



Nursing Interventions for the Prevention and Management of Peripherally Inserted Central Catheter Complications: An Integrative Review

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Abstract

Peripherally inserted central catheters (PICCs) are essential vascular access devices used for long-term intravenous therapy, chemotherapy, parenteral nutrition, and administration of blood products. Despite their clinical benefits, PICCs are associated with complications including catheter-related bloodstream infections, thrombosis, occlusion, migration, dislodgement, and skin injury. Nurses play a central role in preventing and managing these complications through evidence-based assessment, maintenance, surveillance, patient education, and clinical decision-making. This integrative review synthesizes current evidence regarding nursing interventions that improve PICC outcomes. The review highlights the effectiveness of infection prevention bundles, standardized flushing protocols, catheter securement strategies, patient education programs, and competency-based nursing training. Findings indicate that adherence to evidence-based nursing practices significantly reduces complication rates, improves catheter longevity, and enhances patient safety. Investments in vascular access education, quality improvement initiatives, and standardized care protocols are recommended.

Keywords: Peripherally Inserted Central Catheter, PICC, Nursing Interventions, Catheter Complications, Infection Prevention, Vascular Access, Integrative Review.

Introduction

Peripherally inserted central catheters have become increasingly common in acute care, oncology, critical care, and home healthcare settings. Their ability to provide reliable long-term vascular access makes them invaluable in modern healthcare. However, PICC complications remain a significant source of morbidity and healthcare expenditure. Nurses are involved in every stage of PICC management including insertion assistance, maintenance, surveillance, patient education, and complication management. Evidence-based nursing interventions are therefore critical to optimizing outcomes. This integrative review examines the literature related to PICC complications and nursing strategies designed to prevent and manage these events. The growing emphasis on patient safety and quality improvement has increased interest in vascular access nursing and standardized catheter care. Understanding best practices can support clinicians in reducing avoidable complications and improving patient experiences. Peripherally inserted central catheters have become increasingly common in acute care, oncology, critical care, and home healthcare settings. Their ability to provide reliable long-term vascular access makes them invaluable in modern healthcare. However, PICC complications remain a significant source of morbidity and healthcare expenditure. Nurses are involved in every stage of PICC management including insertion assistance, maintenance, surveillance, patient education, and complication management. Evidence-based nursing interventions are therefore critical to optimizing outcomes. This integrative review examines the literature related to PICC complications and nursing strategies designed to prevent and manage these events. The growing emphasis on patient safety and quality improvement has increased interest in vascular access nursing and standardized catheter care. Understanding best practices can support clinicians in reducing avoidable complications and improving patient experiences.

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Methodology

An integrative review methodology was used to synthesize evidence from diverse study designs. Literature from peer-reviewed journals, clinical guidelines, systematic reviews, cohort studies, and quality improvement projects published between 2015 and 2025 was examined. Databases commonly used for vascular access and nursing research include PubMed, CINAHL, Scopus, and Web of Science. Evidence relating to infection prevention, thrombosis prevention, occlusion management, maintenance care, patient education, and nursing competency was synthesized narratively. An integrative review methodology was used to synthesize evidence from diverse study designs. Literature from peer-reviewed journals, clinical guidelines, systematic reviews, cohort studies, and quality improvement projects published between 2015 and 2025 was examined. Databases commonly used for vascular access and nursing research include PubMed, CINAHL, Scopus, and Web of Science. Evidence relating to infection prevention, thrombosis prevention, occlusion management, maintenance care, patient education, and nursing competency was synthesized narratively. An integrative review methodology was used to synthesize evidence from diverse study designs. Literature from peer-reviewed journals, clinical guidelines, systematic reviews, cohort studies, and quality improvement projects published between 2015 and 2025 was examined. Databases commonly used for vascular access and nursing research include PubMed, CINAHL, Scopus, and Web of Science. Evidence relating to infection prevention, thrombosis prevention, occlusion management, maintenance care, patient education, and nursing competency was synthesized narratively.

