carer assistance may reduce some barriers while simultaneously changing confidentiality and autonomy.

Accordingly, the proposed synthesis treats accessibility as usable communicative capability: the degree to which a person can enter, understand, navigate, and act through a digital communication environment under real-life conditions.

Emotional connection and relational presence

Human connection in digitally mediated care depends on more than physical copresence. Across video, EHR, messaging, and AI evidence, relational presence appears to depend on recognizable attention, responsiveness, continuity, acknowledgment, and the patient's ability to perceive that communication is directed toward their situation rather than merely processed through a system. Digital environments can support this presence. Video may preserve visual cues; messaging may extend contact beyond visits; screen sharing may turn the EHR into a jointly interpreted object; carefully designed AI support may make complex language easier to understand. The same technologies can also attenuate presence when attention becomes fragmented, messages become standardized, or technological tasks displace acknowledgment of emotion and uncertainty.

Relational presence should therefore be treated as a property of interaction rather than a property of communication modality.

Privacy, data concerns, and control

Digitally mediated relationships expose patients to forms of informational vulnerability that may be less visible in conventional encounters. Patients must often decide whether they are comfortable communicating through portals, having clinical data processed by digital systems, or receiving information that may have been generated or transformed by AI.

Public-attitude evidence indicates that notification about AI use is meaningful to many patients [32]. Transparency is therefore not merely an implementation detail. It can influence whether patients understand who—or what—participated in creating a communication and where responsibility resides.

Control also includes the ability to choose communication modes, request human clarification, challenge inaccurate information, and understand how personal data contribute to technological processes. The review consequently treats privacy and control as relational conditions that help determine whether digital convenience is experienced as support or loss of agency.

Clinician–patient role changes

Digital communication redistributes work. Patients increasingly retrieve results, monitor records, compose messages, navigate interfaces, and interpret information outside clinical encounters. Clinicians manage portal queues, electronic documentation, video workflows, and AI-generated drafts. Informal carers may become technical facilitators and communication intermediaries. Qualitative evidence suggests that portals are often valued as complements to care while remaining insufficient for some forms of bidirectional relational communication [33]. This highlights a central role transition: patients may receive more information without necessarily receiving more interpretive support. The resulting relationship is therefore neither simply more autonomous nor more clinician-controlled. Digital communication produces distributed relational work, in which responsibility for sustaining meaningful communication is spread across people, technologies, and organizational processes.

Equity and population differences

Digital communication can reduce geographical and scheduling barriers while reproducing or creating other inequalities. Telemedicine access and video use have differed across sociodemographic groups in large

observational studies [34]. Similar inequalities appear in portal use, message response, health-literacy requirements, and access to supportive resources.

These patterns should not be interpreted as evidence that particular demographic groups possess fixed levels of motivation, trust, or digital capability. Population differences are more appropriately treated as indicators of unequal exposure to enabling and constraining conditions, including broadband access, language concordance, device availability, health literacy, disability accommodation, insurance arrangements, institutional practices, and prior experience with healthcare.

Equity therefore operates across every relational domain in this review rather than as a final subgroup analysis.

Conceptual and evidence gaps

Several gaps cut across technology classes. First, constructs remain inconsistently operationalized. Utilization is sometimes treated as engagement, satisfaction as relationship quality, empathy ratings as human connection, and stated trust as evidence of appropriate reliance. These substitutions weaken comparison across studies.

Second, much evidence remains cross-sectional, qualitative, observational, or based on short-term implementation. Such designs are valuable for identifying relational conditions but provide limited evidence about how trust, participation, dependence, rupture, or repair evolve over time.

Third, AI communication creates a particularly large transfer problem. Performance on readability, empathy, or evaluator preference does not establish safe relational substitution in longitudinal care. Fourth, technology-centered research often inadequately measures organizational context, clinician workload, continuity, cultural expectations, and the availability of alternative communication modes.

The resulting heterogeneity is summarized below (**Table 4**).

