

Assessment of Radiation Protection Measures in Diagnosis and Treatment: A Critical Review

Authors : Buhari Samaila, Buhari Maidamma

Abstract : Background: The use of ionizing radiation in medical diagnostics and treatment is indispensable for accurate imaging and effective cancer therapies. However, radiation exposure carries inherent risks, necessitating strict protection measures to safeguard both patients and healthcare workers. This review critically examines the existing radiation protection measures in diagnostic radiology and radiotherapy, highlighting technological advancements, regulatory frameworks, and challenges. Objective: The objective of this review is to critically evaluate the effectiveness of current radiation protection measures in diagnostic and therapeutic radiology, focusing on minimizing patient and staff exposure to ionizing radiation while ensuring optimal clinical outcomes and propose future directions for improvement. Method: A comprehensive literature review was conducted, covering scientific studies, regulatory guidelines, and international standards on radiation protection in both diagnostic radiology and radiotherapy. Emphasis was placed on ALARA principles, dose optimization techniques, and protective measures for both patients and healthcare workers. Results: Radiation protection measures in diagnostic radiology include the use of shielding devices, minimizing exposure times, and employing advanced imaging technologies to reduce dose. In radiotherapy, accurate treatment planning and image-guided techniques enhance patient safety, while shielding and dose monitoring safeguard healthcare personnel. Challenges such as limited infrastructure in low-income settings and gaps in healthcare worker training persist, impacting the overall efficacy of protection strategies. Conclusion: While significant advancements have been made in radiation protection, challenges remain in optimizing safety, especially in resource-limited settings. Future efforts should focus on enhancing training, investing in advanced technologies, and strengthening regulatory compliance to ensure continuous improvement in radiation safety practices.

Keywords : radiation protection, diagnostic radiology, radiotherapy, ALARA, patient safety, healthcare worker safety

Conference Title : ICBMP 2025 : International Conference on Biophysics and Medical Physics

Conference Location : Istanbul, Türkiye

Conference Dates : June 28-29, 2025