

## TRANSFORMING PATIENT CARE: THE IMPACT OF NURSE-PATIENT COMMUNICATION ON HEALTH OUTCOMES

**Author's Name**: Dr Kavita V Matere<sup>1</sup> Sanju Sharma<sup>2</sup> Om Prakash Shrimal<sup>3</sup> Anitha M<sup>4</sup> Jishnu Vasavan<sup>5</sup> Mr. Nagesh<sup>6</sup> Dr. Varsha Upadhyay<sup>7</sup>

## Affiliation:

- 1. Principal, SMBT Institute of Nursing, Nandi Hills, Dhamangoan, Nashik, Maharashtra, India.
- 2. Nursing Tutor, GMN College of Nursing, Ambala Cantt, Haryana, India.
- 3. Assistant Professor, S. N. Institute of Nursing Sciences, Nirwan University Jaipur, India.
- 4. Nursing administrator, Sre Vidya Hospital, Krishnagiri, Tamil Nadu, India.
- 5. Professor, Community Health Nursing, Jagadguru Shankaracharya College of Nursing Sejbahar, Raipur, Chhattisgarh, India.
- 6. Nursing officer, MPMMCC/HBCH, Varanasi, U.P, India.
- 7. Assistant Professor Mahatma Gandhi Nursing College Jaipur, Rajasthan, India.

Corresponding Author Name and Email ID: Dr Kavita V Matere, <u>kavita.matere@gmail.com</u>

## ABSTRACT

Effective nurse-patient communication is a cornerstone of quality healthcare, directly influencing patient outcomes and overall satisfaction. This review explores the profound impact that nurse-patient communication has on health outcomes, emphasizing how clear, empathetic, and culturally competent communication enhances the patient experience and promotes better recovery. Communication fosters trust and a strong nurse-patient relationship, which can lead to improved patient adherence to treatment plans, reduced anxiety, and better management of chronic conditions. Furthermore, communication plays a critical role in preventing medical errors, ensuring accurate patient information exchange, and facilitating interdisciplinary collaboration. Barriers such as time constraints, language differences, and emotional challenges can impede effective communication, but strategies like active listening, emotional intelligence, and patient-centered communication, offering both opportunities and challenges in maintaining patient engagement. Ultimately, this review underscores that investing in communication skills for nurses is essential for improving health outcomes, enhancing patient safety, and fostering a more compassionate, effective healthcare environment. By prioritizing effective communication, well-being.

Keywords: Nurse-Patient Communication, Patient-Centered Care, Health Outcomes, Effective Communication, Emotional Intelligence, Healthcare Communication



## INTRODUCTION

Nurse-patient communication is an essential component of high-quality healthcare that significantly influences patient outcomes. Effective communication builds a foundation of trust, understanding, and collaboration between nurses and patients, which is crucial for delivering patient-centered care. In an environment where healthcare professionals are tasked with managing complex medical conditions, clear and compassionate communication becomes a pivotal tool in ensuring patients' needs are met and their concerns are addressed. Poor communication, on the other hand, can lead to misunderstandings, non-adherence to treatment plans, increased anxiety, and even medical errors, all of which can adversely affect patient health outcomes. With the increasing complexity of modern healthcare systems, the role of nurses as communicators has expanded beyond simple information exchange to involve active listening, emotional support, and cultural sensitivity. As healthcare continues to evolve, particularly with the integration of technology, the landscape of nurse-patient communication is also transforming. Digital tools, telehealth, and electronic health records present both opportunities and challenges in how nurses interact with patients. This review aims to highlight the critical role that nurse-patient communication plays in shaping health outcomes, identify barriers to effective communication, and explore strategies that can be implemented to improve interactions and, ultimately, patient care. By understanding the profound impact of communication, healthcare systems can better support the development of nursing practices that lead to better health outcomes, patient safety, and overall healthcare satisfaction.

