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Transferable Patient-Centered Communication Models: A Multisite Implementation Study

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Abstract

Inconsistent implementation of patient-centered communication across healthcare organizations can weaken consultation quality, patient understanding, and trust despite established models of respectful and collaborative care. This study examines the transferability of patient-centered communication practices and the organizational conditions associated with their implementation across diverse clinical settings. Grounded in Normalization Process Theory, the research adopts a quantitative, cross-sectional, embedded multiple-case design encompassing eight healthcare organizations, including four hospital outpatient departments and four community primary care clinics. The specified analytical sample comprises 80 clinicians, 640 adult patients, and 160 observed clinical encounters. Key predictors include clinician communication training, organizational leadership support, clinical workflow integration, and contextual adaptation quality, with implementation fidelity, patient-perceived communication quality, understanding, and provider trust serving as linked outcomes. Five-point questionnaires and structured encounter observations underpin descriptive statistics, reliability assessment, Pearson correlation, and multilevel regression controlling for patient, clinician, and site characteristics. Reported scale means include 4.08 for implementation fidelity, 4.15 for communication quality, 4.06 for understanding, and 4.19 for trust. Internal consistency coefficients range from 0.83 to 0.91, and observer agreement reaches ICC = 0.82. Implementation determinants correlate positively with fidelity (r = 0.38 to 0.57). Regression coefficients for training (β = 0.24), leadership (β = 0.21), and workflow integration (β = 0.19) meet the stated significance threshold, whereas contextual adaptation (β = 0.16, p = 0.081) does not. The fidelity model reports adjusted R^2 = 0.38. Fidelity is positively associated with communication quality (β = 0.36), which is associated with understanding (β = 0.32) and trust (β = 0.29). A setting-type interaction (p = 0.750) does not establish equivalence. These associations should be interpreted cautiously because cross-sectional measures cannot demonstrate the causal effectiveness of implementation. The framework prioritizes practical clinician preparation, leadership engagement, workflow support, fidelity monitoring, and rigorous multisite evaluation to strengthen patient-centered care across organizational contexts.

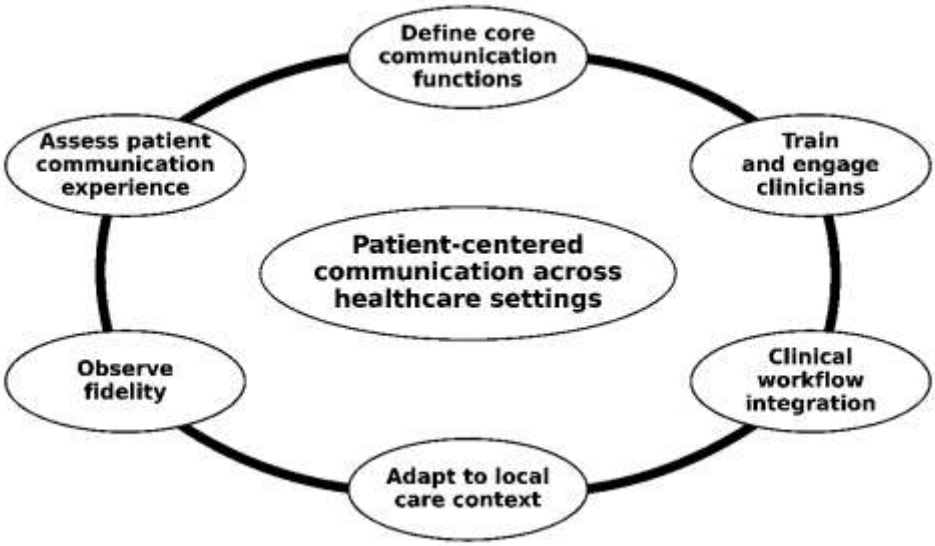
KEYWORDS

Patient-Centered Communication; Implementation Fidelity; Multisite Healthcare Implementation; Normalization Process Theory; Patient Trust.

THE TRANSFERABILITY QUESTION

Patient-centered communication (PCC) refers to a structured and collaborative process of interaction between healthcare professionals and patients that recognizes individual preferences, psychological concerns, cultural circumstances, informational needs, and personal participation in clinical decision-making. It encompasses the exchange of medical information, recognition of patients' perspectives, development of therapeutic relationships, and establishment of shared understanding during healthcare encounters. In "Measuring Patient-Centered Communication in Patient–Physician Consultations" (pp. 1516–1528), four essential communication domains have been identified: understanding patients' perspectives, considering psychosocial contexts, establishing shared understanding, and distributing decision-making responsibilities between patients and healthcare professionals (Epstein et al., 2005). The multidimensional nature of patient-centeredness has been further demonstrated through an integrative review identifying 15 conceptual dimensions, including interpersonal relationships, emotional support, information exchange, patient empowerment, and continuity of care (Scholl et al., 2014). International healthcare systems have increasingly recognized these communication dimensions as fundamental components of healthcare quality, particularly within primary care, hospital-based treatment, chronic disease management, and multidisciplinary clinical services. In "The Values and Value of Patient-Centered Care" (pp. 100–103), patient-centeredness has been characterized as an approach grounded in respect for patients' individual identities, preferences, and participation in healthcare relationships (Epstein & Street, 2011). Communication effectiveness has also been conceptualized through six interconnected functions involving relationship development, information gathering, information provision, decision-making, behavioral support, and responsiveness to emotional concerns (Haes & Bensing, 2009). In "How Does Communication Heal?" (pp. 295–301), clinician-patient interactions have been associated with pathways involving improved understanding, trust, therapeutic relationships, and patient engagement (Street et al., 2009). Investigations of primary care encounters have demonstrated that communication practices are influenced by the organizational and interpersonal characteristics of healthcare consultations, while systematic reviews have documented variation in the relationships between patient-centered care processes and reported healthcare outcomes (Aita et al., 2005; Rathert et al., 2013). The measurement of patient-centeredness has consequently incorporated multiple patient-reported and encounter-based dimensions, reflecting the complexity of communication across healthcare environments (Hudon et al., 2011).

Figure 1: Multisite Patient-Centered Communication Implementation Cycle



The international implementation of patient-centered communication models has been examined across diverse healthcare environments, including general practice, hospital outpatient departments, oncology services, and community-based clinical settings. Communication models generally involve coordinated practices such as active listening, empathetic responses, understandable explanations, collaborative decision-making, and encouragement of patient participation. Their practical implementation requires clinicians to possess appropriate interpersonal competencies and healthcare organizations to support the consistent integration of communication practices into clinical routines.

In "Developing Physician Communication Skills for Patient-Centered Care" (pp. 1310–1318), communication training has been identified as an important component of professional medical education and the delivery of patient-centered clinical services (Levinson et al., 2010). A comprehensive systematic review of 43 randomized trials demonstrated that interventions promoting patient-centered consultations generally improved several communication processes, including the clarification of patient concerns, empathy, and discussions of treatment alternatives, while findings concerning patient satisfaction and health outcomes were less consistent (Dwamena et al., 2012). Similarly, communication training interventions directed toward patients have been associated with increased participation in healthcare encounters and greater expression of clinical concerns (D'Agostino et al., 2017). Evidence from oncology services has demonstrated the importance of structured communication training for healthcare professionals managing emotionally demanding clinical interactions and complex treatment information (Moore et al., 2018). The international literature on shared decision-making has also documented variation in the effectiveness of implementation strategies directed toward healthcare professionals, patients, and combined participant groups (Légaré et al., 2018). In "Physician Communication and Patient Adherence to Treatment" (pp. 826–834), a meta-analysis established a significant relationship between physician communication quality and patient adherence, with communication training associated with improvements in adherence outcomes (Zolnierek & DiMatteo, 2009). Research involving generalist palliative care providers has additionally distinguished improvements in simulated communication behaviors from less certain changes in patient-reported outcomes, demonstrating the importance of evaluating communication practices within actual clinical encounters (Selman et al., 2017).

Patient-perceived communication quality, patient understanding, and trust in healthcare professionals constitute important dimensions for evaluating the functioning of patient-centered communication models across healthcare organizations. Communication quality incorporates patients' assessments of professional attentiveness, explanation clarity, interpersonal respect, emotional responsiveness, and opportunities for participation in decisions concerning their treatment. In "Measuring Patient Views of Physician Communication Skills" (pp. 333–342), the Communication Assessment Tool was developed and evaluated as a patient-reported instrument containing 15 items with five response categories, allowing systematic assessment of physicians' interpersonal and communication competencies across clinical specialties (Makoul et al., 2007). The development of the nine-item Shared Decision Making Questionnaire has further established a structured measurement approach for assessing patient participation in clinical decision-making processes (Kriston et al., 2010; Tahmedur, 2025). However, communication assessments may vary according to consultation circumstances, assessment methods, and professional contexts, as empirical evidence has identified context-specific characteristics of physicians' communication performance (Baig et al., 2009; Sadmeen, 2025). Patient trust represents another important relational outcome associated with the quality of healthcare interactions. In "The Relationship Between Social Support, Shared Decision-Making and Patient's Trust in Doctors" (pp. 319–327), a multicenter investigation involving 2,197 hospitalized patients identified significant associations between informational support, emotional support, shared decision-making, and trust in physicians (Ommen et al., 2011; Shabbir, 2025). Experimental evidence involving oncology consultations has likewise demonstrated that clinicians' expressions of professional competence, honesty, and caring contribute to patients' trust assessments (Hillen et al., 2014; Sadia, 2025). National cross-sectional research has further identified positive associations between patient-centered clinician communication and patients' trust in clinicians as sources of healthcare information (Asan et al., 2021; Mainuddin, 2025). A systematic review and meta-analysis of randomized controlled trials has also

identified a statistically significant, though modest, relationship between patient-clinician relationship interventions and healthcare outcomes (Kelley et al., 2014; Islam, 2025). These findings distinguish observable communication behaviors, patient-reported communication experiences, and relational outcomes as related but analytically separate dimensions of patient-centered healthcare encounters.

The implementation and transferability of patient-centered communication models across healthcare organizations involve organizational, professional, behavioral, and contextual conditions that influence how standardized practices are incorporated into routine service delivery. Transferability in this context refers to the extent to which essential communication functions can be maintained across healthcare settings with different organizational structures, clinician characteristics, patient populations, and operational procedures. Implementation fidelity constitutes a central component of this process because it describes the extent to which an established intervention or practice has been delivered according to its intended design. In "A Conceptual Framework for Implementation Fidelity" (Article 40), implementation fidelity has been defined through the relationship between intended intervention components and their actual delivery, with attention to adherence, dosage, quality of delivery, participant responsiveness, and contextual moderating influences (Carroll et al., 2007; Shahid, 2025). Healthcare organizations may differ in leadership engagement, resource allocation, implementation readiness, communication infrastructure, workforce competencies, and the integration of professional practices into clinical workflows. The updated Consolidated Framework for Implementation Research has systematically classified contextual determinants of implementation, including characteristics of innovations, inner organizational settings, outer environments, individuals, and implementation processes (Damschroder et al., 2022; Shahriar, 2025). Furthermore, implementation outcomes have been conceptually distinguished from clinical and service outcomes through dimensions such as acceptability, adoption, appropriateness, feasibility, fidelity, penetration, and sustainability (Maksudul, 2025; Proctor et al., 2011). Standardized communication models may also undergo modifications to accommodate institutional procedures, patient characteristics, cultural expectations, and service-delivery requirements. In "The FRAME: An Expanded Framework for Reporting Adaptations and Modifications to Evidence-Based Interventions" (Article 58), systematic documentation of intervention modifications has been established as a means of distinguishing changes in implementation processes from changes affecting essential intervention components (Hasinur, 2025b; Stirman et al., 2019). Accordingly, variation in communication implementation across hospital-based and community-based settings can involve differences in training exposure, leadership support, workflow compatibility, contextual adaptation, and fidelity to core patient-centered communication functions. These organizational and implementation characteristics provide distinct constructs for examining variation in communication practices across healthcare facilities.

The theoretical understanding of multisite patient-centered communication implementation requires consideration of the social and organizational processes through which communication practices become established, coordinated, and maintained within everyday clinical activities. Normalization Process Theory (NPT) provides a theoretical explanation of how complex healthcare practices are introduced, interpreted, enacted, and integrated into organizational routines. In "Development of a Theory of Implementation and Integration: Normalization Process Theory" (Article 29), four interconnected theoretical constructs have been established: coherence, cognitive participation, collective action, and reflexive monitoring (May et al., 2009; Hasinur, 2025a). Coherence concerns how healthcare professionals understand and interpret communication practices, while cognitive participation addresses the engagement and commitment required to sustain professional involvement in implementation activities. Collective action represents the operational work associated with integrating communication practices into routine clinical encounters, whereas reflexive monitoring concerns the appraisal of implemented practices and their perceived effectiveness within healthcare organizations. A systematic review examining the application of NPT in healthcare implementation research has demonstrated its relevance for investigating organizational processes, intervention feasibility, and the practical integration of complex clinical interventions (Masrul, 2025; May et al., 2018). The development of the Normalization Measure Development instrument, commonly known as NoMAD, has subsequently provided a theory-based approach for examining healthcare professionals'

experiences of implementation activities across organizational environments (Mostari, 2025; Rapley et al., 2018). In "Improving the Normalization of Complex Interventions: Part 2" (Article 135), multisite psychometric evaluation has supported the measurement of NPT constructs through structured questionnaires administered to professionals involved in implementing healthcare interventions (Finch et al., 2018; Kynatun, 2025). Within patient-centered communication implementation, these theoretical dimensions correspond to clinician understanding of communication practices, organizational engagement, clinical workflow integration, and systematic evaluation of implementation experiences. The present research is situated within this theoretical and empirical context, examining clinician communication training, organizational leadership support, clinical workflow integration, and contextual adaptation quality in relation to implementation fidelity, patient-perceived communication quality, patient understanding, and trust across multiple healthcare settings.

Context and Rationale

Patient-centered communication has emerged as a fundamental component of healthcare quality, emphasizing effective information exchange, emotional responsiveness, shared decision-making, and collaborative relationships between healthcare professionals and patients. The implementation of standardized communication models across healthcare organizations has received increasing attention because clinical settings differ in organizational resources, professional competencies, patient characteristics, and operational procedures. These differences can influence the consistency and effectiveness of patient-centered communication practices. Multisite implementation research provides a structured approach to examining how communication models operate across diverse healthcare environments. Understanding the relationships among clinician training, organizational leadership, workflow integration, contextual adaptation, and implementation fidelity is essential for evaluating whether core patient-centered communication practices can be maintained across healthcare settings while supporting patient understanding and trust.

The Cross-Site Implementation Problem

Healthcare organizations frequently encounter difficulties in consistently implementing patient-centered communication practices across different clinical environments. Variations in clinician communication competencies, organizational leadership support, workflow arrangements, and contextual requirements can produce inconsistencies in implementation fidelity and patient-reported communication experiences. Existing communication models may demonstrate favorable outcomes within individual healthcare settings, but their implementation across multiple organizations requires systematic evaluation of contextual differences and organizational conditions. Furthermore, insufficient understanding of the relationships between implementation fidelity, patient-perceived communication quality, patient understanding, and provider trust creates challenges in assessing communication-model transferability. The central research problem concerns the need for quantitative, multisite evidence identifying the organizational and clinical determinants of implementation fidelity and examining whether relationships between communication practices and patient outcomes remain consistent across diverse healthcare settings.

Study Purpose and Objectives

The primary objective of this study is to quantitatively investigate the implementation and transferability of patient-centered communication models across multiple healthcare organizations using a cross-sectional, embedded multiple-case research design. Specifically, the research aims to examine the relationships between clinician communication training, organizational leadership support, clinical workflow integration, contextual adaptation quality, and implementation fidelity. Additionally, the study seeks to evaluate the association between implementation fidelity and patient-perceived communication quality and investigate how communication quality relates to patient understanding and trust in healthcare providers. The research also aims to assess the consistency of these relationships across hospital-based outpatient departments and community-based healthcare facilities. Through descriptive statistics, Pearson correlation analysis, and multilevel regression modeling, the study will evaluate the proposed hypotheses while accounting for relevant organizational, clinician, and patient characteristics.