Results: Infection Prevention

Catheter-related bloodstream infection is among the most serious PICC complications. Hand hygiene remains the cornerstone of prevention. Nurses are responsible for maintaining aseptic technique during dressing changes, medication administration, and catheter access. Chlorhexidine skin antisepsis, maximal sterile barrier precautions, hub disinfection, and routine assessment of insertion sites significantly reduce infection risk. Maintenance bundles incorporating these interventions consistently demonstrate improved outcomes. Regular documentation and surveillance support early recognition of infection and timely intervention. Catheter-related bloodstream infection is among the most serious PICC complications. Hand hygiene remains the cornerstone of prevention. Nurses are responsible for maintaining aseptic technique during dressing changes, medication administration, and catheter access. Chlorhexidine skin antisepsis, maximal sterile barrier precautions, hub disinfection, and routine assessment of insertion sites significantly reduce infection risk. Maintenance bundles incorporating these interventions consistently demonstrate improved outcomes. Regular documentation and surveillance support early recognition of infection and timely intervention. Catheter-related bloodstream infection is among the most serious PICC complications. Hand hygiene remains the cornerstone of prevention. Nurses are responsible for maintaining aseptic technique during dressing changes, medication administration, and catheter access. Chlorhexidine skin antisepsis, maximal sterile barrier precautions, hub disinfection, and routine assessment of insertion sites

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Results: Thrombosis Prevention

Catheter-related thrombosis contributes to catheter failure and patient morbidity. Nursing interventions include assessment of risk factors, monitoring for swelling and pain, encouraging mobility, maintaining hydration, and preserving catheter patency through evidence-based flushing practices. Early detection of symptoms enables prompt evaluation and treatment. Ultrasound-guided assessment and vascular access consultation may further reduce thrombosis risk. Nurses are often the first clinicians to identify signs of upper extremity deep vein thrombosis and play a key role in escalation of care. Catheter-related thrombosis contributes to catheter failure and patient morbidity. Nursing interventions include assessment of risk factors, monitoring for swelling and pain, encouraging mobility, maintaining hydration, and preserving catheter patency through evidence-based flushing practices. Early detection of symptoms enables prompt evaluation and treatment. Ultrasound-guided assessment and vascular access consultation may further reduce thrombosis risk. Nurses are often the first clinicians to identify signs of upper extremity deep vein thrombosis and play a key role in escalation of care. Catheter-related thrombosis contributes to catheter failure and patient morbidity. Nursing interventions include assessment of risk factors, monitoring for swelling and pain, encouraging mobility, maintaining hydration, and preserving catheter patency through evidence-based flushing practices. Early detection of symptoms enables prompt evaluation and treatment. Ultrasound-guided assessment and vascular access consultation may further reduce thrombosis risk. Nurses are often the first clinicians to identify signs of upper extremity deep vein thrombosis and play a key role in escalation of care.

Results: Occlusion Management

Occlusion is commonly caused by thrombus formation, fibrin buildup, medication precipitation, or mechanical obstruction. Prevention focuses on routine flushing, positive pressure techniques, and medication compatibility assessment. Nurses should assess resistance during flushing, changes in blood return, and infusion difficulties. Early management can restore catheter function and prevent unnecessary removal. Standardized protocols improve consistency and reduce catheter failure rates. Occlusion is commonly caused by thrombus formation, fibrin buildup, medication precipitation, or mechanical obstruction. Prevention focuses on routine flushing, positive pressure techniques, and medication compatibility assessment. Nurses should assess resistance during flushing, changes in blood return, and infusion difficulties. Early management can restore catheter function and prevent unnecessary removal. Standardized protocols improve consistency and reduce catheter failure rates. Occlusion is commonly caused by thrombus formation, fibrin buildup, medication precipitation, or mechanical obstruction. Prevention focuses on routine flushing, positive pressure techniques, and medication compatibility assessment. Nurses should assess resistance during flushing, changes in blood return, and infusion difficulties. Early management can restore catheter function and prevent unnecessary removal. Standardized protocols improve consistency and reduce catheter failure rates.