## EFFECTIVE COMMUNICATION STRATEGIES IN NURSING

Effective communication is an essential skill for nurses, directly influencing patient outcomes, satisfaction, and overall quality of care. A review of evidence-based communication techniques reveals several strategies that nurses can utilize to enhance their interactions with patients and improve health outcomes. One key technique is active listening, which involves fully concentrating on the patient's words, interpreting their emotions, and responding thoughtfully. This fosters trust and helps nurses gain a deeper understanding of the patient's needs, concerns, and preferences. Another critical strategy is patient-centered communication, which emphasizes engaging patients in their care process by respecting their autonomy, involving them in decision-making, and tailoring information to meet their individual needs. This approach has been shown to increase patient satisfaction and improve adherence to treatment plans.

Empathetic communication is crucial for establishing an emotional connection with patients. Nurses who express empathy by acknowledging patients' feelings and providing emotional support have been shown to reduce anxiety, enhance coping skills, and improve overall patient well-being. Non-verbal



communication, such as eye contact, facial expressions, and body language, is also a powerful tool in establishing rapport and conveying care. Nurses trained to use positive body language create an environment where patients feel valued and understood.

Cultural competence is becoming increasingly important in nursing communication, as it allows nurses to effectively interact with patients from diverse cultural backgrounds. Being aware of cultural differences in communication styles, health beliefs, and practices ensures that nurses can deliver care that is both respectful and effective. The use of teaching techniques, such as visual aids or plain language, can further enhance communication, especially when explaining medical procedures or complex treatment plans. Finally, with the rise of digital health technologies, telehealth communication has emerged as an important tool, where nurses engage with patients remotely. Successful telehealth communication relies on clear, concise, and empathetic exchanges to maintain the same quality of care as in-person visits.

Incorporating these evidence-based communication strategies into nursing practice not only strengthens the nurse-patient relationship but also plays a key role in improving patient outcomes. Research consistently shows that effective communication leads to better patient satisfaction, increased treatment adherence, reduced errors, and enhanced patient safety. Therefore, continuous education and training in communication techniques should be an integral part of nursing education and professional development, ensuring that nurses are equipped to meet the complex needs of their patients and deliver high-quality, compassionate care.

## THE ROLE OF EMOTIONAL INTELLIGENCE IN NURSE-PATIENT COMMUNICATION

Emotional intelligence (EI) plays a pivotal role in nurse-patient communication, influencing not only the quality of interactions but also patient satisfaction, adherence to treatment, and overall health outcomes. Emotional intelligence refers to the ability to recognize, understand, and manage one's own emotions, as well as the ability to recognize and influence the emotions of others. In nursing practice, high EI allows nurses to build strong, empathetic connections with patients, creating a therapeutic environment where patients feel valued, understood, and respected. This emotional connection is essential for promoting trust, which is the foundation of a positive nurse-patient relationship.

Studies consistently show that nurses with high emotional intelligence tend to exhibit better communication skills, which directly impact patient satisfaction. For example, emotionally intelligent nurses are more adept at picking up on subtle emotional cues from patients, allowing them to address concerns and anxieties more effectively. This ability to engage with patients on an emotional level leads to increased patient satisfaction, as patients feel more heard and supported. Furthermore, patients who have positive interactions with their nurses are more likely to feel comfortable discussing their



concerns and asking questions, which leads to improved communication and a greater sense of empowerment in managing their health.

The impact of emotional intelligence extends to health outcomes as well. Research has shown that nurses with high EI can effectively manage stress and remain calm in high-pressure situations, leading to better decision-making and more accurate patient assessments. This emotional regulation enables nurses to provide more consistent and high-quality care, which in turn positively impacts patient health outcomes. Furthermore, emotionally intelligent nurses are more likely to create a supportive care environment, which has been linked to better patient coping mechanisms, improved mental health, and faster recovery times.

## **BARRIERS TO EFFECTIVE NURSE-PATIENT COMMUNICATION**

Effective nurse-patient communication is essential for providing high-quality care, but several barriers can hinder the ability of nurses to communicate effectively with their patients. One of the most significant challenges is language barriers, particularly in multicultural societies where patients may speak different languages or dialects than their healthcare providers. When there is a lack of a common language, it becomes difficult for nurses to accurately assess patient needs, explain medical procedures, or convey important information about treatment plans, leading to misunderstandings, increased patient anxiety, and potential errors in care. The use of interpreters or translation services can help alleviate this challenge, but these services are not always available or may create delays in communication.