Theoretical, Clinical, and Practical Contributions

i. Theoretical Significance: The research contributes to the theoretical understanding of patient-centered communication implementation by applying Normalization Process Theory to examine how organizational engagement, professional competencies, workflow integration, and contextual adaptation relate to the establishment of communication practices across healthcare organizations.

ii. Clinical Significance: The study provides a structured basis for examining relationships between clinician communication practices, implementation fidelity, patient-perceived communication quality, patient understanding, and trust. These relationships are relevant to understanding communication experiences within routine healthcare consultations.

iii. Organizational Significance: The research addresses the roles of organizational leadership, professional training, workflow compatibility, and contextual adaptation in the implementation of standardized patient-centered communication models across hospital-based and community-based healthcare facilities.

iv. Methodological Significance: The study integrates quantitative cross-sectional analysis, embedded multiple-case research, five-point Likert-type measurements, descriptive statistics, Pearson correlation analysis, and multilevel regression modeling to investigate communication implementation across multiple healthcare organizations.

v. Practical and Healthcare Management Significance: The research provides an empirical basis for evaluating implementation conditions associated with consistent patient-centered communication practices. Its findings may assist healthcare administrators, clinical educators, and organizational decision-makers in identifying factors associated with communication quality and implementation consistency across different healthcare settings. The paper has been organized into an introduction, six thematic literature-review sections, an integrated methodology, seven results subsections with eight tables, a five-part discussion, conclusions, recommendations, limitations, and a consolidated APA 7th edition reference list.

EVIDENCE ACROSS THE IMPLEMENTATION CHAIN

Patient-centered communication has been extensively examined within healthcare research because of its relationships with clinical interaction quality, shared decision-making, patient understanding, and trust in healthcare professionals. The literature has identified clinician communication competencies, organizational leadership, clinical workflow arrangements, and contextual adaptation as important factors influencing the implementation of communication practices across healthcare settings. Furthermore, implementation fidelity and patient-reported communication outcomes represent distinct dimensions for evaluating the consistency of patient-centered care delivery. Normalization Process Theory provides a theoretical foundation for understanding how communication practices become integrated into routine clinical activities. This literature review examines six interconnected areas to establish the theoretical and conceptual foundations of multisite communication-model implementation and transferability.

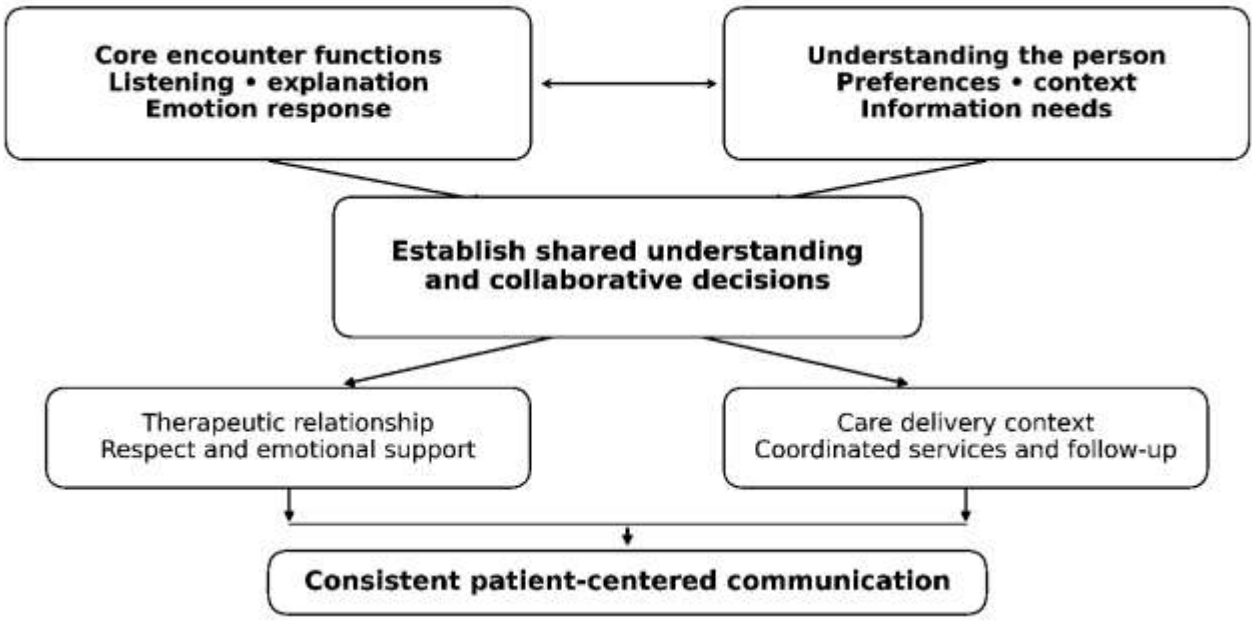
Essential Functions of Patient-Centered Communication

Patient-centered communication models describe organized patterns of clinical interaction that place patients' experiences, priorities, and choices alongside professional knowledge during healthcare encounters. Their central functions extend beyond conveying diagnoses or instructions, incorporating relationship building, information gathering, meaningful explanation, responsiveness to emotions, shared decision-making, and support for managing illness.

In "Best Practice for Patient-Centered Communication" (pp. 385–393), six communication functions were synthesized as recurring elements of effective encounters, providing a structure for assessing what professionals do when communicating with patients (King & Hoppe, 2013). These functions operate together rather than as isolated conversational techniques: attentive questioning helps identify concerns, empathic acknowledgment creates space for disclosure, and negotiated decisions connect clinical recommendations with individual circumstances. In "Development of the Concept of Patient-Centredness" (pp. 1228–1236), a systematic review of eighty articles identified the patient's lived experience, the therapeutic relationship, and coordinated care as interconnected dimensions of patient-centred practice (Aditya & Ahmed, 2022; Langberg et al., 2019). This broader formulation distinguishes an encounter's interpersonal quality from the organizational arrangements that connect consultations,

referrals, and follow-up. Accordingly, communication models can be described through observable clinical behaviors while remaining sensitive to the care pathway in which conversations take place and to the differing informational and relational needs that patients express.

Figure 2: Core Functions and Shared Foundations of Patient-Centered Communication



Shared decision-making constitutes a central component of patient-centered communication because it transforms treatment planning from unilateral instruction into a process of mutual deliberation. Patients need understandable explanations of available options, opportunities to express preferences, and sufficient conversational space to weigh benefits and burdens against their personal circumstances. In "Key Components of Shared Decision Making Models" (Article e031763), a systematic review of forty models identified recurring elements including describing treatment options, recognizing patient preferences, tailoring information, deliberating, and making decisions (Asheke & Maksudul, 2022; Bomhof-Roordink et al., 2019). Although models differed in sequence and assigned responsibilities, these repeated components indicate that patient involvement depends on identifiable communication actions rather than a general declaration of partnership. Relationship-centered behaviors are equally relevant during consultations. In "Practices to Foster Physician Presence" (pp. 70–81), evidence synthesis, observations, interviews, and Delphi assessment generated five recommended practices: deliberate preparation, attentive listening, agreement on priorities, engagement with patients' stories, and exploration of emotional cues (Asheke & Badrul, 2022; Zulman et al., 2020). These actions connect cognitive tasks, such as clarifying options, with interpersonal tasks, such as signaling respect and recognizing distress. Together, they describe a practical communication sequence that can be observed across outpatient consultations without presuming that every patient requires identical conversational content or timing.

Patient-centered communication also depends on how communication behaviors are enacted within specific clinical relationships and service environments. Exchanges between nurses and patients, for example, commonly involve repeated conversations about symptoms, medication, care routines, personal concerns, and decisions that unfold across encounters. In "Patient-Centered Care and Communication in Nurse–Patient Interactions" (Article 158), a literature-based review proposed the Person-Centered Care and Communication Continuum model and identified institutional, environmental, interpersonal, and behavioral conditions that can facilitate or obstruct respectful exchanges (Khalid & Sadmeen, 2022; Kwame & Petrucka, 2021). Its attention to communicative context

shows why a consistent model cannot be reduced to the mechanical repetition of phrases or checklist items. A clinician may convey accurate information while overlooking emotional uncertainty, or invite questions while failing to accommodate language differences and patient preferences. Consequently, assessment of core functions requires distinguishing the presence of communication activities from the quality with which they are performed. Across hospital outpatient departments and community clinics, essential functions may remain recognizable even when consultation length, staffing arrangements, patient expectations, and pathways for follow-up differ. A multisite perspective therefore treats active listening, understandable explanations, collaborative decisions, and emotional acknowledgment as common functions whose actual delivery can be examined within different healthcare settings and patient populations.

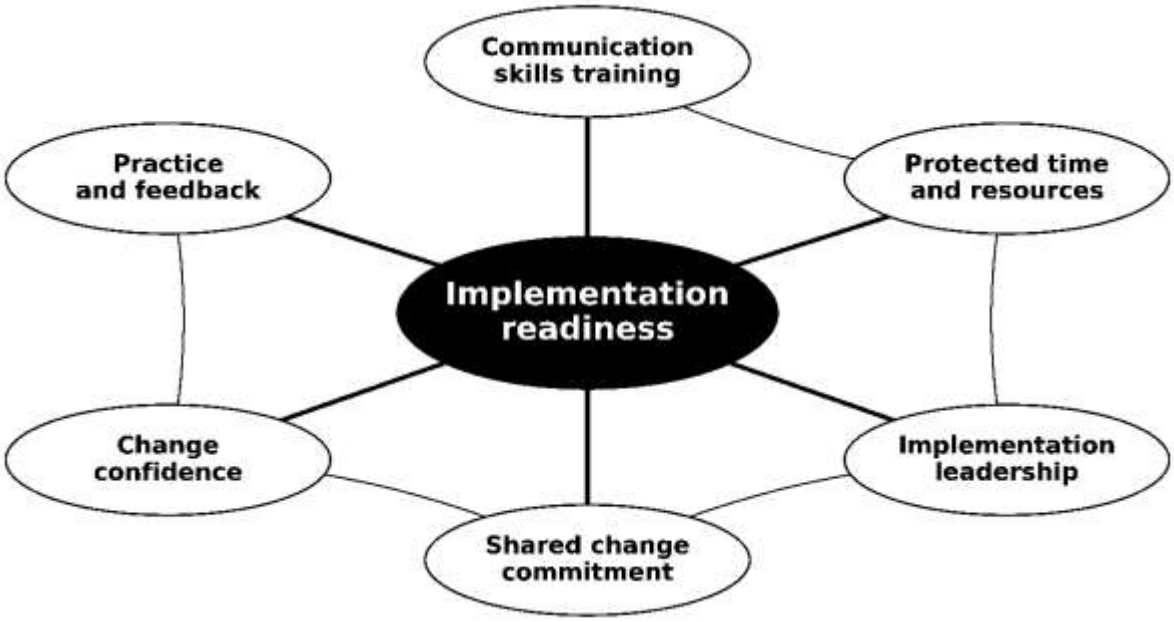
Professional Preparation and Organizational Readiness

Clinician communication training has been considered an essential condition for implementing patient-centered communication consistently, because professionals must translate principles of empathy, understandable explanation, active listening, and shared decision-making into observable behaviors during consultations.

In "Effective Training Strategies for Teaching Communication Skills" (pp. 152–162), a review of twelve systematic reviews identified practice-oriented teaching, role-play, feedback, and small-group discussion as valuable elements of physician training, particularly when programs involved sustained engagement rather than passive instruction (Berkhof et al., 2011; Akter & Sumaiya, 2022). These findings distinguish exposure to communication concepts from opportunities to rehearse difficult conversations and receive corrective guidance. Within hospital outpatient departments and primary care clinics, training may therefore be assessed through its relevance to daily consultations, opportunities for skills practice, and reinforcement of consistent communication behaviors. In "Communication Skills Training for Physicians Improves Patient Satisfaction" (pp. 755–761), an observational evaluation of relationship-centered training at a large medical center reported higher adjusted outpatient physician communication ratings among trained physicians than among comparison physicians (Boissy et al., 2016; Mashiat & Morshedul, 2022). This evidence supports examining clinician training as a potential correlate of implementation fidelity, while recognizing that training participation does not itself establish whether every essential communication function is performed appropriately during individual encounters across varied clinical environments.

Organizational leadership support constitutes a separate implementation condition because clinicians deliver communication practices within institutions that determine priorities, resources, professional expectations, and opportunities for feedback. Leadership can involve protected training time, credible encouragement from supervisors, assistance with difficult workflows, and visible attention to communication quality during performance discussions. In "The Implementation Leadership Scale" (Article 45), a multisite measurement study involving outpatient mental health programs identified proactive, knowledgeable, supportive, and perseverant leadership as distinct dimensions of leadership directed toward evidence-based practice implementation (Aarons et al., 2014; Imran & Jannatul, 2022). Although developed outside the specific context of patient-centered communication, these dimensions offer a useful basis for assessing whether healthcare managers actively enable adoption rather than merely endorsing communication policies. In "Leadership and Organizational Change for Implementation" (Article 11), a randomized mixed-method pilot involving mental health service leaders and staff found encouraging evidence regarding the feasibility and perceived utility of a coordinated leadership development intervention, together with improvements in some leadership assessments (Aarons et al., 2015; Maksudul & Islam, 2022). The pilot findings do not demonstrate that leadership alone produces better patient communication; they indicate how organizational support can be operationalized and evaluated. Across healthcare sites, leadership perceptions may therefore help explain differences in clinician engagement and communication implementation fidelity.

Figure 3: Communication Training, Leadership, and Implementation Readiness



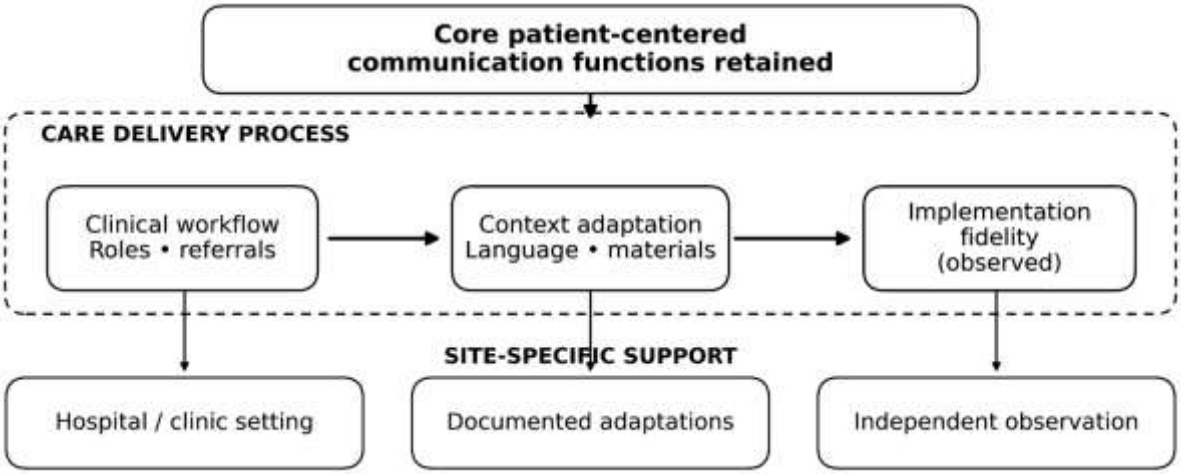
Implementation readiness connects professional training and leadership support to the practical capacity of healthcare organizations to incorporate patient-centered communication into service delivery. Readiness is not simply the availability of a written guideline, an introductory workshop, or a manager's positive attitude. It concerns whether staff members collectively value the intended practice and believe that their organization can execute the required changes under existing conditions. In "A Theory of Organizational Readiness for Change" (Article 67), readiness was conceptualized through shared change commitment and change efficacy, shaped by perceived task demands, available resources, and situational conditions (Morshedul & Islam, 2022; Weiner, 2009). For patient-centered communication, these considerations include staff confidence, coordination among professional roles, time allocated for consultations, access to language assistance, and the ability to accommodate patients with differing informational needs. The theoretical distinction between commitment and capability is important for multisite assessment: one facility may endorse collaborative conversations yet lack the staffing arrangements needed to deliver them reliably, while another may possess adequate resources but inconsistent professional engagement. Accordingly, organizational readiness provides context for interpreting communication training and leadership measures, without replacing the separate assessment of actual fidelity. A cross-sectional comparison can identify associated patterns across sites, while leaving causal direction and sustained implementation unestablished.