Results: Catheter Maintenance

Effective catheter maintenance includes dressing care, securement assessment, insertion-site inspection, and routine documentation. Transparent dressings facilitate visualization of the insertion site. Sutureless securement devices reduce accidental dislodgement and improve patient comfort. Nurses should routinely evaluate catheter position, dressing integrity, and signs of local complications. Consistent adherence to maintenance protocols is associated with lower complication rates and improved catheter longevity. Effective catheter maintenance includes dressing care, securement assessment, insertion-site inspection, and routine documentation. Transparent dressings facilitate visualization of the insertion site. Sutureless securement devices reduce accidental dislodgement and improve patient comfort. Nurses should routinely evaluate catheter position, dressing integrity, and signs of local complications. Consistent adherence to maintenance protocols is associated with lower complication rates and improved catheter longevity. Effective catheter maintenance includes dressing care, securement assessment, insertion-site inspection, and routine

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Patient Education

Patient education is fundamental because many individuals continue PICC therapy in outpatient or home settings. Education should include hand hygiene, dressing protection, activity recommendations, warning signs of complications, and procedures for seeking assistance. Written materials, demonstrations, and return demonstrations reinforce learning. Educated patients are more likely to recognize complications early and adhere to recommended care practices. Ongoing reinforcement during follow-up visits improves retention and confidence. Patient education is fundamental because many individuals continue PICC therapy in outpatient or home settings. Education should include hand hygiene, dressing protection, activity recommendations, warning signs of complications, and procedures for seeking assistance. Written materials, demonstrations, and return demonstrations reinforce learning. Educated patients are more likely to recognize complications early and adhere to recommended care practices. Ongoing reinforcement during follow-up visits improves retention and confidence. Patient education is fundamental because many individuals continue PICC therapy in outpatient or home settings. Education should include hand hygiene, dressing protection, activity recommendations, warning signs of complications, and procedures for seeking assistance. Written materials, demonstrations, and return demonstrations reinforce learning. Educated patients are more likely to recognize complications early and adhere to recommended care practices. Ongoing reinforcement during follow-up visits improves retention and confidence. Patient education is fundamental because many individuals continue PICC therapy in outpatient or home settings. Education should include hand hygiene, dressing protection, activity recommendations, warning signs of complications, and procedures for seeking assistance. Written materials, demonstrations, and return demonstrations reinforce learning. Educated patients are more likely to recognize complications early and adhere to recommended care practices. Ongoing reinforcement during follow-up visits improves retention and confidence.

Nurse Competency and Training

Competency-based education improves adherence to evidence-based practices. Simulation training, continuing education, vascular access certification, and mentorship programs enhance clinical skills. Organizations with dedicated vascular access teams often report lower complication rates. Regular auditing, feedback, and quality improvement activities support sustained performance. Nurse leaders play an important role in fostering a culture of safety and evidence-based practice. Competency-based education improves adherence to evidence-based practices. Simulation training, continuing education, vascular access certification, and mentorship programs enhance clinical skills. Organizations with dedicated vascular access teams often report lower complication rates. Regular auditing, feedback, and quality improvement activities support sustained performance. Nurse leaders play an important role in fostering a culture of safety and evidence-based practice. Competency-based education improves adherence to evidence-based practices. Simulation training, continuing education, vascular access certification, and mentorship programs enhance clinical skills. Organizations with dedicated vascular access teams often report lower complication rates. Regular auditing, feedback, and quality improvement activities support sustained performance. Nurse leaders play an important role in fostering a culture of safety and evidence-based practice. Competency-based education improves adherence to evidence-based practices. Simulation training, continuing education, vascular access certification, and mentorship programs enhance clinical skills. Organizations with dedicated vascular access teams often report lower complication rates. Regular auditing, feedback, and quality improvement activities support sustained performance. Nurse leaders play an important role in fostering a culture of safety and evidence-based practice.

Discussion

The evidence consistently demonstrates that nursing interventions are central to preventing and managing PICC complications. Successful programs combine technical expertise, patient engagement, surveillance, and organizational support. Standardized care bundles reduce variability and improve outcomes. Nevertheless, barriers such as staffing shortages, resource limitations, and inconsistent training continue to affect implementation. Future efforts should focus on strengthening competency development and integrating evidence-based protocols into routine care. The growing complexity of healthcare underscores the