Another major barrier is cultural differences. Patients from diverse cultural backgrounds may have different health beliefs, practices, and expectations regarding healthcare, which can affect how they interpret medical advice or engage with nurses. For example, some cultures may emphasize the role of family in decision-making, while others may prioritize individual autonomy. Nurses who are not culturally competent may inadvertently make assumptions about patients' preferences or fail to provide care in a way that aligns with their values. To address these challenges, nurses must develop cultural awareness and competence, ensuring they can adapt their communication strategies to meet the unique needs of patients from different cultural backgrounds.

Technological limitations also pose significant barriers to effective nurse-patient communication, especially as healthcare increasingly relies on digital tools. For example, the rise of telehealth and electronic health records (EHRs) has improved access to care but also introduced challenges in maintaining clear and personal communication. Telehealth visits, while convenient, can feel impersonal and may limit the ability to pick up on non-verbal cues, such as body language and facial expressions, which are often critical for understanding patient emotions and concerns. Additionally,



some patients may have difficulty using digital platforms or lack access to the necessary technology, further hindering effective communication. Moreover, technical issues such as poor internet connectivity can disrupt virtual consultations, preventing effective communication from taking place. Time constraints are another common barrier in healthcare settings, particularly in busy hospitals or clinics. Nurses often work under pressure, managing multiple patients and tasks simultaneously. In such environments, effective communication may be compromised due to limited time for one-on-one interactions with patients. The urgency to complete tasks quickly can lead to rushed conversations, missed opportunities to address patient concerns, or inadequate explanation of complex medical information. In these situations, nurses may struggle to provide the level of care needed to foster understanding and trust, which can negatively affect patient outcomes.

## THE IMPACT OF NURSE-PATIENT COMMUNICATION ON PATIENT ENGAGEMENT AND EMPOWERMENT

Effective nurse-patient communication plays a pivotal role in enhancing patient engagement and empowerment, both of which are crucial for achieving positive health outcomes. Research consistently shows that when nurses engage in clear, compassionate, and open communication, patients are more likely to feel involved in their care and take an active role in decision-making. This sense of involvement fosters a greater understanding of their health conditions, treatment options, and potential outcomes, allowing them to make informed choices that align with their personal values and preferences. Nurses who listen actively to their patients' concerns, provide tailored information, and encourage open dialogue help patients feel respected and valued, which in turn enhances their sense of autonomy and control over their health.

Empowerment through effective communication can also encourage patients to engage in selfmanagement behaviors. When nurses communicate effectively, they not only explain medical instructions clearly but also provide the emotional and informational support patients need to manage their conditions independently. This includes teaching patients how to monitor their health, take medications as prescribed, and make lifestyle changes, such as improving diet or exercise habits. Empowered patients, who feel confident in their ability to manage their health, are more likely to adhere to treatment plans, attend follow-up appointments, and make choices that promote long-term well-being.

The role of shared decision-making in nurse-patient communication is integral to patient empowerment. Nurses who facilitate discussions about treatment options, risks, and benefits enable patients to weigh their choices in a supportive and informed manner. This process helps to align treatment plans with the patient's goals, values, and lifestyle, resulting in more personalized care.



Studies have shown that when patients actively participate in decisions about their treatment, they are more likely to feel a sense of ownership over their care, leading to increased adherence and improved health outcomes.

## NURSE-PATIENT COMMUNICATION IN DIVERSE PATIENT POPULATIONS

Nurse-patient communication in diverse patient populations presents unique challenges that require culturally sensitive, adaptable, and effective communication strategies. Patients from different cultural backgrounds may have distinct health beliefs, practices, and values that influence how they perceive and engage with healthcare. For example, some cultures may place a strong emphasis on family involvement in medical decisions, while others may prioritize individual autonomy. Nurses must be attuned to these cultural differences and avoid making assumptions about a patient's preferences. Culturally competent communication involves understanding and respecting these differences, using culturally relevant language, and being mindful of non-verbal cues that may carry different meanings across cultures. Nurses can overcome cultural barriers by engaging in cultural humility, continuously learning about the cultural backgrounds of their patients, and adapting their communication style to align with patients' values and expectations.

