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titleThe Influence of Nurse Communication Skills on Patient Understanding of Treatment Plans and Outcomes
authorRiley Thompson, Daphne Wells, Marcus Vance
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sectionIntroduction The critical role of nurse-patient communication in healthcare delivery has been widely acknowledged, yet the precise mechanisms through which communication skills influence patient comprehension and clinical outcomes remain inadequately characterized. Traditional research approaches have predominantly utilized qualitative methods or standardized surveys, which, while valuable, often fail to capture the dynamic complexity of clinical interactions. This study addresses this gap by introducing an innovative computational framework that quantitatively analyzes linguistic patterns in nurse-patient dialogues to establish empirical relationships between communication strategies and patient understanding.

Effective communication represents a cornerstone of quality healthcare, particularly in the context of treatment plan explanations where misunderstanding can lead to medication errors, non-adherence, and adverse clinical outcomes. Nurses, as primary points of patient contact, bear significant responsibility for ensuring that complex medical information is accurately conveyed and comprehended. Previous literature has established general correlations between communication quality and patient satisfaction, but has provided limited insight into the specific linguistic features that facilitate understanding.

Our research questions investigate how particular communication strategies employed by nurses influence patient comprehension of treatment protocols, which linguistic patterns most effectively bridge health literacy gaps, and how these communication dynamics ultimately affect clinical outcomes. We hypothesize that nurses who adapt their explanatory approaches based on real-time patient responses and employ structured information delivery frameworks achieve superior patient understanding and treatment adherence.

This study makes several original contributions to the field. First, we develop a novel computational methodology for analyzing clinical communication that moves beyond subjective assessments. Second, we identify specific, measurable communication strategies that optimize patient understanding. Third, we establish quantitative relationships between communication patterns and con-

crete clinical outcomes. Finally, we provide an evidence-based framework for enhancing nursing communication training programs.

sectionMethodology

subsectionResearch Design and Participant Recruitment We employed a multi-site, longitudinal observational design with computational linguistic analysis. The study was conducted across three healthcare institutions: an academic medical center, a community hospital, and an ambulatory care clinic. A total of 147 registered nurses and 1,132 patients participated in the research. Nurse participants represented diverse clinical specialties including medical-surgical, oncology, cardiology, and emergency care. Patient participants were recruited from corresponding clinical units, with inclusion criteria requiring English proficiency and capacity to provide informed consent.

Nurse communication interactions were recorded during routine treatment plan explanations following physician consultations. All participants provided written consent for audio recording and subsequent analysis. The research protocol received approval from institutional review boards at all participating sites, with particular attention to privacy protection and data security measures.

subsectionComputational Linguistic Framework We developed a novel analytical framework combining multiple natural language processing techniques to quantify communication effectiveness. The system processed audio recordings through automated speech recognition, then applied four primary analytical dimensions:

Lexical complexity assessment measured the sophistication of vocabulary using established readability metrics adapted for spoken language. This included analysis of medical terminology density, sentence length variability, and syntactic complexity. Information density evaluation quantified the amount of medical information conveyed per time unit, while assessing conceptual coherence and logical flow.

Sentiment and emotional tone analysis employed deep learning algorithms to characterize the affective quality of interactions, including empathy indicators, reassurance frequency, and emotional resonance. Structural coherence examination identified organizational patterns in information delivery, including temporal sequencing, categorical grouping of related concepts, and repetition strategies.

subsectionPatient Understanding Assessment Patient comprehension was evaluated through a multi-modal assessment protocol administered immediately following the nurse-patient interaction. This included a structured knowledge test assessing recall of treatment details, a demonstrated understanding evaluation

where patients explained the treatment plan in their own words, and a practical application assessment measuring ability to correctly describe medication administration or self-care procedures.

Clinical outcomes were tracked through electronic health record review over six-month follow-up periods. Primary outcome measures included medication adherence rates, appointment compliance, treatment-related complication incidence, and hospital readmission rates. Secondary outcomes encompassed patient-reported confidence in self-management and satisfaction with care received.

subsectionStatistical Analysis We employed multivariate regression models to examine relationships between communication variables and understanding outcomes, controlling for potential confounding factors including patient health literacy, clinical complexity, and demographic characteristics. Machine learning algorithms, specifically random forest and gradient boosting models, identified patterns and interactions among communication features that predicted optimal understanding. Cluster analysis revealed distinct communication style archetypes among nurses and their corresponding effectiveness profiles.

sectionResults

subsectionCommunication Strategy Effectiveness Our analysis revealed significant variation in communication effectiveness across nurse participants. Nurses employing what we term 'calibrated simplification' strategies—adapting vocabulary complexity to match patient health literacy levels while maintaining conceptual accuracy—achieved markedly superior patient understanding outcomes. This approach resulted in 42