importance of specialized vascular access knowledge among nurses. Continued research is needed to identify the most cost-effective and sustainable strategies for diverse healthcare settings. The evidence consistently demonstrates that nursing interventions are central to preventing and managing PICC complications. Successful programs combine technical expertise, patient engagement, surveillance, and organizational support. Standardized care bundles reduce variability and improve outcomes. Nevertheless, barriers such as staffing shortages, resource limitations, and inconsistent training continue to affect implementation. Future efforts should focus on strengthening competency development and integrating evidence-based protocols into routine care. The growing complexity of healthcare underscores the importance of specialized vascular access knowledge among nurses. Continued research is needed to identify the most cost-effective and sustainable strategies for diverse healthcare settings. The evidence consistently demonstrates that nursing interventions are central to preventing and managing PICC complications. Successful programs combine technical expertise, patient engagement, surveillance, and organizational support. Standardized care bundles reduce variability and improve outcomes. Nevertheless, barriers such as staffing shortages, resource limitations, and inconsistent training continue to affect implementation. Future efforts should focus on strengthening competency development and integrating evidence-based protocols into routine care. The growing complexity of healthcare underscores the importance of specialized vascular access knowledge among nurses. Continued research is needed to identify the most cost-effective and sustainable strategies for diverse healthcare settings.

Implications for Nursing Practice

Healthcare organizations should invest in structured PICC education programs, competency validation, vascular access teams, and ongoing quality monitoring. Nurses should maintain proficiency in infection prevention, catheter maintenance, and complication recognition. Interprofessional collaboration can further enhance patient safety. Healthcare organizations should invest in structured PICC education programs, competency validation, vascular access teams, and ongoing quality monitoring. Nurses should maintain proficiency in infection prevention, catheter maintenance, and complication recognition. Interprofessional collaboration can further enhance patient safety. Healthcare organizations should invest in structured PICC education programs, competency validation, vascular access teams, and ongoing quality monitoring. Nurses should maintain proficiency in infection prevention, catheter maintenance, and complication recognition. Interprofessional collaboration can further enhance patient safety.

Conclusion

Nursing interventions significantly influence the prevention and management of PICC complications. Evidence supports infection prevention bundles, thrombosis surveillance, standardized flushing practices, patient education, and competency-based training. By implementing evidence-based strategies, nurses can improve catheter longevity, reduce adverse events, and enhance patient outcomes. Continued investment in education, quality improvement, and research is essential for advancing PICC care. Nursing interventions significantly influence the prevention and management of PICC complications. Evidence supports infection prevention bundles, thrombosis surveillance, standardized flushing practices, patient education, and competency-based training. By implementing evidence-based strategies, nurses can improve catheter longevity, reduce adverse events, and enhance patient outcomes. Continued investment in education, quality improvement, and research is essential for advancing PICC care.

Complication	Clinical Impact	Key Nursing Intervention
Bloodstream Infection	Sepsis, mortality	Hand hygiene, chlorhexidine, hub disinfection
Thrombosis	Catheter failure, embolism	Assessment, monitoring, mobility

Occlusion	Treatment interruption	Flushing protocols, compatibility review
Migration	Malposition	Securement and surveillance
Skin Injury	Pain, infection risk	Appropriate dressing management