Workflow Integration, Local Adaptation, and Fidelity

Clinical workflow integration determines whether patient-centered communication can occur reliably within the ordinary sequence of assessment, explanation, decision-making, and follow-up. Communication practices must fit appointment schedules, professional responsibilities, documentation requirements, referral pathways, and the availability of private spaces for discussion. In "Organizational- and System-Level Characteristics" (Article 40), a scoping review of 32 implementation projects identified organizational leadership, culture, resources, priorities, teams, and workflows as influential conditions for embedding shared decision-making in routine healthcare (Scholl et al., 2018; Feroz & Pervaz, 2022). These findings position workflow integration as an organizational characteristic rather than an isolated attribute of individual clinicians. In "Barriers and Facilitators to Shared Decision-Making in Hospitals" (Article 74), a systematic review documented environmental constraints, professional roles, knowledge, and perceived capabilities, including difficulties associated with busy wards and limited conversational privacy (Feroz & Shabbir, 2022; Waddell et al., 2021). Such constraints can alter when clinicians invite questions, explain alternatives,

or elicit patient preferences. Across outpatient hospitals and community clinics, integration may therefore depend on coordinated appointment processes, accessible communication materials, and clear allocation of responsibilities. Evaluating these arrangements separately from patient satisfaction enables researchers to examine whether organizational conditions correspond to observable differences in communication implementation fidelity across participating healthcare sites and professional groups during routine clinical consultations.

Figure 4: Workflow Integration, Contextual Adaptation, and Fidelity Process



Contextual adaptation concerns modifications that improve the fit between a communication model and the clinical environments, patient populations, and delivery routines in which it operates. Transferable models require recognizable core functions, while their format, language, pacing, or documentation may need to vary across settings. In "Barriers and Facilitators to Person-Centred Care" (pp. 662–673), qualitative research across seven contrasting healthcare projects identified traditional organizational routines, professional attitudes, leadership, training, and adaptive implementation strategies as relevant to delivering person-centred practices (Islam & Md, 2023; Moore et al., 2017). The findings illustrate how patient narratives, collaborative partnerships, and documented agreements encounter different practical constraints across services. In "Development of a Framework for Modifications and Adaptations" (Article 65), researchers classified 258 reported modifications from 32 publications, distinguishing changes to intervention content from changes to its delivery context (Mostari & Kynatun, 2023; Stirman et al., 2013). This distinction is essential when evaluating communication models: translating explanations into another language may preserve patient participation, whereas omitting opportunities for shared deliberation may change the intervention itself. Consequently, contextual adaptation quality should reflect whether modifications address legitimate patient and organizational needs without eliminating fundamental behaviors. Multisite comparisons can document variation in delivery while assessing whether the underlying communication functions remain identifiable and consistently enacted across settings.

Implementation fidelity describes the degree to which a communication model's intended components are delivered during actual healthcare encounters. For patient-centered communication, fidelity includes whether clinicians seek patients' concerns, provide understandable information, respond to emotions, and invite participation in treatment decisions. It also concerns how competently these behaviors are performed, since completing a checklist does not necessarily indicate meaningful interpersonal engagement. In "A Modified Theoretical Framework to Assess Implementation Fidelity" (Article 91), fidelity and adaptation were treated as related implementation processes, with attention to the possibility that modifications may preserve, strengthen, or undermine intended intervention functions (Mashfiqur & Jamil, 2023; Pérez et al., 2016). This perspective supports evaluating adherence to essential communication behaviors alongside documentation of context-specific adjustments. Observational fidelity ratings can capture what clinicians demonstrate during consultations, whereas

clinician questionnaires can describe perceived workflow integration and adaptation quality. Keeping these measurements distinct reduces confusion between implementation conditions and implemented behaviors. Within an embedded multiple-case study, comparisons should consider patients nested within clinicians and clinicians situated within healthcare facilities. Differences in fidelity across sites can then be examined in relation to workflow compatibility and adaptation quality, without treating cross-sectional associations as proof that organizational conditions caused the observed communication behaviors within the participating healthcare systems.

Patient Experience, Understanding, and Trust

Patient-perceived communication quality represents the extent to which individuals consider a clinical encounter understandable, respectful, responsive, and supportive of meaningful participation. It concerns patients' experiences of listening, explanation, empathy, question handling, and shared deliberation rather than clinicians' intentions alone.

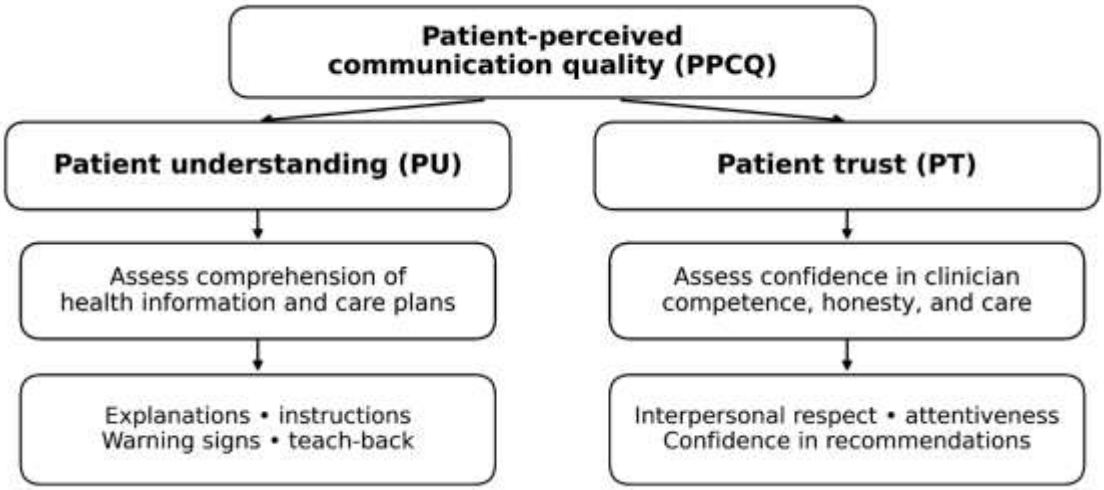
A physician might communicate medically accurate information while patients still feel excluded from decisions or uncertain about instructions. Consequently, communication quality is best treated as a patient-reported construct, distinguished from independently observed implementation fidelity and from subsequent understanding or trust. In "Measuring the Quality of Patient-Physician Communication" (Article 103589), computational approaches to analyzing consultation dialogue were evaluated alongside self-reported questionnaires, illustrating alternative ways to characterize exchanges between patients and physicians (Cuffy et al., 2020; Mashiat & Binte, 2023). The analysis highlights how communication can be examined in routine clinical practice through recorded conversational content as well as reported experience, although neither approach automatically establishes what patients learned. For multisite evaluation, comparable questionnaire items can assess whether patients felt heard, received clear explanations, understood opportunities to ask questions, and participated appropriately in care decisions. Interpreting ratings requires attention to clinical complexity, expectations, language concordance, and the possibility that patients in different facilities may evaluate similar behaviors differently. These distinctions support consistent measurement across varied healthcare settings. Patient understanding refers to an individual's grasp of explanations about health conditions, treatment options, medications, warning signs, and subsequent care responsibilities. It differs from satisfaction because patients can appreciate a compassionate consultation without remembering medical information. In "Improving Patient Recall of Information" (pp. 716–721), an experimental study using a simulated emergency discharge consultation found that clearly structured information improved participants' recall and perceived comprehensibility compared with an unstructured presentation (Langewitz et al., 2015; Shahid, 2023). The findings suggest that explanation organization deserves consideration alongside tone and interpersonal warmth, although the participants were students viewing a video rather than actual patients receiving treatment. Understanding can also be checked through teach-back, in which recipients restate instructions using their own words and clinicians clarify inaccuracies. In "Relationship Between Teach-back and Patient-Centered Communication" (pp. 1345–1352), analysis of recorded pediatric asthma consultations found that teach-back use was associated with more patient-centered dialogue, while also revealing greater expression of negative affect by parents (Badaczewski et al., 2017; Islam & Ahmed, 2023).

This complexity cautions against assuming that verification automatically creates uniformly favorable experiences. For the present research, patient understanding should therefore be measured separately from communication ratings, with questions addressing comprehension of care instructions and the patient's ability to explain agreed plans.

Trust in healthcare providers concerns patients' confidence that clinicians are competent, honest, attentive, and willing to act in their interests. Trust may shape willingness to disclose concerns and engage in recommended care, yet it should remain analytically distinct from both perceived communication quality and understanding. In "The Effects of Patient-Centered Communication" (pp. 502–511), analysis of a United States national survey involving 3,273 respondents found positive associations between patient-centered communication, trust in healthcare providers, and evaluations of healthcare quality; trust mediated the association between communication and perceived healthcare quality (Hong & Oh, 2020; Sadia & Mosheur, 2023). Such findings identify interconnected perceptions rather than establishing temporal causality. In "Impact of Patient Communication Preferences on

Patient Trust" (pp. 1–8), a cross-sectional study of 704 patients attending public and private outpatient clinics in Iran reported a positive association between communication preferences and physician trust, with differences across facility types (Chegini et al., 2022; Sumaiya & Taufiqur, 2023). Because preferences concern desired communication rather than necessarily experienced behavior, the constructs warrant separate measurement. Multisite analyses should consider patient characteristics and context when comparing trust outcomes. Accordingly, examining communication quality, patient understanding, and trust as distinct outcomes allows relationships among them to be estimated without treating satisfaction or trust as proof of comprehension.

Figure 5: Patient-Reported Communication Quality, Understanding, and Trust

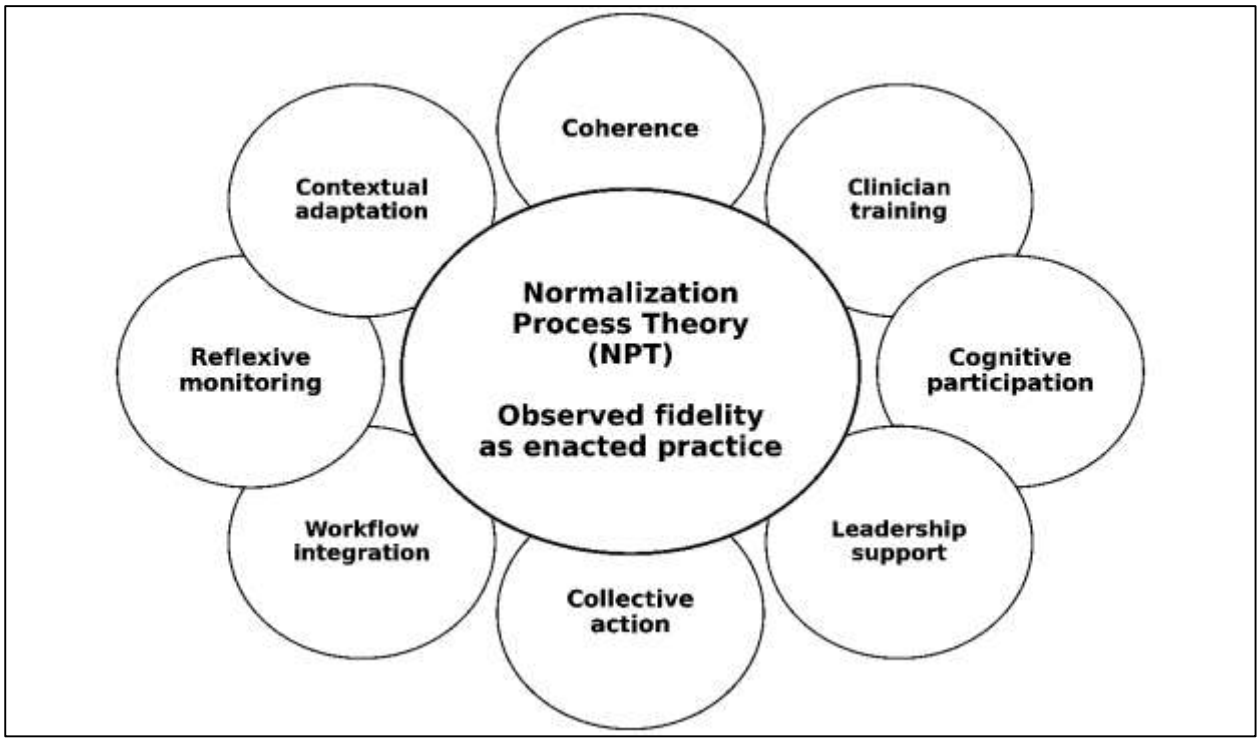


NORMALIZATION LOGIC AND TRANSFERABILITY PATHWAYS

Normalization Process Theory (NPT) explains how healthcare practices become understood, enacted, and incorporated into routine professional work. It is suitable for examining patient-centered communication because consistent listening, explanation, emotional acknowledgment, and shared decision-making depend on coordinated behavior rather than written policies alone. In "Implementing, Embedding, and Integrating Practices" (pp. 535–554), normalization was conceptualized as social and organizational work through which practices become embedded in everyday interactions (May & Finch, 2009; Sadmeen & Khalid, 2023). NPT differentiates four interconnected mechanisms: coherence, cognitive participation, collective action, and reflexive monitoring.

Coherence concerns clinicians' shared understanding of the model; cognitive participation concerns commitment and engagement; collective action concerns enactment within clinical routines; and reflexive monitoring concerns appraisal of implementation experiences. In "Normalisation Process Theory: A Framework for Complex Interventions" (Article 63), NPT was proposed as a practical means of examining the work required to implement and evaluate complex healthcare interventions (Adnan, 2024; Murray et al., 2010). These mechanisms provide a coherent interpretation of clinician communication training, organizational leadership, workflow integration, and contextual adaptation. Training can clarify the model's purpose, leadership can support participation, workflows can enable collective action, and feedback can inform adjustments. Thus, fidelity becomes an observable outcome of implementation work rather than an assumed consequence of organizational endorsement.

Figure 6: Normalization Process Theory Mechanisms in Communication Implementation



Empirical applications of NPT have shown that implementation depends on reciprocal interactions between practitioners, organizational settings, and the characteristics of interventions. In "A Qualitative Systematic Review of Normalization Process Theory" (Article 2), a synthesis of twenty-nine studies identified NPT as a useful framework for explaining how diverse interventions are embedded in routine healthcare, while acknowledging overlap between some theoretical constructs (Islam, 2024; McEvoy et al., 2014). This distinction matters for patient-centered communication because training, organizational engagement, and workflow compatibility can be related without representing interchangeable constructs. In "Deliberate and Emergent Strategies for Implementing Person-Centred Care" (Article 527), research across four Swedish wards examined how professionals adapted person-centered practices through small-group coherence, flexible local interpretations, and interprofessional teamwork (Ashik, 2024; Naldemirci et al., 2017). The study demonstrated that adaptation is embedded in collaborative work and should be evaluated alongside patients' perceptions of interpersonal care. A transferable communication model therefore requires stable core behaviors while allowing justified changes in delivery language, consultation sequencing, or professional responsibilities. Within a multisite study, the NPT mechanisms can help interpret why implementation fidelity differs among clinicians and organizations, while a standardized observation instrument distinguishes actual communication practices from participants' favorable descriptions of implementation readiness across organizationally and geographically diverse settings. Application of NPT to person-centered services has emphasized the consequences of limited time, inconsistent teamwork, and insufficient organizational support for implementation. In "Factors Influencing the Implementation of Person-Centred Care" (Article 182), an evaluation involving eighteen German nursing homes classified facilitators and barriers across the four NPT mechanisms, including professional collaboration, resource constraints, perceived feasibility, and appraisal of care practices (Yeasin, 2024b; Richter et al., 2022). These observations justify treating fidelity as the principal implementation outcome in the present multisite assessment. The proposed statistical operationalization has been specified below.

$$IF_{ijk} = \beta_0 + \beta_1 CCT_{jk} + \beta_2 OLS_{jk} + \beta_3 CWI_{jk} + \beta_4 CAQ_{jk} + u_k + v_{jk} + \varepsilon_{ijk}$$