Patients from socioeconomic backgrounds that limit their access to education or healthcare resources may face challenges in understanding complex medical terminology or following detailed treatment plans. These patients may also experience higher levels of stress and distrust due to previous negative experiences with the healthcare system. Nurses must be sensitive to the social determinants of health that affect their patients and tailor their communication to ensure clarity and understanding. Using plain language, providing written instructions, and confirming that the patient comprehends the information are key strategies for addressing these barriers. Furthermore, showing empathy and providing additional support, such as helping patients access resources for financial assistance or transportation, can empower patients to engage more effectively in their care.

# THE RELATIONSHIP BETWEEN NURSE-PATIENT COMMUNICATION AND PATIENT SAFETY

Effective nurse-patient communication is a critical factor in ensuring patient safety and minimizing the risk of medical errors. Clear and open communication between nurses and patients is essential in preventing misunderstandings, improving medication adherence, and reducing adverse events in healthcare settings. One of the most direct ways in which communication impacts patient safety is through the accurate exchange of information. When nurses communicate effectively with patients, they can ensure that the patient understands their diagnosis, treatment plan, and any potential risks



involved in their care. This exchange of information not only helps patients feel informed but also ensures they can follow through on prescribed treatments or report any adverse effects they experience, thus preventing errors that may arise from miscommunication or lack of patient involvement.

Medication errors are a significant concern in healthcare, and nurse-patient communication plays an essential role in preventing them. Nurses are often responsible for administering medications and educating patients about their use. When nurses provide clear instructions on dosage, timing, and potential side effects, patients are more likely to adhere to their medication regimens. Miscommunication about the use of medications, such as unclear instructions or failing to ask patients about their current medications, can lead to serious errors, such as drug interactions or incorrect dosages. Research shows that when nurses engage in patient-centered communication, they are more likely to address concerns, clarify doubts, and ensure that patients fully understand their medication-related errors.

Effective communication also plays a vital role in enhancing overall patient safety by promoting collaboration among healthcare professionals. Nurses who communicate well with patients are better able to relay important information to the rest of the care team, ensuring continuity of care and preventing misunderstandings that could compromise patient safety. For instance, if a nurse communicates a patient's change in condition clearly to the attending physician, it can lead to timely interventions that prevent complications. Similarly, involving patients in discussions about their care, such as asking them to confirm their identity or understanding of procedures, helps reduce the risk of wrong-site surgeries, incorrect patient identification, or other preventable mistakes.

## MEASURING THE EFFECTIVENESS OF NURSE-PATIENT COMMUNICATION

Measuring the effectiveness of nurse-patient communication is essential for evaluating the quality of care provided and identifying areas for improvement. Several tools and methods have been developed to assess how well communication occurs between nurses and patients, with the goal of enhancing patient outcomes and ensuring that care is delivered in a compassionate, clear, and effective manner. One common approach is the use of patient satisfaction surveys, which capture patients' perceptions of their communication with nurses. These surveys typically include questions about the clarity of explanations, the nurse's ability to listen, and whether patients felt respected and involved in decision-making. While these surveys provide valuable insights into the patient's experience, they can be subjective and may not always reflect the nuances of communication in different care settings.

Communication assessment tools have also been developed to evaluate the quality of nurse-patient



interactions in more structured ways. Instruments such as the Communication Assessment Tool (CAT) and the Patient-Reported Communication Scale (PRCS) focus on specific aspects of communication, including empathy, active listening, and the effectiveness of information delivery. These tools often involve direct observation or video recordings of nurse-patient interactions, allowing evaluators to assess non-verbal communication, such as body language and facial expressions, which are crucial for understanding the full scope of communication. Such assessments can identify whether nurses use clear, non-technical language, provide information in a way that patients can easily understand, and respond appropriately to emotional cues.

Another useful method for measuring communication effectiveness is the use of patient outcomes as a proxy. Studies have shown that effective communication can improve patient adherence to treatment plans, reduce misunderstandings, and lower the incidence of medical errors. By tracking outcomes such as medication adherence, patient satisfaction scores, and the rate of complications or readmissions, healthcare organizations can indirectly assess the impact of communication on patient care. For example, patients who receive clear communication about medication instructions and potential side effects are more likely to adhere to their prescribed regimens, leading to better clinical outcomes.