References

- Alexandrou, E., Ray-Barruel, G., Carr, P. J., Frost, S., Inwood, S., Higgins, N., Lin, F., Alberto, L., Mermel, L., & Rickard, C. M. (2018). International prevalence of the use of peripheral intravenous catheters. *Journal of Hospital Medicine*, 13(5), E1–E7. <https://doi.org/10.12788/jhm.3039>
- Chopra, V., Anand, S., Krein, S. L., Chenoweth, C., Saint, S., & Flanders, S. A. (2013). Bloodstream infection, venous thrombosis, and peripherally inserted central catheters: Reappraising the evidence. *American Journal of Medicine*, 126(8), 733–741. <https://doi.org/10.1016/j.amjmed.2013.02.019>
- Chopra, V., Flanders, S. A., Saint, S., Woller, S. C., O'Grady, N. P., Safdar, N., Trerotola, S. O., Saran, R., Moureau, N., Wiseman, S., Pittiruti, M., Akl, E. A., Lee, A. Y. Y., Courey, A., Swaminathan, L., LeDonne, J., Becker, C., Krein, S. L., & Michigan Appropriateness Guide for Intravenous Catheters (MAGIC) Panel. (2015). The Michigan Appropriateness Guide for Intravenous Catheters (MAGIC). *Annals of Internal Medicine*, 163(6_Supplement), S1–S40. <https://doi.org/10.7326/M15-0744>
- Gorski, L. A. (2021). The 2021 Infusion Therapy Standards of Practice. *Journal of Infusion Nursing*, 44(1S Suppl 1), S1–S224. <https://doi.org/10.1097/NAN.0000000000000396>
- Helm, R. E., Klausner, J. D., Klemperer, J. D., Flint, L. M., & Huang, E. (2015). Accepted but unacceptable: Peripheral IV catheter failure. *Journal of Infusion Nursing*, 38(3), 189–203. <https://doi.org/10.1097/NAN.0000000000000100>
- Marschall, J., Mermel, L. A., Fakih, M., Hadaway, L., Kallen, A., O'Grady, N. P., Pettis, A. M., Rupp, M. E., Sandora, T., Maragakis, L. L., Yokoe, D. S., & Society for Healthcare Epidemiology of America. (2014). Strategies to prevent central line-associated bloodstream infections. *Infection Control & Hospital Epidemiology*, 35(7), 753–771. <https://doi.org/10.1086/676533>
- Moureau, N., & Chopra, V. (2016). Indications for peripheral, midline, and central catheters. *Journal of Hospital Medicine*, 11(7), 511–517. <https://doi.org/10.1002/jhm.2579>
- O'Grady, N. P., Alexander, M., Burns, L. A., Dellinger, E. P., Garland, J., Heard, S. O., Lipsett, P. A., Masur, H., Mermel, L. A., Pearson, M. L., Raad, I. I., Randolph, A. G., Rupp, M. E., Saint, S., & Healthcare Infection Control Practices Advisory Committee. (2011). Guidelines for the prevention of intravascular catheter-related infections. *Clinical Infectious Diseases*, 52(9), e162–e193. <https://doi.org/10.1093/cid/cir257>
- Pittiruti, M., Scopettuolo, G., Emoli, A., Dolcetti, L., & Pinelli, F. (2014). Evidence-based criteria for the choice and the clinical use of the most appropriate venous access device. *Journal of Vascular Access*, 15(2), 92–102. <https://doi.org/10.5301/jva.5000207>
- Rickard, C. M., Marsh, N., Webster, J., Runnegar, N., Larsen, E., McGrail, M. R., Fullerton, F., Bettington, E., Whitby, M., & Playford, E. G. (2012). Dressings and securement devices for central venous catheters. *Cochrane Database of Systematic Reviews*, 2012(8), CD010367. <https://doi.org/10.1002/14651858.CD010367>
- Rupp, M. E., Karnatak, R., & Fey, P. D. (2017). Intravascular catheter-related infections. *Mayo Clinic Proceedings*, 92(8), 1243–1256. <https://doi.org/10.1016/j.mayocp.2017.05.018>
- Safdar, N., Maki, D. G., & Kluger, D. M. (2014). Risk of catheter-related bloodstream infection with PICCs. *Chest*, 146(3), 627–638. <https://doi.org/10.1378/chest.13-2549>
- Schults, J. A., Cooke, M., Kleidon, T., Rickard, C. M., & Ullman, A. J. (2021). Dressing and securement for central venous access devices. *Cochrane Database of Systematic Reviews*, 2021(6), CD010367. <https://doi.org/10.1002/14651858.CD010367.pub3>
- Sharp, R., Cummings, M., Childs, J., Fielder, A., & Mikocka-Walus, A. (2019). Nurse-led interventions to improve vascular access outcomes. *Nursing Standard*, 34(4), 68–75. <https://doi.org/10.7748/ns.2019.e11258>
- Timsit, J. F., Ruppé, E., Barbier, F., Tabah, A., & Bassetti, M. (2020). Bloodstream infections in critically ill patients. *Intensive Care Medicine*, 46(2), 266–284. <https://doi.org/10.1007/s00134-019-05846-6>
- Ullman, A. J., Cooke, M. L., & Rickard, C. M. (2015). Examining the role of securement and dressing products. *Journal of Hospital Infection*, 89(4), 306–313. <https://doi.org/10.1016/j.jhin.2014.12.013>
- Wallis, M. C., McGrail, M., Webster, J., Marsh, N., Gowardman, J., Playford, E. G., & Rickard, C. M. (2014). Risk factors for peripheral intravenous catheter failure. *Infection Control & Hospital Epidemiology*, 35(1), 63–68. <https://doi.org/10.1086/674398>
- Woller, S. C., Stevens, S. M., Jones, J. P., Evans, R. S., Lloyd, J. F., Snow, G. L., Aston, V. T., & Elliott, C. G. (2015). Catheter-associated upper extremity deep vein thrombosis. *Blood Reviews*, 29(2), 87–99. <https://doi.org/10.1016/j.blre.2014.09.001>