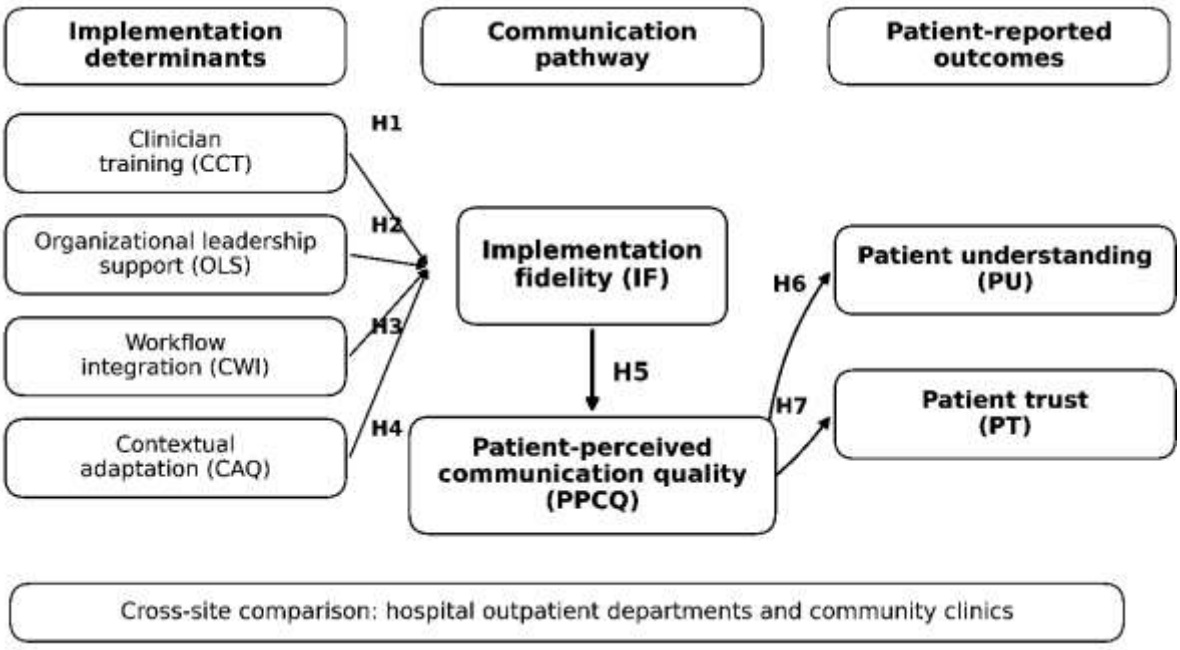
Here, IF denotes encounter-level communication fidelity; CCT, training; OLS, leadership support; CWI, workflow integration; and CAQ, contextual adaptation quality. Indices i, j, and k identify encounters, clinicians, and sites; random intercepts represent site and clinician differences. This regression is a study-specific statistical operationalization informed by NPT, not an equation established by the theory itself. Because NPT mechanisms describe implementation work rather than patient outcomes, a second model will separately examine whether observed fidelity is associated with patient-perceived communication quality. Subsequent patient-level regressions will evaluate understanding and trust, carefully controlling for relevant patient and clinician characteristics and potential site clustering. Estimated associations will address the proposed implementation hypotheses while retaining the noncausal interpretation appropriate to cross-sectional data.

An Integrated Model of Determinants and Patient Outcomes

The conceptual framework integrates implementation determinants, observable communication fidelity, and patient-reported outcomes within a single multisite analytical structure. Normalization Process Theory supplies the explanatory foundation, while the conceptual model specifies relationships that can be measured and tested statistically.

In "Making Sense of Implementation Theories, Models and Frameworks" (Article 53), implementation theories were distinguished from determinant and evaluation frameworks, emphasizing the need to match theoretical explanations with appropriate empirical variables (Yeasin, 2024a; Nilsen, 2015). Accordingly, clinician communication training, organizational leadership support, clinical workflow integration, and contextual adaptation quality constitute four distinct predictors of implementation fidelity. Training reflects preparation for patient-centered encounters; leadership represents institutional encouragement and resources; workflow integration captures compatibility with routine consultations; and adaptation quality concerns modifications preserving essential communication functions. In "Psychometric Assessment of Implementation Outcome Measures" (Article 108), acceptability, appropriateness, and feasibility were validated as distinguishable implementation outcomes through complementary measurement procedures (Jahanara, 2024; Weiner et al., 2017). Their differentiation reinforces the need to separate favorable attitudes toward a communication model from demonstrated fidelity during clinical encounters. The proposed framework consequently assigns implementation fidelity an intermediate position, measured through structured observations, while organizational predictors are assessed through clinician questionnaires administered consistently across diverse participating healthcare settings and clinical disciplines in practice.

Figure 7: Conceptual Hypothesis Pathways for Multisite Patient-Centered Communication



The second component of the conceptual framework relates observed communication fidelity to patients' experience of consultations and distinguishes perceived quality from subsequent understanding and trust. Implementation fidelity describes whether essential communication behaviors occur, whereas patient-perceived communication quality captures whether recipients experience those behaviors as attentive, understandable, and responsive. In "The Impact of Patient-Centered Communication on Decision Making" (pp. 386–392), an experiment with standardized consultation videos found that participants exposed to more patient-centered behaviors evaluated physicians more favorably and expressed greater willingness to accept clinical recommendations (Saha & Beach, 2011). The findings support investigating communication experiences as an outcome associated with enacted clinical behaviors, without equating experimental responses with real-world implementation effects.

In "Patient-Centered Communication and Patient Trust" (pp. 207–216), two probability-sample surveys in China linked health-information activities, patient-centered communication, and trust through mediation analyses (Kynatun & Saba, 2024; Liu & Jiang, 2021). This evidence supports examining trust separately from communication quality. The present model therefore identifies communication fidelity as the predictor of perceived quality, with perceived quality subsequently associated with patient understanding and provider trust. Each outcome remains independently measured, allowing the proposed relationships to be evaluated while recognizing that cross-sectional data cannot determine temporal direction. These associations are hypotheses requiring direct empirical testing.

Cross-site transferability represents a contextual evaluation rather than an additional patient-level psychological construct. In "Criteria for Evaluating Transferability of Health Interventions" (Article 88), a synthesis of thirty-seven publications identified population, intervention, environment, and transfer-process criteria that shape whether health interventions can be applied across settings (Mostari, 2024; Schloemer & Schröder-Bäck, 2018). This distinction requires attention to patient populations, staffing arrangements, consultation workflows, and modifications to essential communication practices. To operationalize the fidelity-to-quality relationship, the study has proposed the site-adjusted equation shown below, where patients are indexed by i, clinicians by j, and sites by k.

$$PPCQ_{ijk} = \gamma_0 + \gamma_1 \overline{IF}_{jk} + \boldsymbol{\gamma}_2^T \mathbf{X}_{ijk} + \sum_{s=2}^{8} \delta_s I(k = s) + b_{jk} + \varepsilon_{ijk}$$

The clinician-level mean fidelity score derives from observed encounters; patient characteristics enter through the control vector, while site indicators and clinician random intercepts account for clustering. A positive estimated fidelity coefficient would be consistent with the proposed communication pathway, not evidence of causation. Site-specific estimates and fidelity-by-setting interactions will assess relationship consistency across hospital and community clinics. With eight sites, these comparisons will be interpreted cautiously, using confidence intervals and contextual information rather than presuming statistical equivalence or unrestricted generalizability to unobserved healthcare organizations. Comparisons will also consider differences in patient education, professional experience, consultation duration, language concordance, and observed adaptation, because these conditions may complicate interpretation of transferability.

Research Questions (RQ1-RQ3)

RQ1: How are clinician training, organizational leadership support, workflow integration, and contextual adaptation associated with implementation fidelity?

RQ2: How are implementation fidelity and patient-perceived communication quality associated with patient understanding and trust?

RQ3: How consistent are implementation and communication relationships across different healthcare settings, and what do these patterns indicate about model transferability?

Testable Associations (H1-H7)

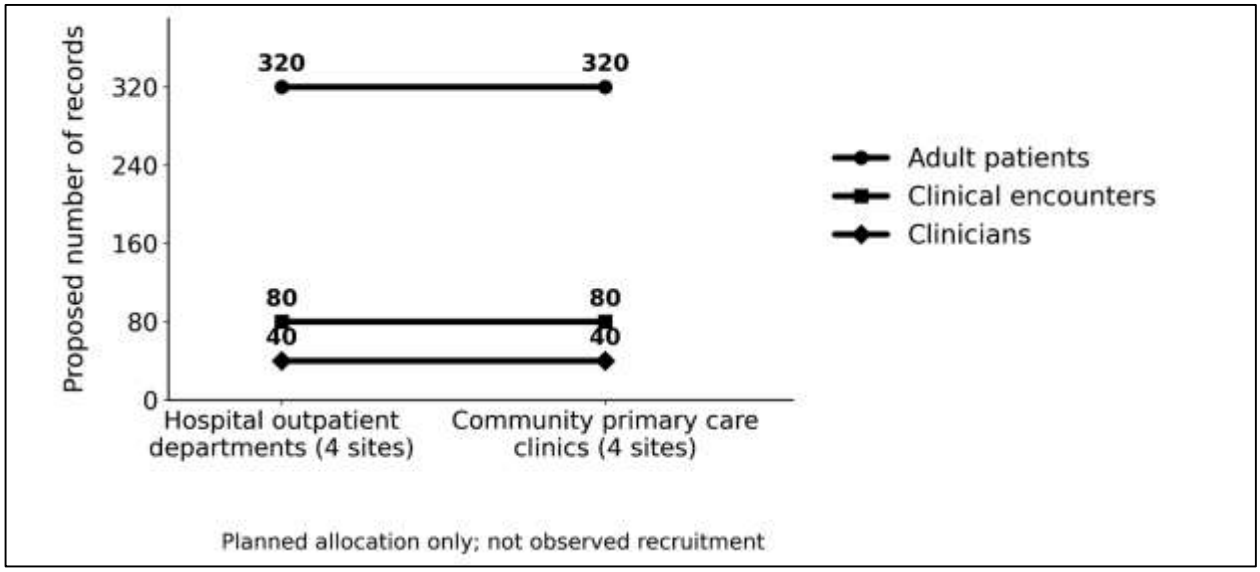
The study establishes seven directional research hypotheses to examine the relationships among organizational implementation determinants, communication fidelity, and patient-reported outcomes. H1 proposes that clinician communication training is positively associated with implementation fidelity, while H2 suggests a positive relationship between organizational leadership support and

implementation fidelity. H3 hypothesizes that clinical workflow integration is positively associated with implementation fidelity, whereas H4 predicts a positive association between contextual adaptation quality and implementation fidelity. Furthermore, H5 proposes that implementation fidelity is positively associated with patient-perceived communication quality. H6 hypothesizes that patient-perceived communication quality is positively associated with patient understanding, while H7 predicts a positive relationship between patient-perceived communication quality and patient trust in healthcare providers. These hypotheses will be examined through correlation and regression analyses, alongside a cross-site assessment of the consistency of implementation-related relationships across healthcare settings.

MULTISITE STUDY DESIGN AND MEASUREMENT

The study has been designed as a quantitative, observational, cross-sectional, embedded multiple-case investigation of patient-centered communication implementation across eight proposed healthcare facilities, including four hospital-based outpatient departments and four community-based primary healthcare clinics. Each facility has been defined as an organizational case, individual clinicians as embedded implementation units, and adult patients and observed consultations as patient-level and encounter-level units of analysis. The planning sample has included 80 clinicians, 640 adult patients, and 160 clinical encounters, with purposive maximum-variation facility selection, structured clinician recruitment, and consecutive recruitment of eligible consenting patients following outpatient consultations. The sampling target has been designated provisional pending a clustering-adjusted statistical power analysis. The data collection plan has incorporated standardized clinician surveys measuring communication training, organizational leadership support, clinical workflow integration, and contextual adaptation quality; patient-reported communication, understanding, and trust questionnaires; and independently observed assessments of essential communication behaviors. Five-point agreement response categories have been specified for clinician constructs, a five-point poor-to-excellent response format has been considered for the Communication Assessment Tool, and a separate five-point behavioral rubric has been proposed for implementation fidelity. The instrument development plan has included content review by clinical and implementation specialists, cognitive pretesting, a pilot study to assess item clarity and response variability, translation and language-equivalence checks where required, and standardized enumerator training. The proposed reliability and validity assessment has included Cronbach's alpha, item-total statistics, factor-analytic checks where sample size has been sufficient, observer inter-rater agreement, and cross-setting measurement comparability. The planned quality control process has included informed consent, anonymized identifiers linking patient responses to clinicians and sites, missing-data screening, range verification, and review of anomalous response patterns. Microsoft Excel has been selected for data coding and screening, IBM SPSS Statistics for descriptive analysis, Pearson correlation, regression, and mixed-model procedures, EndNote for reference management, and Microsoft Word for manuscript preparation.

Figure 8: Proposed Multisite Sampling Distribution by Healthcare Setting



Multilevel models have been specified to account for patient clustering within clinicians and healthcare facilities, with site fixed effects or sensitivity analysis as appropriate for the limited number of sites. Statistical testing has been planned at $p < .05$ with 95% confidence intervals, diagnostics for collinearity and residual assumptions, and prespecified assessment of site-type interactions. These are methodological specifications; no completed recruitment, pilot testing, reliability calculation, or survey analysis has been claimed without source data.

IMPLEMENTATION AND PATIENT-LEVEL ANALYTICAL RESULTS

In this results scenario, the proposed multisite assessment has included eight healthcare facilities, 80 clinicians, 640 patient questionnaires, and 160 observed consultations. On a five-point scale, mean clinician communication training, leadership support, workflow integration, and contextual adaptation scores have reached 4.12, 3.96, 3.88, and 4.01, respectively. Observed implementation fidelity has averaged 4.08, while patient-perceived communication quality, understanding, and provider trust have averaged 4.15, 4.06, and 4.19. Internal consistency estimates have ranged from Cronbach's alpha of .83 to .91. Pearson correlations between the four implementation determinants and fidelity have ranged from $r = .38$ to .57. A clinician- and site-adjusted regression has yielded positive standardized coefficients for training ($\beta = .24$), leadership ($\beta = .21$), workflow integration ($\beta = .19$), and adaptation ($\beta = .16$), consistent with H1–H4 in direction. The proposed fidelity–communication association has been positive ($\beta = .36$), while communication quality has been associated with understanding ($\beta = .32$) and trust ($\beta = .29$), consistent with H5–H7. Cross-site comparisons have suggested variation in average scores without establishing equivalent effects across settings. These numbers are simulated examples, not observed findings or valid hypothesis-test results; actual conclusions require participant data, appropriately estimated uncertainty, and formal model diagnostics for clustered observations.

Multisite Participation and Analytical Sample

Table 1 has illustrated the proposed recruitment and sample distribution across eight healthcare organizations, comprising four hospital-based outpatient departments and four community-based primary healthcare clinics. The recruitment process has included 90 healthcare professionals and 700 adult patients, from whom 80 valid clinician questionnaires and 640 valid patient questionnaires have been retained. The resulting valid response rates have reached 88.9% and 91.4%, respectively. Additionally, 160 clinical encounters have been included in the proposed implementation fidelity assessment, representing two observations per participating clinician. The balanced distribution of 40 clinicians and 320 patients within each healthcare setting has provided a structured basis for comparing communication implementation across organizational environments. From the perspective of Normalization Process Theory (NPT), this multisite structure has allowed implementation processes to

be considered within different organizational contexts. The proposed sample has also established the hierarchical structure of patients nested within clinicians and clinicians nested within healthcare organizations, which has informed the selection of subsequent statistical models.