Focus groups and interviews with patients and nurses are also valuable tools for gaining deeper insights into the effectiveness of communication. These qualitative methods allow researchers to explore the nuances of communication that may not be captured through structured surveys or assessments. Through open-ended questions, patients and nurses can share their experiences and perceptions about how well communication is occurring, what barriers exist, and what improvements are needed. This approach provides a more holistic view of nurse-patient communication, considering factors like cultural competence, emotional support, and the use of technology in communication.

## CONCLUSION

In conclusion, nurse-patient communication is a cornerstone of effective healthcare, significantly impacting patient outcomes across various dimensions of care. The quality of communication between nurses and patients directly influences patient satisfaction, adherence to treatment plans, and overall health outcomes. When nurses communicate clearly, empathetically, and effectively, they foster a therapeutic relationship that empowers patients, enhances their engagement in care, and promotes their active participation in health management. This collaborative partnership is crucial in reducing medical errors, improving medication adherence, and ensuring the safe delivery of care. Furthermore, effective communication is essential in addressing the unique needs of diverse patient populations, overcoming barriers such as language differences, cultural variations, and socioeconomic factors. As



the healthcare landscape continues to evolve with the integration of technology, the role of communication remains central in maintaining patient-centered care, particularly in virtual and telehealth settings. To ensure optimal outcomes, ongoing efforts to enhance nurses' communication skills, through training and the use of evidence-based practices, are essential. Ultimately, strengthening nurse-patient communication contributes to a holistic approach to healthcare that improves not only clinical results but also the overall patient experience, underscoring the importance of communication as an integral component of high-quality care.

## REFERANCE

- Croke L. Mobile health apps are transforming patient care. AORN J. 2020 Jun;111(6):P5. doi: 10.1002/aorn.13080. PMID: 32463497.
- St Mart JP, Goh EL, Liew I, Shah Z, Sinha J. Artificial intelligence in orthopaedics surgery: transforming technological innovation in patient care and surgical training. Postgrad Med J. 2023 Jun 30;99(1173):687-694. doi: 10.1136/postgradmedj-2022-141596. PMID: 37389584.
- Ray PP, Majumder P. ChatGPT in Radiology: Transforming Patient Care With Artificial Intelligence Chatbots. J Am Coll Radiol. 2023 Oct;20(10):943-944. doi: 10.1016/j.jacr.2023.06.029. Epub 2023 Jul 28. PMID: 37517769.
- 4. Sands DZ, Wald JS. Transforming health care delivery through consumer engagement, health data transparency, and patient-generated health information. Yearb Med Inform. 2014 Aug 15;9(1):170-6. doi: 10.15265/IY-2014-0017. PMID: 25123739; PMCID: PMC4287058.
- de Lourdes Arrieta-Canales M, Mukherjee J, Gilbert H, Flores H, Muñoz M, Aranda Z, DiChiara S, Noya C. Transforming care for patients living with diabetes in rural Mexico: a qualitative study of patient and provider experiences and perceptions of shared medical appointments. Glob Health Action. 2023 Dec 31;16(1):2215004. doi: 10.1080/16549716.2023.2215004. PMID: 37254880; PMCID: PMC10234136.
- Stout NL, Santa Mina D, Lyons KD, Robb K, Silver JK. A systematic review of rehabilitation and exercise recommendations in oncology guidelines. CA Cancer J Clin. 2021 Mar;71(2):149-175. doi: 10.3322/caac.21639. Epub 2020 Oct 27. PMID: 33107982; PMCID: PMC7988887.
- Elliott PM, Camici P. Transforming care for rare and inherited cardiovascular diseases through education and training. Int J Cardiol. 2018 Apr 15;257:342-343. doi: 10.1016/j.ijcard.2018.01.035. PMID: 29506728.
- Rocque GB, Partridge EE, Pisu M, Martin MY, Demark-Wahnefried W, Acemgil A, Kenzik K, Kvale EA, Meneses K, Li X, Li Y, Halilova KI, Jackson BE, Chambless C, Lisovicz N, Fouad M, Taylor RA. The Patient Care Connect Program: Transforming Health Care Through Lay Navigation. J Oncol



Pract. 2016 Jun;12(6):e633-42. doi: 10.1200/JOP.2015.008896. Epub 2016 May 10. PMID: 27165489; PMCID: PMC5702802.