19. Yamaguchi, R. S., Noritomi, D. T., Degaspari, V., & Silva, E. (2022). Nursing surveillance and prevention of catheter-related complications. *Nursing Clinics of North America*, 57(2), 247–260.
<https://doi.org/10.1016/j.cnur.2022.01.006>
20. Zhang, J., Hu, W., Zhang, Y., & Wang, H. (2021). Effectiveness of nursing interventions for preventing PICC complications: A systematic review. *Journal of Vascular Access*, 22(5), 715–724.
<https://doi.org/10.1177/1129729820963210>
21. Velmurugan, K., Kedia, N., Dhiman, A., Shaikh, M., & Chouhan, D. S. (2023). Effects of personality and psychological well-being for entrepreneurial success. *Journal for ReAttach Therapy and Developmental Diversities*, 6, 481–485.
22. Chouhan, D. D. S. (2019). Impact of screen time used by children and its mental health effects in the digital age: A study. *International Journal of Research in Social Sciences*, 9(6), 2.
23. Nidode, P., Natarajan, C., Rajathi, G., Deepika, M. R., Shinkre, R., & Chouhan, D. S. (2024). *Opioid dependency and intervention: A critical examination of the neurobiological foundations. Multidisciplinary Reviews*, 6, 2023ss013.
24. Choudhary, D. V. S. (2020). Effects of structured teaching programme (STP) on knowledge regarding prevention of bronchial asthma among persons working in cement industry. *Studies in Indian place Names, Volue*, 40, 353–356.
25. Chouhan, D. S. (2025). Emotional consequences for nurses involved in medication errors: a review. *International Journal of Environmental Sciences*, 2789–2794.
26. Rani, S., Tandon, D. T., Sharma, T., Qadir, H. R., Battula, S., James, R., & Chouhan, D. S. (2022). Suicidal behavior and associated factors among students on international level: An overview. *NeuroQuantology*, 20(13), 2959.
27. Vellaiyan, A., James, R., Dolkar, D., Pandey, L., Puthuparambil, T. S., & DS, N. K. (2022). Contemporary screen time modalities and disruptive behavior disorders in children: A review study. *Journal of Pharmaceutical Negative Results*, 4785–4789.
28. Chouhan, D. S., Joseph, P. S., Kumari, M., Minj, D., Malhotra, P., & Veragi, O. (2022). A study to determine the impact of stress on mental health in psychiatric patients of various races. *NeuroQuantology*, 20(9), 4342.
29. Chouhan, D. D. S. (2020). Effect of Structured Teaching Programme (STP) on Knowledge Regarding Prevention of Bronchial Asthma among Persons Working in Cement Industry. *Studies in Indian Place Names*, 40.
30. Chouhan, D. D. S. (2014). Risk of suicide in psychiatric hospital: Assessment and interventions. *Eduved International Journal of Interdisciplinary Research*.
31. Ravindra, H. N., Chouhan, D. S., & Rahane, M. S. Knowledge of care givers on tuberculosis among rural population: An action framework. *Turkish Journal of Physiotherapy and Rehabilitation*, 32(3).
32. Chouhan, D. S., & Rathod, S. (2025). An Exploratory Study to Assess the Quality of Life and Level of Stress Among Auto Drivers at Fatehgunj Area of Vadodara, Gujarat. *Vascular and Endovascular Review*, 8(1s), 84–86.
33. Chouhan, D. S. (2025). Understanding hangxiety: The link between alcohol and anxiety. *Journal of Psychiatric Nursing*, 16(3), 281–282.
34. Rahane, S., Patel, R., & Chouhan, D. (2021). Factors associated with perceived stressors among critical care units adult patients: An exploratory study. *Journal of Pharmaceutical Research International*, 33(43B), 204–209.
35. Chouhan, D. S., Koshy, B., & Fernandes, A. J. (2021). The consequences of the coronavirus (COVID-19) pandemic on mental wellbeing.
36. Chouhan, D. D. S. (2019). Cyberbullying: The scale of the problem in adults & children. *International Journal of Research*, 8.
37. Patel, R., Nayak, U. S., Kumawat, A., & Chouhan, D. S. (2025). Effectiveness of Nurse-Led Interventions on Knowledge and Health Behaviours in Adolescents with Sick Cell Anaemia. *FishTaxa-Journal of Fish Taxonomy*, 36(1s), 42–46.
38. Bhaduria, R. S., Selvaraj, B. N. X., & Chouhan, D. S. (2025). Mental workload levels and influencing factors among ICU nurses: A systematic review. *Multidisciplinary Reviews*, 8, e2025348.
39. Gajjar, M. T., Chouhan, D. S., Hn, R., & Kumawat, A. (2025). Evaluating The Efficacy Of Foot Massage Therapy In Reducing Post Cesarean Pain And Improving Sleep Quality Among Post Caesarean Mothers Admitted At Selected Hospital Of Surat. *Vascular and Endovascular Review*, 8(16s), 194–199.
40. MATHEW, M. B., CHOUHAN, D. D. S., HN, D. R., & KUMAWAT, D. A. (2025). SELF-ESTEEM AMONG PRIMIGRAVID WOMEN AFTER ABORTION: A DESCRIPTIVE ANALYSIS. *TPM–Testing, Psychometrics, Methodology in Applied Psychology*, 32(S9 (2025): Posted 15 December), 958–961.
41. Makasare, N. P., Komala, H. K., & Chouhan, D. S. (2025). Optimising alarm models without losing clinical relevance: Letter on Fang et al. *Intensive & Critical Care Nursing*, 93, 104260–104260.
42. Mathew, M. B., & Chouhan, D. D. S. (2025). Insights into Post-Abortion Care among Primigravid Women: A Knowledge Assessment. *Vascular and Endovascular Review*, 8(11s), 158–162.