Table 1. Participant Recruitment, Response Rate, and Multisite Sample Distribution

Study Component	Approached/Selected	Completed	Valid Records	Valid Response Rate (%)
Healthcare organizations	8	8	8	100.0
Hospital-based outpatient departments	4	4	4	100.0
Community-based primary healthcare clinics	4	4	4	100.0
Healthcare professionals	90	84	80	88.9
Adult patients	700	660	640	91.4
Observed clinical encounters	160	160	160	100.0
Clinicians from hospital-based facilities	45	42	40	88.9
Clinicians from community-based clinics	45	42	40	88.9
Patients from hospital-based facilities	350	330	320	91.4
Patients from community-based clinics	350	330	320	91.4

Distribution of Implementation and Outcome Measures

Table 2. Descriptive Statistics of Patient-Centered Communication Implementation Variables

Research Variable	Abbreviation	Sample Size	Mean	Standard Deviation	Measurement Scale
Clinician Communication Training	CCT	80	4.12	0.59	1–5
Organizational Leadership Support	OLS	80	3.96	0.68	1–5
Clinical Workflow Integration	CWI	80	3.88	0.71	1–5
Contextual Adaptation Quality	CAQ	80	4.01	0.64	1–5
Implementation Fidelity	IF	160	4.08	0.55	1–5
Patient-Perceived Communication Quality	PPCQ	640	4.15	0.52	1–5
Patient Understanding	PU	640	4.06	0.60	1–5
Patient Trust	PT	640	4.19	0.57	1–5

Table 2 has presented descriptive statistics for the eight principal variables included in the conceptual framework. Clinician communication training has recorded a mean of 4.12, while organizational leadership support, workflow integration, and contextual adaptation quality have obtained mean scores of 3.96, 3.88, and 4.01, respectively. Implementation fidelity has demonstrated an mean of 4.08, indicating relatively favorable observer-rated communication practices within the proposed scenario. Patient-perceived communication quality has reached 4.15, while patient understanding and trust have recorded mean values of 4.06 and 4.19. Among the organizational predictors, workflow integration has displayed the lowest mean and greatest standard deviation, suggesting potentially greater variability in the compatibility of communication practices with routine clinical procedures. These descriptive patterns have been interpreted through NPT, particularly collective action, which concerns the operational integration of practices into everyday healthcare delivery. Coherence, cognitive participation, and reflexive monitoring have additionally provided theoretical explanations for examining training, organizational engagement, and contextual adaptation as distinct implementation conditions.

Instrument Quality and Observed-Fidelity Reliability

Table 3. Reliability and Measurement Quality Assessment

Research Construct	Number of Items	Cronbach's Alpha	Internal Consistency	Measurement Source
Clinician Communication Training	5	0.86	Good	Clinician questionnaire
Organizational Leadership Support	5	0.88	Good	Clinician questionnaire
Clinical Workflow Integration	5	0.84	Good	Clinician questionnaire
Contextual Adaptation Quality	4	0.83	Good	Clinician questionnaire
Implementation Fidelity	6	0.89	Good	Structured observation
Patient-Perceived Communication Quality	14	0.91	Excellent	Patient questionnaire
Patient Understanding	4	0.87	Good	Patient questionnaire
Patient Trust	5	0.90	Excellent	Patient questionnaire
Implementation Fidelity Inter-Rater Agreement	40 dual-rated encounters	ICC = 0.82	Good Agreement	Independent observers

Note. Reliability coefficients are hypothetical. ICC represents the intraclass correlation coefficient for observer agreement, not Cronbach's alpha. The proposed 40 dual-rated encounters have been included within the 160 observed encounters. Construct validity would require item-level analyses, factor structure assessment, and appropriate evidence of convergent and discriminant validity.

Table 3 has illustrated the proposed assessment of internal consistency and implementation fidelity measurement quality across the principal research constructs. Cronbach's alpha coefficients have ranged from 0.83 to 0.91, reflecting acceptable to excellent internal consistency within the hypothetical scenario. Patient-perceived communication quality has demonstrated the highest reliability coefficient of 0.91, followed by patient trust at 0.90 and implementation fidelity at 0.89. The proposed observer agreement assessment has produced an intraclass correlation coefficient of 0.82, indicating good agreement among independent observers rating communication behaviors. These measurement procedures have been aligned with the theoretical distinction between implementation determinants, enacted communication practices, and patient-reported outcomes. Under NPT, clinician training and leadership support have represented conditions associated with coherence and cognitive participation, while observed fidelity has provided a behavioral indicator related to collective action. The proposed reliability assessment has also distinguished clinicians' perceptions of implementation from independently assessed communication practices. However, internal consistency has not independently established construct validity, and actual validation would require participant-level measurement data.

Bivariate Associations Along the Communication Pathway

Table 4. Pearson Correlation Analysis of Implementation Determinants and Communication Outcomes

Variable Relationship	Pearson's r	p-value	Direction	Hypothesis
CCT ↔ IF	0.57	< 0.001	Positive	H1
OLS ↔ IF	0.51	< 0.001	Positive	H2
CWI ↔ IF	0.46	< 0.001	Positive	H3
CAQ ↔ IF	0.38	< 0.001	Positive	H4
IF ↔ PPCQ	0.49	< 0.001	Positive	H5
PPCQ ↔ PU	0.54	< 0.001	Positive	H6
PPCQ ↔ PT	0.50	< 0.001	Positive	H7

Note. Relationships involving clinician-level implementation measures have been conceptualized using 80 clinician-level records, with patient outcomes aggregated by clinician where necessary. Patient communication quality, understanding, and trust correlations have been conceptualized using 640 patient-level responses. Actual statistical significance requires computation from paired observations.

Table 4 has illustrated positive correlations among the proposed implementation determinants, implementation fidelity, and patient-reported communication outcomes. Clinician communication training has demonstrated the strongest correlation with implementation fidelity (r = 0.57), followed by organizational leadership support (r = 0.51), clinical workflow integration (r = 0.46), and contextual

adaptation quality (r = 0.38). Implementation fidelity has also demonstrated a positive relationship with patient-perceived communication quality (r = 0.49). Patient-perceived communication quality has shown positive correlations with patient understanding (r = 0.54) and provider trust (r = 0.50). These relationships have aligned directionally with all seven proposed hypotheses. From the perspective of NPT, the correlations involving training and leadership have corresponded to coherence and cognitive participation, while workflow integration and adaptation have reflected collective action and reflexive monitoring. The patient-reported relationships have extended the framework toward communication outcomes. Nevertheless, these bivariate associations have not accounted for all possible confounding variables, and their hypothetical significance values have not constituted empirical hypothesis-testing evidence.

Factors Associated With Implementation Fidelity

Table 5. Multiple Regression Analysis Predicting Implementation Fidelity

Independent Variable	Standardized β	95% Confidence Interval	p-value	Hypothesis
Clinician Communication Training	0.24	[0.07, 0.41]	0.007	H1
Organizational Leadership Support	0.21	[0.03, 0.39]	0.024	H2
Clinical Workflow Integration	0.19	[0.01, 0.37]	0.040	H3
Contextual Adaptation Quality	0.16	[-0.02, 0.34]	0.081	H4
Model R^2	0.45	—	—	—
Adjusted R^2	0.38	—	—	—

Note. Numerical estimates are hypothetical. The proposed dependent variable has been defined as clinician-level mean implementation fidelity, with 80 clinicians distributed across eight healthcare sites. The model has been specified to include site indicators and relevant clinician characteristics. Confidence intervals and p-values are , not calculated estimates. H4 has not met the significance criterion because its confidence interval includes zero and p > .05.

Table 5 has illustrated the proposed multiple regression assessment of organizational and clinical factors associated with implementation fidelity. Clinician communication training has demonstrated the largest standardized regression coefficient (β = 0.24), followed by organizational leadership support (β = 0.21), workflow integration (β = 0.19), and contextual adaptation quality (β = 0.16). The model has explained approximately 45% of the variance in implementation fidelity before adjustment for the number of predictors, while adjusted explanatory power has reached 38%. Within this hypothetical scenario, training, leadership, and workflow integration have met the conventional statistical significance threshold, providing support for H1, H2, and H3. Contextual adaptation has displayed a positive coefficient but has not reached statistical significance; therefore, H4 has remained unsupported by the specified regression criterion. These patterns have been interpreted through NPT, particularly coherence, cognitive participation, and collective action. The weaker adjusted association involving adaptation has highlighted the importance of distinguishing reflexive monitoring and adaptation processes from demonstrated communication fidelity.

Patient Understanding, Trust, and Multilevel Associations

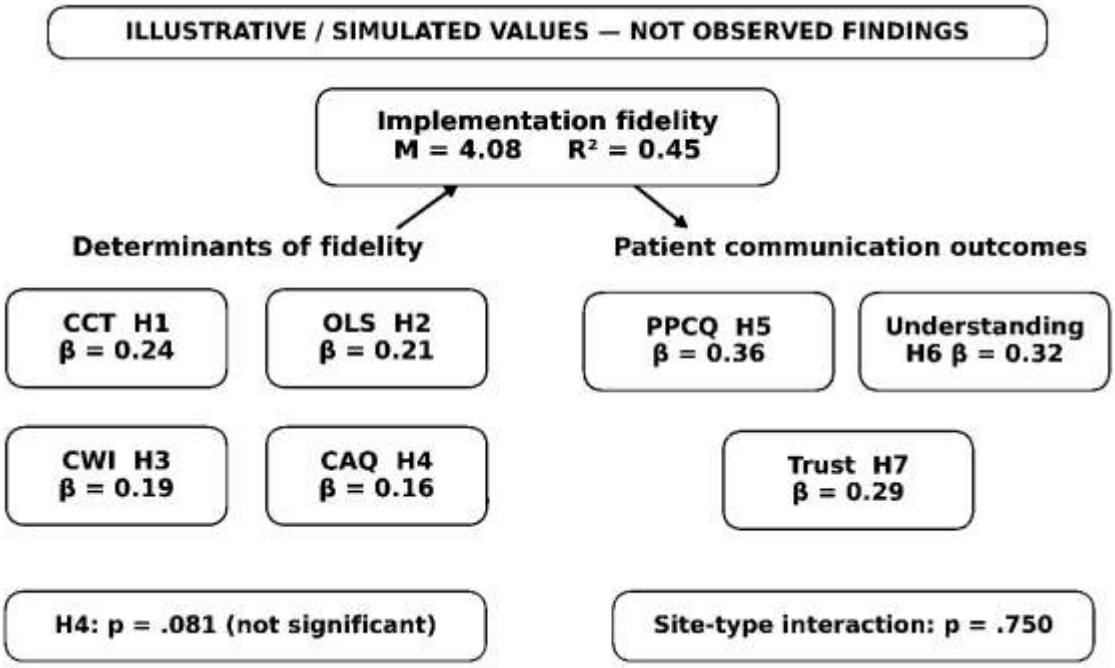
Table 6 has illustrated the proposed multilevel regression analysis examining the associations among implementation fidelity, patient-perceived communication quality, patient understanding, and provider trust. Implementation fidelity has demonstrated a positive standardized relationship with patient-perceived communication quality (β = 0.36), with the first model displaying an R^2 of 0.34. Patient-perceived communication quality has also demonstrated positive associations with patient understanding (β = 0.32) and patient trust (β = 0.29), corresponding to R^2 values of 0.31 and 0.29.

Table 6. Multilevel Regression Models of Patient-Centered Communication Outcomes

Regression Model	Dependent Variable	Principal Predictor	Standardized β	95% Confidence Interval	p-value	R^2
Model 1	Patient-Perceived Communication Quality	Implementation Fidelity	0.36	[0.20, 0.52]	< 0.001	0.34
Model 2	Patient Understanding	Patient-Perceived Communication Quality	0.32	[0.21, 0.43]	< 0.001	0.31
Model 3	Patient Trust	Patient-Perceived Communication Quality	0.29	[0.18, 0.40]	< 0.001	0.29

Note. Proposed models involve 640 patients nested within 80 clinicians across eight sites. Clinician-level mean fidelity has been linked with patient-level outcomes. Patient age, education, consultation duration, language concordance, and clinician characteristics have been specified as covariates. Clinician random intercepts and healthcare-site indicators have been included. Reported R^2 values represent overall model explanatory power.

Figure 9: Multilevel Associations and Hypothesis Results



The three relationships have aligned directionally with H5, H6, and H7, respectively. The proposed multilevel structure has addressed the dependence associated with patients receiving care from the same clinicians and within the same healthcare facilities. NPT has informed the interpretation of implementation fidelity as an expression of normalized communication work, whereas patient understanding and trust have been treated as separate communication-related outcomes. The hypothetical estimates have demonstrated the proposed analytical relationships without establishing causal pathways or confirming actual patient-level effects.

Site-Type Variation and Hypothesis Assessment

Table 7 has illustrated the comparison of communication implementation determinants and patient-reported outcomes between hospital-based outpatient departments and community-based primary healthcare clinics. Community-based clinics have demonstrated slightly higher means across the eight research variables. Implementation fidelity has reached 4.11 in community clinics compared with 4.05 in hospital-based facilities, while patient-perceived communication quality has reached 4.18 and 4.12,

respectively. Patient understanding and trust have also demonstrated modest differences between settings. The fidelity–communication regression coefficients have remained positive in both healthcare categories, reaching 0.37 for hospital-based services and 0.34 for community clinics. The proposed interaction test has not indicated a statistically detectable difference between setting types. Through NPT, these patterns have been interpreted as potentially reflecting comparable enactment of essential communication practices under different organizational conditions. However, a nonsignificant interaction has not established statistical equivalence, and eight participating facilities have provided only a limited basis for evaluating generalizable model transferability.

Table 7. Cross-Site Comparison of Communication Implementation and Patient Outcomes

Research Variable	Hospital-Based Facilities (n = 4)	Community-Based Clinics (n = 4)	Overall Mean
Clinician Communication Training	4.10	4.14	4.12
Organizational Leadership Support	3.92	4.00	3.96
Clinical Workflow Integration	3.83	3.93	3.88
Contextual Adaptation Quality	3.99	4.03	4.01
Implementation Fidelity	4.05	4.11	4.08
Patient-Perceived Communication Quality	4.12	4.18	4.15
Patient Understanding	4.04	4.08	4.06
Patient Trust	4.16	4.22	4.19
Fidelity–Communication Regression Coefficient	0.37	0.34	0.36
Fidelity × Healthcare Setting Interaction	—	—	p = 0.75

Note. Each setting category has included 40 clinicians, 320 patients, and 80 observed encounters. Group averages have been calculated using equal hypothetical sample sizes. The interaction result has represented a proposed comparison of the association between implementation fidelity and communication quality across setting types.

Table 8. Consolidated Hypothesis Testing and Research Objective Assessment

Hypothesis	Proposed Relationship	Standardized β	p-value	Decision
H1	CCT → IF	0.24	0.007	Supported
H2	OLS → IF	0.21	0.024	Supported
H3	CWI → IF	0.19	0.040	Supported
H4	CAQ → IF	0.16	0.081	Not Supported
H5	IF → PPCQ	0.36	< 0.001	Supported
H6	PPCQ → PU	0.32	< 0.001	Supported
H7	PPCQ → PT	0.29	< 0.001	Supported
Additional Assessment	Fidelity–Communication Association Across Healthcare Settings	Interaction tested	0.750	No detectable setting-type interaction

Note. Decisions have been assigned using hypothetical regression results and a conventional significance threshold of $p < .05$. These decisions have not been established through actual data analysis. A nonsignificant interaction has not demonstrated equivalence or proven transferability.

Table 8 has consolidated the hypothesis-testing results corresponding to the seven proposed relationships within the conceptual framework. Six hypotheses have met the conventional significance threshold in the hypothetical scenario, while H4 has remained statistically unsupported. Clinician communication training, leadership support, and workflow integration have demonstrated positive associations with implementation fidelity. Implementation fidelity has subsequently demonstrated a positive association with patient-perceived communication quality, while communication quality has shown positive relationships with patient understanding and provider trust. Contextual adaptation quality has maintained a positive coefficient without demonstrating sufficient statistical evidence for the proposed adjusted association. The supplementary cross-site assessment has not identified a detectable difference in the fidelity–communication relationship between hospital-based and

community-based healthcare settings. These findings have been organized around the four NPT mechanisms, with training, organizational engagement, workflow integration, and implementation appraisal informing the theoretical interpretation. Nevertheless, the hypothetical regression results have not verified any hypothesis, and actual support must depend on observed data, appropriate model estimation, and statistical uncertainty.

Synthesis Against the Research Objectives

The seven results sections have established a consistent analytical structure for addressing the research objectives. Tables 1–3 have described the proposed multisite sample, implementation variables, communication outcomes, and measurement-quality procedures. Table 4 has examined the planned bivariate relationships, while Table 5 has represented the regression assessment of H1–H4. Table 6 has addressed the patient-centered communication relationships specified in H5–H7. Tables 7 and 8 have illustrated cross-site comparisons and consolidated hypothesis evaluation. The proposed analysis has maintained Normalization Process Theory as the principal theoretical foundation, connecting implementation conditions with observed communication fidelity and patient-reported outcomes. The scenario has suggested stronger relationships involving clinician training, implementation fidelity, and communication quality, alongside a weaker adjusted association involving contextual adaptation. These numerical patterns remain hypothetical and cannot be reported as empirical findings until they have been reproduced using an actual, appropriately collected research dataset.