- Dobrina R, Tenze M, Palese A. Transforming End-of-Life Care by Implementing a Patient-Centered Care Model: Findings From an Action Research Project. J Hosp Palliat Nurs. 2018 Dec;20(6):531-541. doi: 10.1097/NJH.00000000000468. PMID: 30260814.
- Schulte MF. The electronic health record imperative: transforming patient care. Front Health Serv Manage. 2011 Fall;28(1):1-2. PMID: 21961379.
- 11. Rock LK, Morse KJ, Eppich W, Rudolph JW. Transforming Team Culture: A Case Study From Critical Care. Chest. 2023 Jun;163(6):1448-1457. doi: 10.1016/j.chest.2022.12.046. Epub 2023 Jan 12. PMID: 36642367.
- French KS. Transforming nursing care through health literacy ACTS. Nurs Clin North Am. 2015 Mar;50(1):87-98. doi: 10.1016/j.cnur.2014.10.007. Epub 2014 Dec 23. PMID: 25680489.
- López López MV. How COVID-19 has Been Transforming the Notion of Care. Invest Educ Enferm.
  2020 Jul;38(2):e1. doi: 10.17533/udea.iee.v38n2e01. PMID: 33047544; PMCID: PMC7883915.
- 14. Hendrich A, Chow MP, Goshert WS. A proclamation for change: transforming the hospital patient care environment. J Nurs Adm. 2009 Jun;39(6):266-75. doi: 10.1097/NNA.0b013e3181a72927. Erratum in: J Nurs Adm. 2009 Nov;39(11):458. PMID: 19509601.
- 15. Burston S, Chaboyer W, Gillespie B, Carroll R. The effect of a transforming care initiative on patient outcomes in acute surgical units: a time series study. J Adv Nurs. 2015 Feb;71(2):417-29. doi: 10.1111/jan.12508. Epub 2014 Aug 27. PMID: 25159223.
- 16. Yedidia MJ. Transforming doctor-patient relationships to promote patient-centered care: lessons from palliative care. J Pain Symptom Manage. 2007 Jan;33(1):40-57. doi: 10.1016/j.jpainsymman.2006.06.007. PMID: 17196906.
- **17.** McRae SL. Transforming leadership for patient satisfaction. Nurs Manage. 2017 Feb;48(2):51-54. doi: 10.1097/01.NUMA.0000511923.13387.69. PMID: 28129229.
- 18. Scales K. Transforming Direct Care Jobs, Reimagining Long-Term Services and Supports. J Am Med Dir Assoc. 2022 Feb;23(2):207-213. doi: 10.1016/j.jamda.2021.12.005. Epub 2021 Dec 29. PMID: 34973168.
- Nurok M, Lee TH. Transforming Culture in Health Care. N Engl J Med. 2019 Nov 28;381(22):2173-2175. doi: 10.1056/NEJMms1906654. PMID: 31774966.
- 20. Burston S, Chaboyer W, Wallis M, Stanfield J. A discussion of approaches to transforming care: contemporary strategies to improve patient safety. J Adv Nurs. 2011 Nov;67(11):2488-95. doi: 10.1111/j.1365-2648.2011.05706.x. Epub 2011 Jun 1. PMID: 21627678.
- 21. Dearmon V, Roussel L, Buckner EB, Mulekar M, Pomrenke B, Salas S, Mosley A, Brown S, Brown



A. Transforming Care at the Bedside (TCAB): enhancing direct care and value-added care. J Nurs Manag. 2013 May;21(4):668-78. doi: 10.1111/j.1365-2834.2012.01412.x. Epub 2012 Aug 9. PMID: 23409738.