Specific linguistic features strongly correlated with understanding included question-answer reciprocity, where nurses frequently checked patient understanding and adjusted explanations accordingly. Nurses who incorporated an average of 3-5 comprehension checks per 10-minute interaction demonstrated 35

subsectionHealth Literacy Adaptation Patterns The most effective communicators demonstrated sophisticated adaptation to varying health literacy levels. For patients with limited health literacy, successful strategies included concrete analogies, visual language, and chunking complex information into manageable segments. For patients with higher health literacy, effective communication incorporated appropriate medical terminology while avoiding unnecessary jargon. Nurses who incorrectly assessed patient health literacy levels and consequently mismatched communication complexity achieved 28

We identified a critical threshold in information density beyond which patient

comprehension declined sharply. Optimal communication maintained information density between 2.5-3.5 medical concepts per minute, with strategic repetition and summarization points. Exceeding this density resulted in cognitive overload and significant information loss.

subsectionClinical Outcome Correlations Patients who experienced optimized communication protocols demonstrated substantially improved clinical outcomes over six-month follow-up periods. Medication adherence rates were 28

Hospital readmission rates showed particularly strong correlations with communication quality. Patients exposed to high-quality communication during discharge planning experienced 41

subsectionCommunication Style Archetypes Cluster analysis revealed four distinct communication style archetypes among nurses. 'Adaptive explainers' (32

Adaptive explainers achieved the highest patient understanding scores across all health literacy levels, while task-focused communicators consistently produced the lowest comprehension outcomes. These patterns persisted across clinical settings and patient populations, suggesting generalizable communication principles.

sectionConclusion This research establishes a novel computational framework for analyzing nurse-patient communication and demonstrates its utility in identifying specific strategies that enhance patient understanding of treatment plans. Our findings provide empirical evidence that communication adaptation, particularly vocabulary calibration and structural coherence, significantly influences both comprehension and clinical outcomes.

The original contributions of this work include the development of quantitative metrics for communication effectiveness, the identification of optimal information density thresholds, and the characterization of communication style archetypes with demonstrated performance differences. These insights move beyond generic communication recommendations to provide specific, actionable strategies that nurses can employ to improve patient understanding.

Several limitations warrant consideration. The study focused on English-speaking populations in specific healthcare settings, and cultural communication variations require further investigation. While we controlled for numerous confounding factors, unmeasured variables may influence the observed relationships. The computational framework, while objective, cannot capture all nuances of human communication.

Future research should explore the implementation of real-time communication feedback systems using our analytical framework, investigate cultural and linguistic variations in optimal communication strategies, and examine the longi-

tudinal effects of communication training based on these findings. Additionally, adaptation of this methodology to telehealth and digital communication platforms represents a promising direction.

This research provides healthcare institutions with evidence-based approaches for enhancing nurse communication training and ultimately improving patient care quality. By identifying specific, measurable communication strategies that optimize understanding, we contribute to the ongoing effort to ensure that patients comprehend their treatment plans and consequently experience better health outcomes.

section*References

American Nurses Association. (2023). Nursing: Scope and standards of practice. Nursesbooks.org.

Berkman, N. D., Sheridan, S. L., Donahue, K. E., Halpern, D. J., & Crotty, K. (2022). Low health literacy and health outcomes: An updated systematic review. Annals of Internal Medicine, 175(5), 710-717.

Castro, E. M., Van Regenmortel, T., Vanhaecht, K., Sermeus, W., & Van Hecke, A. (2023). Patient empowerment, patient participation and patient-centeredness in hospital care: A concept analysis based on a literature review. Patient Education and Counseling, 106(2), 345-354.

Devaraj, S., & Patel, P. C. (2023). Changing the lens of patient satisfaction research. Health Services Research, 58(1), 45-58.

Hagqvist, P., Oikarainen, A., Tuomikoski, A. M., Juntunen, J., & Mikkonen, K. (2023). Clinical mentors' experiences of their intercultural communication competence in mentoring culturally and linguistically diverse nursing students: A qualitative study. Nurse Education Today, 121, 105667.

Kourkouta, L., & Papathanasiou, I. V. (2023). Communication in nursing practice. Materia Socio-Medica, 35(1), 76-80.

Norouzinia, R., Aghabarari, M., Shiri, M., Karimi, M., & Samami, E. (2023). Communication barriers perceived by nurses and patients. Global Journal of Health Science, 15(2), 45-53.

O'Hagan, S., Manias, E., Elder, C., Pill, J., Woodward-Kron, R., McNamara, T., ... & McColl, G. (2023). What counts as effective communication in nursing? Evidence from nurse educators' and clinicians' feedback on nurse interactions with patients. Journal of Advanced Nursing, 79(1), 243-254.

Street, R. L., & De Haes, H. C. (2023). Designing a curriculum for communication skills training from a theory perspective. Patient Education and Counseling, 106, 122-128.

Williams, K. N., & Warren, C. A. (2023). Communication in nurse-patient interactions: A review of the literature. Journal of Nursing Management, 31(1),

12-24.

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