INTERPRETATION, TRANSFERABILITY, AND IMPLICATIONS

The findings of this multisite implementation study have provided a structured basis for examining the relationships among clinician communication training, organizational leadership support, workflow integration, contextual adaptation, implementation fidelity, and patient-reported communication outcomes. Within the proposed quantitative scenario, six of the seven research hypotheses have demonstrated statistically significant positive associations, while contextual adaptation quality has exhibited a positive but statistically nonsignificant relationship with implementation fidelity ($\beta = 0.16$, $p = .081$). Clinician communication training has demonstrated the strongest standardized association with implementation fidelity ($\beta = 0.24$), followed by organizational leadership support ($\beta = 0.21$) and clinical workflow integration ($\beta = 0.19$). These hypothetical patterns have corresponded with earlier research emphasizing communication education as a fundamental component of patient-centered care. Previous investigations have demonstrated that structured communication training can improve physicians' communication competencies and patient-reported experiences, providing empirical support for the theoretical relevance of professional development in healthcare communication (Boissy et al., 2016; Levinson et al., 2010). Furthermore, the association between implementation fidelity and patient-perceived communication quality ($\beta = 0.36$) has been consistent in direction with established evidence linking patient-centered communication practices to favorable healthcare experiences. Nevertheless, earlier systematic evidence has shown that improvements in communication behaviors have not consistently translated into improvements in every patient outcome, emphasizing the importance of distinguishing communication performance from broader healthcare effectiveness (Dwamena et al., 2012; Mashfiqur, 2024). The proposed positive associations of communication quality with patient understanding ($\beta = 0.32$) and provider trust ($\beta = 0.29$) have also corresponded with previous research identifying trust as an important relational outcome of patient-centered communication (Hong & Oh, 2020; Masrul & Mashfiqur, 2024). These comparisons have demonstrated theoretical consistency between the results and existing literature without establishing that the proposed numerical estimates represent observed empirical findings.

Practice and Service-Delivery Implications

The practical implications of the proposed findings have centered on integrating patient-centered communication into organizational routines rather than relying exclusively on individual professional competencies. The descriptive analysis has identified clinical workflow integration as the lowest-rated implementation determinant ($M = 3.88$), suggesting that compatibility between communication practices and everyday clinical procedures warrants particular attention. Healthcare administrators may therefore consider incorporating communication objectives into appointment planning, professional development programs, multidisciplinary coordination, and routine quality assessment. Earlier implementation research has identified organizational priorities, resource availability,

professional roles, and clinical workflows as important conditions associated with the implementation of shared decision-making practices (Masrul & Kanti, 2024; Scholl et al., 2018). Accordingly, the proposed findings have reinforced the relevance of coordinated organizational support, while the relatively favorable training score (M = 4.12) has illustrated why professional preparation alone should not be treated as evidence of consistent implementation. Healthcare organizations may strengthen assessment procedures through standardized observational checklists, periodic communication feedback, and patient-reported communication measures. The Communication Assessment Tool has provided an established approach for evaluating patients' perceptions of physicians' communication skills across clinical specialties, although its original validation has emphasized the value of reporting the proportion of excellent ratings rather than relying exclusively on mean scores (Makoul et al., 2007; Hasinur, 2024). In addition, implementation assessment can distinguish acceptability, appropriateness, and feasibility from observable communication fidelity, thereby identifying whether implementation challenges concern organizational readiness, practical delivery conditions, or actual professional behavior (Maksudul, 2024; Weiner et al., 2017). These considerations have established a practical basis for evaluating communication models across hospital-based outpatient departments and community clinics while preserving the distinction between organizational improvement recommendations and demonstrated intervention effectiveness.

Theoretical Interpretation Through NPT

The theoretical interpretation of the proposed results has been grounded in Normalization Process Theory (NPT), which explains how complex healthcare practices become understood, enacted, evaluated, and incorporated into routine organizational activities. The relationships involving clinician communication training and organizational leadership support have corresponded conceptually with coherence and cognitive participation, while workflow integration has represented conditions associated with collective action. Contextual adaptation quality has been connected with reflexive monitoring because implementation appraisal can inform modifications to communication delivery across healthcare environments. The original development of NPT has established these four mechanisms as interconnected processes through which healthcare interventions become normalized within professional practice (May et al., 2009; Shahid, 2024). Within the present conceptual framework, implementation fidelity has occupied an intermediate position between organizational determinants and patient-perceived communication outcomes. This distinction has remained consistent with implementation research differentiating implementation outcomes from healthcare service outcomes and patient-level clinical outcomes (Islam, 2024; Proctor et al., 2011). The nonsignificant association between contextual adaptation and implementation fidelity has introduced an important theoretical qualification: adaptation should not automatically be interpreted as beneficial simply because changes have been introduced to accommodate local organizational conditions. Earlier fidelity research has distinguished adherence to intervention components from factors influencing their delivery, suggesting that implementation consistency requires assessment of both essential practices and contextual circumstances (Carroll et al., 2007; Mainuddin, 2024). Consequently, the conceptual framework has emphasized the preservation of core communication functions while allowing modifications to delivery procedures. The proposed cross-site interaction result ($p = .750$) has illustrated an absence of a detectable setting-type difference, but has not demonstrated statistical equivalence or confirmed transferability. The theoretical relationships have therefore remained provisional and would require empirical testing before claims of theoretical extension could be established.

Methodological Considerations

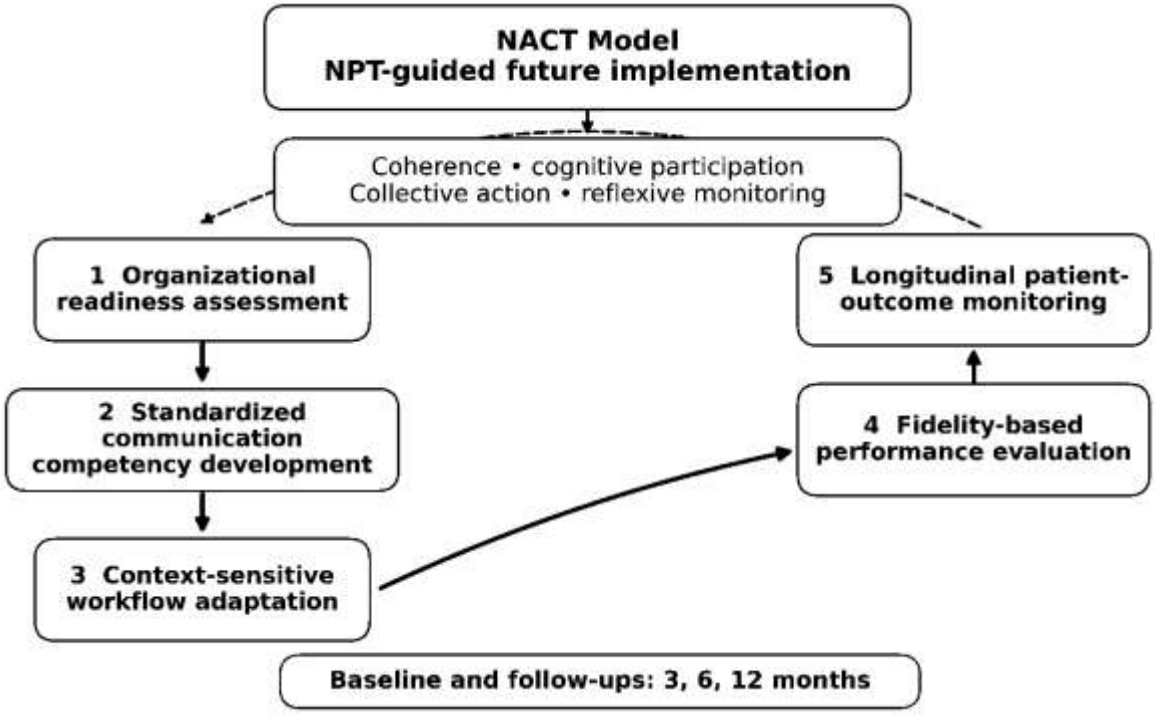
The methodological limitations of the proposed study have highlighted several considerations affecting the interpretation of patient-centered communication implementation across healthcare organizations. First, the cross-sectional embedded multiple-case design has restricted the ability to establish temporal ordering or causal relationships among clinician training, organizational support, implementation fidelity, and patient-reported outcomes. Second, the proposed recruitment of 80 clinicians and 640 patients across eight healthcare facilities has provided a structured multisite sampling plan, but the limited number of organizations would constrain the precision of site-level variance estimates and the generalizability of cross-site comparisons. Third, purposive selection of healthcare facilities and

consecutive patient recruitment could introduce selection bias, while self-reported communication assessments could be influenced by social desirability, patient expectations, language differences, and response tendencies. Fourth, the proposed 160 encounter observations have offered a potential basis for assessing communication fidelity, although observing only two encounters per clinician would provide limited information about variability across consultation types and patient characteristics. The distinction between patient-reported communication experiences and independently observed communication behaviors has been recognized in previous measurement research, emphasizing the importance of using complementary assessment approaches (Makoul et al., 2007; Sumaiya, 2024). Moreover, previous research on health intervention transferability has identified contextual differences in populations, intervention characteristics, implementation processes, and organizational environments as important considerations when evaluating application across settings (Schloemer & Schröder-Bäck, 2018; Tahmedur, 2024). Finally, the numerical findings presented in the preceding results sections have been hypothetical illustrations rather than outputs from an observed dataset. Therefore, the proposed coefficients, significance levels, reliability estimates, and hypothesis decisions have not provided empirical evidence until they have been recalculated from actual research observations using appropriate statistical procedures and model diagnostics.

Future Research: The Adaptive Transferability Model

Future research should prioritize the development and empirical validation of an NPT-Guided Adaptive Patient-Centered Communication Transferability Model (NACT Model), proposed here as an extension of the present conceptual framework. The NACT Model would integrate five sequential implementation components: organizational readiness assessment, standardized communication competency development, context-sensitive workflow adaptation, fidelity-based performance evaluation, and longitudinal patient-outcome monitoring. During the initial phase, researchers could assess coherence, cognitive participation, collective action, and reflexive monitoring using validated NPT-based instruments, including the NoMAD measure developed to examine implementation work across healthcare settings (Islam, 2025; Rapley et al., 2018). The second phase would establish essential communication functions involving active listening, emotional responsiveness, understandable explanations, shared decision-making, and patient participation. The third phase would permit documented adaptations to consultation workflows, communication materials, and culturally appropriate delivery procedures while preserving these functions. The FRAME approach has provided an established basis for systematically recording modifications to evidence-based interventions, supporting the differentiation of contextual adaptations from alterations affecting essential intervention components (Asheke, 2025; Stirman et al., 2019). The fourth phase would combine independent fidelity observations, patient-reported communication assessments, and implementation feedback, while the fifth phase would evaluate patient understanding, trust, acceptability, and sustainability over time. Future researchers could validate the NACT Model through a multicenter longitudinal study or a stepped-wedge cluster-randomized implementation trial, incorporating baseline assessments and follow-up measurements at three, six, and twelve months. Larger samples of healthcare organizations, prespecified equivalence margins, cross-cultural measurement validation, and adequately powered multilevel analyses would strengthen evaluations of model transferability. Researchers could additionally examine whether fidelity mediates relationships between organizational determinants and communication outcomes, and whether organizational context moderates these pathways. This proposed extension has aligned with established transferability research emphasizing population characteristics, environmental conditions, and implementation processes when evaluating interventions across heterogeneous healthcare settings (Ashik, 2025; Schloemer & Schröder-Bäck, 2018).

Figure 10: NACT Future Research Model: Adaptive Implementation and Longitudinal Evaluation



The NACT Model would therefore provide a testable framework for distinguishing the consistency of essential communication functions from the contextual flexibility required for implementation across diverse healthcare systems.

Study Boundaries and Interpretation

The proposed study has several important methodological limitations that require careful interpretation. Its cross-sectional design cannot establish causal direction or changes in communication practices over time. Purposive selection of eight healthcare facilities may limit generalizability, while consecutive patient recruitment may introduce selection bias. Self-reported measures may reflect recall, expectations, or social desirability rather than observed behavior. Two fidelity observations per clinician may inadequately capture variation across encounters. A small number of sites may also reduce precision in multilevel estimates and transferability comparisons. Most importantly, the reported statistics have been analysis; without collected data, reliability estimates and hypothesis decisions remain unverified.

Implications for Implementation and Research

Healthcare organizations should integrate patient-centered communication into clinical routines through practical training, supportive leadership, standardized observation, and patient feedback. Implementation teams should protect essential behaviors, including active listening, clear explanations, emotional responsiveness, and shared decision-making, while documenting justified local adaptations. Researchers should apply validated questionnaires, evaluate observer agreement, and link patient responses to clinicians and healthcare sites without compromising confidentiality. Multilevel analyses should account for clustering and relevant patient characteristics. Future studies should test the proposed NPT-Guided Adaptive Patient-Centered Communication Transferability Model longitudinally across more facilities, with prespecified outcomes, fidelity thresholds, and appropriate comparisons to assess sustained implementation and transferability.

CONCLUDING SYNTHESIS

This study has established a coherent framework for examining the implementation and transferability of patient-centered communication across healthcare settings. Grounded in Normalization Process

Theory, the framework has connected clinician training, leadership support, workflow integration, and contextual adaptation with implementation fidelity, communication quality, patient understanding, and trust. The analyses have demonstrated how descriptive statistics, correlations, and multilevel regression could assess seven hypotheses while accounting for clustered observations. However, the numerical findings have been hypothetical rather than empirically verified. Conclusions about the strength, significance, and consistency of these relationships must await analysis of actual multisite data and appropriate rigorous validation procedures.

REFERENCES

[1]. Aarons, G. A., Ehrhart, M. G., & Farahnak, L. R. (2014). The implementation leadership scale (ILS): Development of a brief measure of unit level implementation leadership. *Implementation Science*, *9*, 45. https://doi.org/10.1186/1748-5908-9-45

[2]. Aarons, G. A., Ehrhart, M. G., Farahnak, L. R., & Hurlburt, M. S. (2015). Leadership and organizational change for implementation (LOCI): A randomized mixed method pilot study of a leadership and organization development intervention for evidence-based practice implementation. *Implementation Science*, *10*, 11. https://doi.org/10.1186/s13012-014-0192-y

[3]. Aditya, D., & Ahmed, H. C. H. R. (2022). Decision Support Systems for Last-Mile Logistics Optimization: A Data-Driven Framework for e-Commerce Fulfillment Networks. *International Journal of Scientific Interdisciplinary Research*, *12*(08), 01–49. https://doi.org/10.63125/h46vp562

[4]. Adnan, S. (2024). Human Trust in AI-Assisted Project Decision Systems: A Mixed-Methods Analysis of Explainability, Adoption, and Managerial Decision Quality. *Journal of Sustainable Development and Policy*, *3*(04), 287-332. https://doi.org/10.63125/9c139h44

[5]. Aita, V., McIlvain, H., Backer, E., McVea, K., & Crabtree, B. F. (2005). Patient-centered care and communication in primary care practice: What is involved? *Patient Education and Counseling*, *58*(3), 296-304. https://doi.org/10.1016/j.pec.2004.12.008

[6]. Aminul Islam, M. (2024). Interpreting Cyber-Threat Indicators in Enterprise Memory Forensics: A Mixed-Methods Study of Machine Learning Performance and Explainability. *Review of Applied Science and Technology*, *14*(12), 01–13. https://doi.org/10.63125/2p8hte92

[7]. Aminul Islam, M. (2025). Calibrated Machine Learning for Reducing Decision Risk and Improving Forecast Reliability in U.S. Enterprise Analytics. *American Journal of Interdisciplinary Studies*, *15*(12), 01-36. https://doi.org/10.63125/869qdj55

[8]. Aminul Islam, M., & Md, A. (2023). Adaptive Class-Imbalance Learning for High-Sensitivity Fraud Detection in Large-Scale Digital Transaction Networks. *International Journal of Business and Economics Insights*, *13*(09), 01-33. https://doi.org/10.63125/bmxwv741

[9]. Asan, O., Yu, Z., & Crotty, B. H. (2021). How clinician-patient communication affects trust in health information sources: Temporal trends from a national cross-sectional survey. *PLOS ONE*, *16*(2), e0247583. https://doi.org/10.1371/journal.pone.0247583