- 22. Page S, Khan T, Kühl P, Schwach G, Storch K, Chokshi H. Patient Centricity Driving Formulation Innovation: Improvements in Patient Care Facilitated by Novel Therapeutics and Drug Delivery Technologies. Annu Rev Pharmacol Toxicol. 2022 Jan 6;62:341-363. doi: 10.1146/annurev-pharmtox-052120-093517. PMID: 34990203.
- 23. Klein S, Eaton KP, Bodnar BE, Keller SC, Helgerson P, Parsons AS. Transforming Health Care from Volume to Value: Leveraging Care Coordination Across the Continuum. Am J Med. 2023 Oct;136(10):985-990. doi: 10.1016/j.amjmed.2023.06.023. Epub 2023 Jul 20. PMID: 37481020.
- 24. Hefflefinger L. Transforming psychiatric care delivery in the emergency department: one hospital's journey. J Emerg Nurs. 2014 Jul;40(4):365-70. doi: 10.1016/j.jen.2013.08.001. Epub 2013 Oct 24. PMID: 24209766.
- 25. Cashaback JGA, Allen JL, Chou AH, Lin DJ, Price MA, Secerovic NK, Song S, Zhang H, Miller HL. NSF DARE-transforming modeling in neurorehabilitation: a patient-in-the-loop framework. J Neuroeng Rehabil. 2024 Feb 13;21(1):23. doi: 10.1186/s12984-024-01318-9. PMID: 38347597; PMCID: PMC10863253.
- 26. Rao S, Brammer C, McKethan A, Buntin MB. Health information technology: transforming chronic disease management and care transitions. Prim Care. 2012 Jun;39(2):327-44. doi: 10.1016/j.pop.2012.03.006. Epub 2012 Apr 24. PMID: 22608869.
- 27. Sim XL, Kwa CX, He Y, Ng KL, Sim EY, Abdullah HR. Transforming the perioperative medicine care model: The Singapore experience. Anaesth Intensive Care. 2023 Mar;51(2):96-106. doi: 10.1177/0310057X221114900. Epub 2023 Jan 23. PMID: 36688348.
- 28. Douglas C, Alexeev S, Middleton S, Gardner G, Kelly P, McInnes E, Rihari-Thomas J, Windsor C, Morton RL. Transforming nursing assessment in acute hospitals: A cluster randomised controlled trial of an evidence-based nursing core assessment (the ENCORE trial). Int J Nurs Stud. 2024 Mar;151:104690. doi: 10.1016/j.ijnurstu.2024.104690. Epub 2024 Jan 6. PMID: 38237324.
- 29. Davis A, Repar P, Wilson M, De Luca E, Doutrich D, Thanasilp S. Transforming Nurse Self-Care Through Integration of Spirituality: Lessons From an International Collaboration in Palliative Care. J Transcult Nurs. 2023 Jan;34(1):91-99. doi: 10.1177/10436596221134814. Epub 2022 Nov 19. PMID: 36408564.
- 30. Lieneck C, Pacheco G, Cole M, Hipp L, Leal G, Matamoros K, Rojas-Trejo B, Stepp N, Torres C. Patient Co-Creation Initiatives in the Ambulatory Care Setting during COVID-19: A Systematic Review. Medicina (Kaunas). 2024 Jan 7;60(1):111. doi: 10.3390/medicina60010111. PMID:



38256372; PMCID: PMC10818531.

- 31. Xue B, Li D, Lu C, King CR, Wildes T, Avidan MS, Kannampallil T, Abraham J. Use of Machine Learning to Develop and Evaluate Models Using Preoperative and Intraoperative Data to Identify Risks of Postoperative Complications. JAMA Netw Open. 2021 Mar 1;4(3):e212240. doi: 10.1001/jamanetworkopen.2021.2240. PMID: 33783520; PMCID: PMC8010590.
- 32. Lorenz HL, Greenhouse PK, Miller R, Wisniewski MK, Frank SL. Transforming care at the bedside: an ambulatory model for improving the patient experience. J Nurs Adm. 2008 Apr;38(4):194-9. doi: 10.1097/01.NNA.0000312757.06913.2d. PMID: 18403993.
- **33.** Singh D; Surrey and Sussex Primary Care Trust Alliance. Transforming chronic care: a systematic review of the evidence. Evid Based Cardiovasc Med. 2005 Jun;9(2):91-4. doi: 10.1016/j.ebcm.2005.03.011. PMID: 16379998.