Table 4. Relational heterogeneity and unresolved inference problems in digital health communication

Relational condition	Evidence pattern mapped in this review	Source of heterogeneity	Unresolved inference	Priority test
Trust	Trust varies across clinician, institution, platform, and AI targets	Different objects and measures of trust	Whether reported trust represents warranted reliance	Longitudinal measurement separating trust targets and consequences

Participation	Digital use can increase contact without demonstrating influence	Utilization, communication, and agency often conflated	Whether digital activity changes decision participation	Link behavioral use to observable preference expression and care response
Relational presence	Both strengthened connection and transactional interaction are reported	Modality, continuity, communication behavior, and context differ	Which interactional behaviors preserve presence across modalities	Comparative encounter studies with behavioral and patient-reported measures
Accessibility	Technical availability can coexist with practical exclusion	Literacy, language, disability, connectivity, support, interface design	Which barriers accumulate or are compensated by assistance	Intersectional implementation studies with usable-access outcomes
AI-mediated communication	Readability and perceived empathy may improve while safety or responsibility remains uncertain	Model, task, oversight, disclosure, clinical context	Whether communication quality transfers to therapeutic trust and outcomes	Prospective patient-facing evaluations with human-oversight conditions
Role redistribution	Digital systems shift interpretive and communicative work among patients, clinicians, and carers	Workflow, platform configuration, illness complexity	When redistribution becomes empowerment versus burden	Workflow-linked studies measuring patient control and professional workload

These gaps motivate a proposed adaptive interpretation of digitally mediated relationships rather than a single directional model (**Figure 1**).