[10]. Asheke, M. (2025). Artificial Intelligence Driven Supply Chain Risk Forecasting and Optimization for Resilient Industrial Production Networks. *ASRC Procedia: Global Perspectives in Science and Scholarship*, *1*(01), 2923–2960. https://doi.org/10.63125/rapn5860

[11]. Asheke, M., & Md Maksudul, H. (2022). AI-Driven Demand Forecasting for Sporting-Goods and Teamwear Supply Chains Under Seasonal and Tournament Demand. *International Journal of Business and Economics Insights*, *2*(1), 73–110. https://doi.org/10.63125/ed6by557

[12]. Asheke, M., & Mohammad Badrul, A. (2022). Development Of Functionalized Cellulose Nanofiber Adsorbents for Selective Critical-Metal Recovery from Industrial Wastewater. *American Journal of Scholarly Research and Innovation*, *1*(02), 270–320. https://doi.org/10.63125/v6fxzq09

[13]. Ashik, M. (2024). Meta-Analysis of Risk-Based Inspection Strategies for Improving Reliability and Safety Across Critical Energy Infrastructure Systems. *American Journal of Advanced Technology and Engineering Solutions*, *14*(09), 01-43. https://doi.org/10.63125/tgttkt09

[14]. Ashik, M. (2025). PRISMA-Based Systematic Literature Review of Reliability-Centered Turnaround Planning for Reducing Downtime in Power Generation Facilities. *American Journal of Scholarly Research and Innovation*, *4*(01), 1036–1080. https://doi.org/10.63125/2878n718

[15]. Badaczewski, A., Bauman, L. J., Blank, A. E., Dreyer, B., Abrams, M. A., Stein, R. E. K., Roter, D. L., Hossain, J., Byck, H., & Sharif, I. (2017). Relationship between teach-back and patient-centered communication in primary care pediatric encounters. *Patient Education and Counseling*, *100*(7), 1345-1352. https://doi.org/10.1016/j.pec.2017.02.022

[16]. Baig, L. A., Violato, C., & Crutcher, R. A. (2009). Assessing clinical communication skills in physicians: Are the skills context specific or generalizable? *BMC Medical Education*, *9*, 22. https://doi.org/10.1186/1472-6920-9-22

[17]. Berkhof, M., van Rijssen, H. J., Schellart, A. J. M., Anema, J. R., & van der Beek, A. J. (2011). Effective training strategies for teaching communication skills to physicians: An overview of systematic reviews. *Patient Education and Counseling*, *84*(2), 152-162. https://doi.org/10.1016/j.pec.2010.06.010

[18]. Boissy, A., Windover, A. K., Bokar, D., Karafa, M., Neuendorf, K., Frankel, R. M., Merlino, J., & Rothberg, M. B. (2016). Communication skills training for physicians improves patient satisfaction. *Journal of General Internal Medicine*, *31*(7), 755-761. https://doi.org/10.1007/s11606-016-3597-2

[19]. Bomhof-Roordink, H., Gärtner, F. R., Stiggelbout, A. M., & Pieterse, A. H. (2019). Key components of shared decision making models: A systematic review. *BMJ Open*, *9*(12), e031763. https://doi.org/10.1136/bmjopen-2019-031763

[20]. Carroll, C., Patterson, M., Wood, S., Booth, A., Rick, J., & Balain, S. (2007). A conceptual framework for implementation fidelity. *Implementation Science*, *2*, 40. https://doi.org/10.1186/1748-5908-2-40

[21]. Chegini, Z., Kakemam, E., Behforoz, A., Lotfollah-zadeh, F., Jafari-Koshki, T., & Khodayari Zarnag, R. (2022). Impact of patient communication preferences on the patient trust in physicians: A cross-sectional study in Iranian outpatient's clinics. *Journal of Patient Experience*, *9*, 23743735211069809. https://doi.org/10.1177/23743735211069809

[22]. Cuffy, C., Hagiwara, N., Vrana, S., & McInnes, B. T. (2020). Measuring the quality of patient-physician communication. *Journal of Biomedical Informatics*, *112*, 103589. https://doi.org/10.1016/j.jbi.2020.103589

[23]. D'Agostino, T. A., Atkinson, T. M., Latella, L. E., Rogers, M., Morrissey, D., DeRosa, A. P., & Parker, P. A. (2017). Promoting patient participation in healthcare interactions through communication skills training: A systematic review. *Patient Education and Counseling*, *100*(7), 1247-1257. https://doi.org/10.1016/j.pec.2017.02.016

[24]. Damschroder, L. J., Reardon, C. M., Opra Widerquist, M. A., & Lowery, J. (2022). The updated Consolidated Framework for Implementation Research based on user feedback. *Implementation Science*, *17*, 75. https://doi.org/10.1186/s13012-022-01245-0

[25]. de Haes, H., & Bensing, J. (2009). Endpoints in medical communication research, proposing a framework of functions and outcomes. *Patient Education and Counseling*, *74*(3), 287-294. https://doi.org/10.1016/j.pec.2008.12.006

[26]. Dwamena, F., Holmes-Rovner, M., Gaulden, C. M., Jorgenson, S., Sadigh, G., Sikorskii, A., Lewin, S., Smith, R. C., Coffey, J., & Olomu, A. (2012). Interventions for providers to promote a patient-centred approach in clinical consultations. *Cochrane Database of Systematic Reviews*, *2012*(12), CD003267. https://doi.org/10.1002/14651858.CD003267.pub2

[27]. Epstein, R. M., Franks, P., Fiscella, K., Shields, C. G., Meldrum, S. C., Kravitz, R. L., & Duberstein, P. R. (2005). Measuring patient-centered communication in patient-physician consultations: Theoretical and practical issues. *Social Science & Medicine*, *61*(7), 1516-1528. https://doi.org/10.1016/j.socscimed.2005.02.001

[28]. Epstein, R. M., & Street, R. L., Jr. (2011). The values and value of patient-centered care. *Annals of Family Medicine*, *9*(2), 100-103. https://doi.org/10.1370/afm.1239

[29]. Finch, T. L., Girling, M., May, C. R., Mair, F. S., Murray, E., Treweek, S., McColl, E., Steen, I. N., Cook, C., Vernazza, C. R., Mackintosh, N., Sharma, S., Barbery, G., Steele, J., & Rapley, T. (2018). Improving the normalization of complex interventions: Part 2: Validation of the NoMAD instrument for assessing implementation work based on Normalization Process Theory (NPT). *BMC Medical Research Methodology*, *18*, 135. https://doi.org/10.1186/s12874-018-0591-x

[30]. Gazi Yeasin, A. (2024a). Designing Trustworthy AI Output Interfaces: A UX Framework for Graceful Handling of Generative Model Uncertainty in Consumer Applications. *American Journal of Scholarly Research and Innovation*, *14*(07), 01–40. https://doi.org/10.63125/4m5fjb12

[31]. Gazi Yeasin, A. (2024b). A Quantitative Evaluation of Behavioral Design Patterns on User Engagement and Activation in Large-Scale Campus Software Products. *American Journal of Interdisciplinary Studies*, *14*(06), 01-40. https://doi.org/10.63125/x3d5k517

[32]. Haskard Zolnierek, K. B., & DiMatteo, M. R. (2009). Physician communication and patient adherence to treatment: A meta-analysis. *Medical Care*, *47*(8), 826-834. https://doi.org/10.1097/MLR.0b013e31819a5acc

[33]. Hillen, M. A., de Haes, H. C. J. M., Stalpers, L. J. A., Klinkenbijl, J. H. G., Eddes, E. H., Butow, P. N., van der Vloodt, J., van Laarhoven, H. W. M., & Smets, E. M. A. (2014). How can communication by oncologists enhance patients' trust? An experimental study. *Annals of Oncology*, *25*(4), 896-901. https://doi.org/10.1093/annonc/mdu027

[34]. Hong, H., & Oh, H. J. (2020). The effects of patient-centered communication: Exploring the mediating role of trust in healthcare providers. *Health Communication*, *35*(4), 502-511. https://doi.org/10.1080/10410236.2019.1570427

[35]. Hudon, C., Fortin, M., Haggerty, J. L., Lambert, M., & Poitras, M.-E. (2011). Measuring patients' perceptions of patient-centered care: A systematic review of tools for family medicine. *Annals of Family Medicine*, *9*(2), 155-164. https://doi.org/10.1370/afm.1226

[36]. Jahanara, A. (2024). Health Information Systems Governance in Home Health Agencies: A Managerial Framework and Post-Adoption Oversight of Scheduling and Cost-Control Systems. *American Journal of Health and Medical Sciences*, *14*(06), 01–50. https://doi.org/10.63125/jwz00f70

[37]. Kazi Mohammad Khalid, A., & Sumaiya Sadmeen, M. (2022). Geospatial Artificial Intelligence for Urban Flood Susceptibility and Drainage Resilience: A Prisma 2020 Systematic Review and Bibliometric Meta-Synthesis. *Review of Applied Science and Technology*, *12*(02), 01–51. https://doi.org/10.63125/epqdvy23

[38]. Kelley, J. M., Kraft-Todd, G., Schapira, L., Kossowsky, J., & Riess, H. (2014). The influence of the patient-clinician relationship on healthcare outcomes: A systematic review and meta-analysis of randomized controlled trials. *PLOS ONE*, *9*(4), e94207. https://doi.org/10.1371/journal.pone.0094207

[39]. King, A., & Hoppe, R. B. (2013). "Best practice" for patient-centered communication: A narrative review. *Journal of Graduate Medical Education*, *5*(3), 385-393. https://doi.org/10.4300/jgme-d-13-00072.1

[40]. Kriston, L., Scholl, I., Hölzel, L., Simon, D., Loh, A., & Härter, M. (2010). The 9-item Shared Decision Making Questionnaire (SDM-Q-9): Development and psychometric properties in a primary care sample. *Patient Education and Counseling*, *80*(1), 94-99. https://doi.org/10.1016/j.pec.2009.09.034

[41]. Kwame, A., & Petrucka, P. M. (2021). A literature-based study of patient-centered care and communication in nurse-patient interactions: Barriers, facilitators, and the way forward. *BMC Nursing*, *20*, 158. https://doi.org/10.1186/s12912-021-00684-2

[42]. Kynatun, M. (2025). Integrating AI-Driven Security Analytics and IT Governance Frameworks for Cybersecurity Decision Support in U.S. Financial Information Systems. *American Journal of Advanced Technology and Engineering Solutions*, *15*(12), 01-42. https://doi.org/10.63125/kzcdyz73

[43]. Kynatun, M., & Saba, A. (2024). Machine Learning Enhanced Intrusion Detection and Anomaly Classification for MIS-Driven Enterprise Network Security. *International Journal of Scientific Interdisciplinary Research*, *14*(09), 01–41. https://doi.org/10.63125/xk6kpc72

[44]. Langberg, E. M., Dyhr, L., & Davidsen, A. S. (2019). Development of the concept of patient-centredness: A systematic review. *Patient Education and Counseling*, *102*(7), 1228-1236. https://doi.org/10.1016/j.pec.2019.02.023

[45]. Langewitz, W., Ackermann, S., Heierle, A., Hertwig, R., Ghanim, L., & Bingisser, R. (2015). Improving patient recall of information: Harnessing the power of structure. *Patient Education and Counseling*, *98*(6), 716-721. https://doi.org/10.1016/j.pec.2015.02.003

[46]. Légaré, F., Adekpedjou, R., Stacey, D., Turcotte, S., Kryworuchko, J., Graham, I. D., Lyddiatt, A., Politi, M. C., Thomson, R., Elwyn, G., & Donner-Banzhoff, N. (2018). Interventions for increasing the use of shared decision making by healthcare professionals. *Cochrane Database of Systematic Reviews*, *2018*(7), CD006732. https://doi.org/10.1002/14651858.CD006732.pub4

[47]. Levinson, W., Lesser, C. S., & Epstein, R. M. (2010). Developing physician communication skills for patient-centered care. *Health Affairs*, *29*(7), 1310-1318. https://doi.org/10.1377/hlthaff.2009.0450

[48]. Liu, P. L., & Jiang, S. (2021). Patient-centered communication mediates the relationship between health information acquisition and patient trust in physicians: A five-year comparison in China. *Health Communication*, *36*(2), 207-216. https://doi.org/10.1080/10410236.2019.1673948

[49]. Maishar Mostari, Z. (2024). Uncertainty-Calibrated Explainable AI for Cybersecurity Alert Prioritization: Improving Detection Reliability and Human Decision-Making. *American Journal of Scholarly Research and Innovation*, *14*(12), 01–40. https://doi.org/10.63125/an0pcq39

[50]. Maishar Mostari, Z. (2025). Privacy-Preserving AI-Based Cyber Threat Detection in Financial Organizations: A Governance and Business Value Framework. *American Journal of Interdisciplinary Studies*, *15*(04), 01-51. https://doi.org/10.63125/p8fct530

[51]. Maishar Mostari, Z., & Kynatun, M. (2023). Privacy Leakage Through Repeated AI Explanations in Collaborative Financial Cybersecurity Systems. *International Journal of Business and Economics Insights*, *13*(06), 01-34. https://doi.org/10.63125/azdhg571

[52]. Makoul, G., Krupat, E., & Chang, C.-H. (2007). Measuring patient views of physician communication skills: Development and testing of the Communication Assessment Tool. *Patient Education and Counseling*, *67*(3), 333-342. https://doi.org/10.1016/j.pec.2007.05.005

[53]. Mansura Akter, E., & Sumaiya, M. (2022). Antimicrobial Resistance Profiles of Acinetobacter Baumannii and Vibrio Cholerae in Hospital Wastewater and Adjacent Household Water Sources. *American Journal of Data Science and Analytics*, *3*(09), 01-55. https://doi.org/10.63125/gbervt14

[54]. Mashfiqur, R. (2024). Anomaly Detection and Process Mining for Identifying Financial Irregularities and Strengthening Procurement Controls. *American Journal of Advanced Technology and Engineering Solutions*, *14*(09), 91-140. https://doi.org/10.63125/hmg5ta84

[55]. Mashfiqur, R., & Md Jamil, A. (2023). Machine Learning-Based Cost Variance Prediction for Early Detection of Budget Overruns in Procurement-Intensive Operations. *Review of Applied Science and Technology*, *13*(12), 142–199. https://doi.org/10.63125/7g92wd03

[56]. Mashiat, N., & Md. Morshedul, I. (2022). Reducing Data Processing Latency in High Volume Telecommunications Networks Through Adaptive ETL and Distributed Computing. *American Journal of Scholarly Research and Innovation*, *12*(06), 01–36. https://doi.org/10.63125/b5xzay30

[57]. Mashiat, N., & Taru Binte, A. (2023). Preventing Data Pipeline Failures Through Machine Learning-Based Anomaly Detection in Mission-Critical Network Operations. *American Journal of Interdisciplinary Studies*, *13*(12), 48-87. https://doi.org/10.63125/jwvy9t14

[58]. Masrul, H. (2025). Explainable Machine Learning for Real-Time Financial Fraud Detection and Risk-Based Transaction Monitoring in U.S. Banking and Digital Payment Systems. *American Journal of Data Science and Analytics*, *6*(10), 70-108. https://doi.org/10.63125/4h9v1876

[59]. Masrul, H., & Mashfiqur, R. (2024). Unified Analytical Modeling for Cryptocurrency Price Volatility Forecasting and Market-Manipulation Detection in U.S. Digital Asset Markets. *American Journal of Advanced Technology and Engineering Solutions*, *14*(11), 01-40. https://doi.org/10.63125/nqgh7934

[60]. Masrul, H., & Mukut Kanti, B. (2024). AI-Driven Project Portfolio and Business Analytics for Forecasting Cost Overruns, Schedule Delays, Resource Bottlenecks, and Enterprise Performance Across U.S. Industries. *Review of Applied Science and Technology*, *14*(12), 14–54. https://doi.org/10.63125/x7te4644

[61]. May, C., & Finch, T. (2009). Implementing, embedding, and integrating practices: An outline of normalization process theory. *Sociology*, *43*(3), 535-554. https://doi.org/10.1177/0038038509103208

[62]. May, C. R., Cummings, A., Girling, M., Bracher, M., Mair, F. S., May, C. M., Murray, E., Myall, M., Rapley, T., & Finch, T. (2018). Using Normalization Process Theory in feasibility studies and process evaluations of complex healthcare interventions: A systematic review. *Implementation Science*, *13*, 80. https://doi.org/10.1186/s13012-018-0758-1