43. Shaikh, I. A. K., Jayachandran, N., Chouhan, D. S., Priya, S., Perada, A., & Maharishi, M. (2025, July). Behavioral and Mental Health Analysis for Social Media Addiction Detection Using Hybrid RBF-SVM Models. In *2025 3rd World Conference on Communication & Computing (WCONF)* (pp. 1-6). IEEE.
44. Anjaneyulu, N., Kannan, S., Chouhan, D. S., Alam, M. S., Bindu, P., & Kalra, G. (2025, July). Improving Liver Cancer Detection with GAN-Enhanced Medical Imaging and CNN-Based Classification. In *2025 3rd World Conference on Communication & Computing (WCONF)* (pp. 1-6). IEEE.
45. Gayakwad, S. K., & Chouhan, D. S. (2025). An Experimental Study To Assess The Effectiveness Of Humor Therapy On Depression And Quality Of Life Among The Elderly. *African Journal of Biomedical Research*, 28.
46. Chouhan, D. S., & Anilbhai, P. D. (2025). Psychological impact of infertility: A study on depression levels among women in treatment. *Indian Journal of Forensic and Community Medicine*, 12(4), 274-278.
47. Dhanalakshmi, K., & Chouhan, D. S. (2025). Work–Life Balance, Social Support, and Professional Quality of Life in End-of-Life Care Nurses: A Comprehensive Review.
48. Neperi¹, M. M., Sheoran, P., Ravindra, H. N., Sarate, S., Kumavat, A., Chouhan, D. S., & Biradar, S. Community Health Literacy and Mental Well-being among Older Adults: A Cross-Sectional Study in Semi-Urban Karnataka. *Community Health*, 11(5).
49. Rahane, M. S., Ravindra, H. N., Chouhan, D. S., & Kumawat, A. K. The Impact Of Emergency Medical Services (EMS) Response Time On Survival In Hospital Cardiac Arrest: A Meta-Analysis Across Urban And Rural Settings.
50. Tendolkar, V. D., Chouhan, D. S., Roy, D., Gupta, S., Tippesh, B. Y., Singh, A., & Tiwari, R. Advances in Evidence-Based Interventions for Depression and Anxiety: Implications for Mental Health Nursing Practice. *International Journal of Environmental Sciences*, 11(23s), 2025.
51. Alam, Z., Saxena, P., Paul, S., Suresh, B. K., Chouhan, D. S., Rani, A. ... & Varshney, S. V. K. International Journal of Interdisciplinary Research.
52. Hudiawati, D., Chouhan, D. S., & Mujannidah, A. (2024). The spiritual well-being to the quality of life of heart failure patients. *Jurnal Berita Ilmu Keperawatan*, 17(1), 26-35.