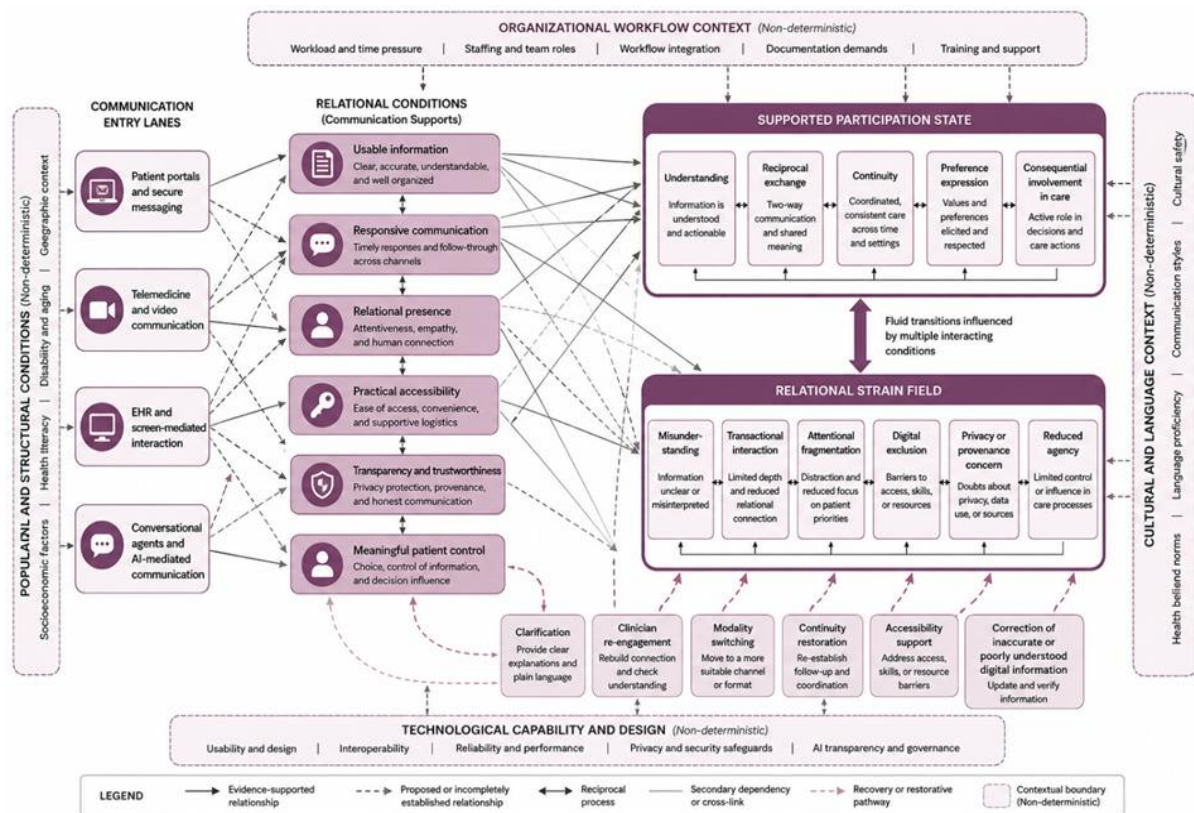


Figure 1. Relational adaptation under digital mediation: transitions between supported participation, relational strain, and recovery

The reviewed evidence does not support a single conclusion that digital communication either improves or erodes the patient-clinician relationship. Instead, digital technologies alter the conditions under which relationships are enacted. The same portal can provide valued informational access yet generate interpretive burden; video can improve geographical access while weakening interaction for patients who lack language, technological, or relational support; EHRs can facilitate shared information while competing for clinician attention; and AI can improve communicative form while introducing new uncertainty about provenance, responsibility, and trust.

The most consistent synthesis is therefore conditional. Relational benefit becomes more plausible when communication is understandable, reciprocal, accessible, transparent, responsive, and integrated with continuity of care. Relational strain becomes more plausible when technology increases communication volume without interpretive support, fragments attention, obscures responsibility, imposes inaccessible interaction requirements, or removes viable alternatives.

This interpretation also rejects technological determinism. Human communication practices, organizational workflow, professional responsibility, social support, and structural resources remain active components of digitally mediated care.

Implications for human-centered digital care

Human-centered digital care should be designed around relational functions rather than platform deployment alone. Systems should preserve routes for clarification, human escalation, alternative modalities, and communication repair. Clinicians need workflows that permit attentive responses rather than simply expanding digital message volume. Interfaces should support comprehension and accessibility, while AI-mediated content should retain transparent human responsibility where clinically consequential.

Evaluation should likewise move beyond adoption and satisfaction. Useful outcomes include understanding, reciprocal communication, patient influence over decisions, trustworthiness judgments, relational continuity, accessibility under real-life conditions, and equitable responsiveness.

Strengths and limitations

This review integrates evidence across communication technologies that are often studied separately and

preserves distinctions among access, use, participation, trust, relational presence, and clinical outcomes. It also separates substantive review evidence from methodological and theoretical support.

Important limitations remain. The included literature is heterogeneous in design, terminology, population, and measurement. Many studies are observational or qualitative, limiting causal inference. Technologies and implementation contexts evolve rapidly, particularly for generative AI. Most importantly, the available search records preserved the final included-evidence endpoint but not complete export-level identification, duplicate-removal, screening, and eligibility denominators. Those missing counts were therefore reported as unavailable rather than reconstructed from the bibliography. This limits reproducibility of the numerical flow while preserving the integrity of the evidence actually synthesized.

Conclusion

Digital health communication is changing the patient relationship by redistributing attention, information, communicative work, and control across patients, clinicians, carers, organizations, and technologies. Its relational consequences are neither inherently beneficial nor inherently dehumanizing. They depend on whether digital communication remains understandable, reciprocal, accessible, transparent, responsive, and connected to meaningful opportunities for participation. Future evaluation should therefore move beyond asking whether patients use digital communication and examine whether they can understand it, act through it, question it, obtain human support when needed, and retain consequential influence over care. Digital communication becomes genuinely patient-centered not when technology replaces human interaction, but when technological mediation preserves the conditions under which trustworthy and responsive relationships can function.

Acknowledgments: None

Conflict of Interest: None

Financial Support: None

Ethics Statement: None

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