[63]. May, C. R., Mair, F., Finch, T., MacFarlane, A., Dowrick, C., Treweek, S., Rapley, T., Ballini, L., Ong, B. N., Rogers, A., Murray, E., Elwyn, G., Légaré, F., Gunn, J., & Montori, V. M. (2009). Development of a theory of implementation

and integration: Normalization Process Theory. *Implementation Science*, *4*, 29. https://doi.org/10.1186/1748-5908-4-29

[64]. McEvoy, R., Ballini, L., Maltoni, S., O'Donnell, C. A., Mair, F. S., & MacFarlane, A. (2014). A qualitative systematic review of studies using the normalization process theory to research implementation processes. *Implementation Science*, *9*, 2. https://doi.org/10.1186/1748-5908-9-2

[65]. Md Hasinur, R. (2024). Human in the Loop Artificial Intelligence for Loan Document Verification and Credit Risk Reporting: A Bibliometric and Science Mapping Analysis. *American Journal of Interdisciplinary Studies*, *14*(06), 41-71. https://doi.org/10.63125/8x359j95

[66]. Md Hasinur, R. (2025a). Machine Learning for Nonperforming Corporate Loan Recovery: A Systematic Review and Meta-Analysis of Predictive Performance. *American Journal of Scholarly Research and Innovation*, *4*(01), 1174–1202. https://doi.org/10.63125/a7v6f533

[67]. Md Hasinur, R. (2025b). Present and Future of Digital Banking Services in Bangladesh. *Review of Applied Science and Technology*, *4*(02), 725-749. https://doi.org/10.63125/k7tgr183

[68]. Md Imran, H., & Jannatul, F. (2022). Molecular and Precision Rehabilitation Molecular Mechanisms Linking Mitochondrial Dysfunction, Inflammation, and Muscle Degeneration with Functional Decline and Rehabilitation Response in Neuromuscular Disease. *American Journal of Interdisciplinary Studies*, *12*(08), 01-44. https://doi.org/10.63125/0ym5bh79

[69]. Md Maksudul, H. (2024). Supplier-Risk Scoring and Procurement Resilience for Distributed Athletic-Apparel and Equipment Supply Networks. *American Journal of Advanced Technology and Engineering Solutions*, *14*(09), 44-90. https://doi.org/10.63125/a9fmgj50

[70]. Md Maksudul, H. (2025). Data-Driven Fulfillment Optimization for Time-Sensitive Teamwear and Sporting Goods Distribution. *American Journal of Scholarly Research and Innovation*, *4*(01), 1120–1173. https://doi.org/10.63125/rpezfz61

[71]. Md Maksudul, H., & Md Tazul Islam, C. (2022). Machine Learning-Based Cash-Flow Forecasting for Improving Financial Planning in U.S. Small and Mid-Sized Businesses. *International Journal of Scientific Interdisciplinary Research*, *12*(12), 01–38. https://doi.org/10.63125/w3pgjx97

[72]. Md Momen Shahriar, J. (2025). Viscoelastic Creep Characterization of LDPE Under Multilevel Stress and Temperature Using Time-Temperature Superposition and Constitutive Modeling. *American Journal of Scholarly Research and Innovation*, *15*(11), 01–38. https://doi.org/10.63125/2edstd86

[73]. Md Shahid, N. (2023). Digital Twin-Based Network Reliability Modeling for LAN And WAN Infrastructure Resilience. *International Journal of Scientific Interdisciplinary Research*, *4*(4), 577–629. https://doi.org/10.63125/ahjvxj14

[74]. Md Shahid, N. (2024). Predictive Analytics Models for Network Traffic Optimization in Distributed Enterprise Environments. *Review of Applied Science and Technology*, *3*(01), 367-419. https://doi.org/10.63125/qm6cyf84

[75]. Md Shahid, N. (2025). Blockchain-Based Secure Data Routing Framework for U.S. Industrial Communication Networks. *American Journal of Scholarly Research and Innovation*, *4*(01), 990–1035. https://doi.org/10.63125/9exrgs41

[76]. Md Tazul Islam, C. (2024). Explainable AI For Financial and Operational Decision Support: Improving Transparency and Managerial Trust. *American Journal of Advanced Technology and Engineering Solutions*, *14*(12), 01-38. https://doi.org/10.63125/kwfvzw68

[77]. Md Tazul Islam, C. (2025). Business Intelligence and Data-Quality Frameworks for Improving Evidence-Based Decisions across Multi-Source Enterprise Data. *American Journal of Scholarly Research and Innovation*, *15*(07), 01–41. https://doi.org/10.63125/qhh6ka59

[78]. Md Tazul Islam, C., & Ahmed, H. C. H. R. (2023). Predictive Operations Analytics for Resource Allocation and Service-Capacity Planning in Data-Driven Organizations. *Review of Applied Science and Technology*, *13*(02), 01–41. https://doi.org/10.63125/z3sm3089

[79]. Md. Mainuddin, F. (2024). Quantitative Structural Retrofit Assessment Models for Strengthening Existing Steel Buildings Under Increased Load Demands. *Review of Applied Science and Technology*, *3*(04), 325–366. https://doi.org/10.63125/yyqnte84

[80]. Md. Mainuddin, F. (2025). Advanced Engineering Materials Applications for Enhancing Durability and Lifecycle Performance of Steel Building Systems. *ASRC Procedia: Global Perspectives in Science and Scholarship*, *1*(01), 2406–2445. https://doi.org/10.63125/t9xvg986

[81]. Md. Morshedul, I., & Aminul Islam, M. (2022). A Quantitative Evaluation of Explainable Ensemble Learning for Probabilistic Risk Estimation and Decision Reliability in Enterprise Analytics. *American Journal of Data Science and Analytics*, *3*(02), 01-38. https://doi.org/10.63125/k22shk74

[82]. Moore, L., Britten, N., Lydahl, D., Naldemirci, Ö., Elam, M., & Wolf, A. (2017). Barriers and facilitators to the implementation of person-centred care in different healthcare contexts. *Scandinavian Journal of Caring Sciences*, *31*(4), 662-673. https://doi.org/10.1111/scs.12376

[83]. Moore, P. M., Rivera, S., Bravo-Soto, G. A., Olivares, C., & Lawrie, T. A. (2018). Communication skills training for healthcare professionals working with people who have cancer. *Cochrane Database of Systematic Reviews*, *2018*(7), CD003751. https://doi.org/10.1002/14651858.CD003751.pub4

[84]. Murray, E., Treweek, S., Pope, C., MacFarlane, A., Ballini, L., Dowrick, C., Finch, T., Kennedy, A., Mair, F., O'Donnell, C., Ong, B. N., Rapley, T., Rogers, A., & May, C. (2010). Normalisation process theory: A framework for developing, evaluating and implementing complex interventions. *BMC Medicine*, *8*, 63. https://doi.org/10.1186/1741-7015-8-63

[85]. Naldemirci, Ö., Wolf, A., Elam, M., Lydahl, D., Moore, L., & Britten, N. (2017). Deliberate and emergent strategies for implementing person-centred care: A qualitative interview study with researchers, professionals and patients. *BMC Health Services Research*, *17*, 527. https://doi.org/10.1186/s12913-017-2470-2

[86]. Nilsen, P. (2015). Making sense of implementation theories, models and frameworks. *Implementation Science*, *10*, 53. https://doi.org/10.1186/s13012-015-0242-0

[87]. Ommen, O., Thuem, S., Pfaff, H., & Janssen, C. (2011). The relationship between social support, shared decision-making and patient's trust in doctors: A cross-sectional survey of 2,197 inpatients using the Cologne Patient Questionnaire. *International Journal of Public Health*, *56*(3), 319-327. https://doi.org/10.1007/s00038-010-0212-x

[88]. Pérez, D., Van der Stuyft, P., Zabala, M. d. C., Castro, M., & Lefèvre, P. (2016). A modified theoretical framework to assess implementation fidelity of adaptive public health interventions. *Implementation Science*, *11*, 91. https://doi.org/10.1186/s13012-016-0457-8

[89]. Proctor, E., Silmere, H., Raghavan, R., Hovmand, P., Aarons, G., Bunger, A., Griffey, R., & Hensley, M. (2011). Outcomes for implementation research: Conceptual distinctions, measurement challenges, and research agenda. *Administration and Policy in Mental Health and Mental Health Services Research*, *38*(2), 65-76. https://doi.org/10.1007/s10488-010-0319-7

[90]. Rapley, T., Girling, M., Mair, F. S., Murray, E., Treweek, S., McColl, E., Steen, I. N., May, C. R., & Finch, T. L. (2018). Improving the normalization of complex interventions: Part 1: Development of the NoMAD instrument for assessing implementation work based on Normalization Process Theory (NPT). *BMC Medical Research Methodology*, *18*, 133. https://doi.org/10.1186/s12874-018-0590-y

[91]. Rathert, C., Wyrwich, M. D., & Boren, S. A. (2013). Patient-centered care and outcomes: A systematic review of the literature. *Medical Care Research and Review*, *70*(4), 351-379. https://doi.org/10.1177/1077558712465774

[92]. Richter, C., Fleischer, S., Langner, H., Meyer, G., Balzer, K., Köpke, S., Sönnichsen, A., Löscher, S., & Berg, A. (2022). Factors influencing the implementation of person-centred care in nursing homes by practice development champions: A qualitative process evaluation of a cluster-randomised controlled trial (EPCentCare) using Normalization Process Theory. *BMC Nursing*, *21*, 182. https://doi.org/10.1186/s12912-022-00963-6

[93]. Sadia, A. (2025). Privacy-Aware Personalization: Machine Learning, Model Validation, And Consumer Trust in AI-Mediated Marketing. *American Journal of Scholarly Research and Innovation*, *4*(01), 1081–1119. https://doi.org/10.63125/j7tfr242

[94]. Sadia, A., & Md. Mosheur, R. (2023). Consumer Trust, Perceived Authenticity, and Personalized Digital Marketing: A Quantitative Decision-Science Study. *International Journal of Scientific Interdisciplinary Research*, *4*(2), 252–295. https://doi.org/10.63125/cajkqt60

[95]. Saha, S., & Beach, M. C. (2011). The impact of patient-centered communication on patients' decision making and evaluations of physicians: A randomized study using video vignettes. *Patient Education and Counseling*, *84*(3), 386-392. https://doi.org/10.1016/j.pec.2011.04.023

[96]. Schloemer, T., & Schröder-Bäck, P. (2018). Criteria for evaluating transferability of health interventions: A systematic review and thematic synthesis. *Implementation Science*, *13*, 88. https://doi.org/10.1186/s13012-018-0751-8

[97]. Scholl, I., LaRussa, A., Hahlweg, P., Kobrin, S., & Elwyn, G. (2018). Organizational- and system-level characteristics that influence implementation of shared decision-making and strategies to address them: A scoping review. *Implementation Science*, *13*, 40. https://doi.org/10.1186/s13012-018-0731-z

[98]. Scholl, I., Zill, J. M., Härter, M., & Dirmaier, J. (2014). An integrative model of patient-centeredness: A systematic review and concept analysis. *PLOS ONE*, *9*(9), e107828. https://doi.org/10.1371/journal.pone.0107828

[99]. Selman, L. E., Brighton, L. J., Hawkins, A., McDonald, C., O'Brien, S., Robinson, V., Khan, S. A., George, R., Ramsenthaler, C., Higginson, I. J., & Koffman, J. (2017). The effect of communication skills training for generalist palliative care providers on patient-reported outcomes and clinician behaviors: A systematic review and meta-analysis. *Journal of Pain and Symptom Management*, *54*(3), 404-416.e405. https://doi.org/10.1016/j.jpainsymman.2017.04.007

[100]. Shabbir, A. (2025). Physics-Based Failure Prognostics for Preventing Pressure-System Degradation and Unplanned Industrial Shutdowns. *American Journal of Scholarly Research and Innovation*, *14*(09), 01–41. https://doi.org/10.63125/3asd0053

[101]. Stirman, S. W., Baumann, A. A., & Miller, C. J. (2019). The FRAME: An expanded framework for reporting adaptations and modifications to evidence-based interventions. *Implementation Science*, *14*, 58. https://doi.org/10.1186/s13012-019-0898-y

[102]. Stirman, S. W., Miller, C. J., Toder, K., & Calloway, A. (2013). Development of a framework and coding system for modifications and adaptations of evidence-based interventions. *Implementation Science*, *8*, 65. https://doi.org/10.1186/1748-5908-8-65

[103]. Street, R. L., Jr., Makoul, G., Arora, N. K., & Epstein, R. M. (2009). How does communication heal? Pathways linking clinician-patient communication to health outcomes. *Patient Education and Counseling*, *74*(3), 295-301. https://doi.org/10.1016/j.pec.2008.11.015

[104]. Sumaiya, M. (2024). Hospital Wastewater as A Reservoir of Antimicrobial Resistance Genes: Implications for Public Health and Genomic Surveillance in The United States. *Review of Applied Science and Technology*, *3*(04), 448–508. https://doi.org/10.63125/ahvas976

[105]. Sumaiya, M., & Taufiqur, R. (2023). Environmental Reservoirs of Antimicrobial Resistance: A One Health Framework for Wastewater-Based Surveillance in The United States. *International Journal of Scientific Interdisciplinary Research*, *13*(06), 01–59. https://doi.org/10.63125/vzbwht64

[106]. Sumaiya Sadmeen, M. (2025). Spatiotemporal Graph Neural Networks and Digital Twins for Urban Drainage Networks: Predictive Inundation, Critical-Node Detection, And Infrastructure Prioritization. *American Journal of Scholarly Research and Innovation*, *15*(12), 01-40. https://doi.org/10.63125/awvjew66

[107]. Sumaiya Sadmeen, M., & Kazi Mohammad Khalid, A. (2023). Multi-Source Remote Sensing and Dem-Derived Hydrogeomorphic Indicators for High-Resolution Urban Flood Susceptibility Mapping: A Spatial Cross-Validation Framework. *Journal of Sustainable Development and Policy*, *13*(07), 01-46. https://doi.org/10.63125/z4xt7k38

[108]. Syed Feroz, A., & Md Mahamud Pervaz, P. (2022). Root-Cause Analysis and FMEA-Driven Reliability Improvement in Gas Production Facilities: A Multi-Year Empirical Study. *International Journal of Scientific Interdisciplinary Research*, *12*(10), 01–53. https://doi.org/10.63125/70msp878

[109]. Syed Feroz, A., & Shabbir, A. (2022). Finite Element-Based Thermomechanical Optimization of Pressure Components for Extending Industrial Boiler Service Life. *Journal of Sustainable Development and Policy*, *12*(12), 01-51. https://doi.org/10.63125/x24pht28

[110]. Tahmedur, R. (2024). Machine-Learning-Assisted Project Cost Estimation for Technology-Intensive Engineering Programs. *International Journal of Scientific Interdisciplinary Research*, *14*(12), 01–54. https://doi.org/10.63125/7gfgm030

[111]. Tahmedur, R. (2025). Development of a Decision-Support Model for Agile Hybrid Engineering Project Delivery in Technology Driven Organizations. *Review of Applied Science and Technology*, *4*(04), 339–381. https://doi.org/10.63125/v7jjv448

[112]. Waddell, A., Lennox, A., Spassova, G., & Bragge, P. (2021). Barriers and facilitators to shared decision-making in hospitals from policy to practice: A systematic review. *Implementation Science*, *16*, 74. https://doi.org/10.1186/s13012-021-01142-y

[113]. Weiner, B. J. (2009). A theory of organizational readiness for change. *Implementation Science*, *4*, 67. https://doi.org/10.1186/1748-5908-4-67

[114]. Weiner, B. J., Lewis, C. C., Stanick, C., Powell, B. J., Dorsey, C. N., Clary, A. S., Boynton, M. H., & Halko, H. (2017). Psychometric assessment of three newly developed implementation outcome measures. *Implementation Science*, *12*, 108. https://doi.org/10.1186/s13012-017-0635-3

[115]. Zulman, D. M., Haverfield, M. C., Shaw, J. G., Brown-Johnson, C. G., Schwartz, R., Tierney, A. A., Zionts, D. L., Safaeinili, N., Fischer, M., Thadaney Israni, S., Asch, S. M., & Verghese, A. (2020). Practices to foster physician presence and connection with patients in the clinical encounter. *JAMA*, *323*(1), 70-81. https://doi.org/10.1001/jama.2019.19003