Georgian Scientists
ქართველი მეცნიერები
Vol. 8 Issue 4(1), 2026
https://doi.org/10.52340/gs.2026.08.04(1).83



AI-AUGMENTED NUTRITION IN THE ICU

Maria Theodorakopoulou

ICU I, General Hospital of Attica "KAT"; National and Kapodistrian University of Athens, Medical School, Athens, Greece

Background: Nutritional requirements in critically ill patients fluctuate with inflammation, organ dysfunction, treatment and recovery. Conventional predictive equations and intermittent reassessment may fail to capture these changes, contributing to discrepancies between prescribed and delivered nutrition.

Objective: To examine the emerging applications of artificial intelligence (AI) in intensive care unit (ICU) nutrition, focusing on nutritional assessment, metabolic modeling, real-time personalization and prediction of feeding complications.

Evidence and Key Findings: AI-assisted assessment can integrate electronic health record data, laboratory results and physiological trends to identify nutritional risk dynamically rather than relying solely on admission scores. Machine-learning models combine clinical variables, ventilator data and, where available, indirect calorimetry to estimate energy expenditure; a comparative 2025 study reported lower estimation error with selected models than with conventional equations. Indirect calorimetry remains the reference method, and AI should complement rather than replace it. A proposed closed-loop approach links continuous monitoring, risk prediction, clinician-reviewed adjustment of nutritional prescriptions and reassessment. Predictive models have been developed for enteral feeding intolerance, diarrhea and underfeeding. The NutriSighT transformer model, for example, uses routinely collected ICU data to update underfeeding-risk predictions every four hours. Reinforcement-learning approaches such as DeepEN also illustrate the feasibility of generating individualized caloric, protein and fluid targets from retrospective ICU trajectories. However, most evidence concerns model performance rather than demonstrated improvements in clinical outcomes. Limitations include missing or inconsistent data, restricted external validation, workflow integration, alert fatigue, model generalizability and regulatory oversight.

Conclusions: AI offers a promising framework for more responsive and individualized ICU nutritional care, moving from static prescriptions toward anticipatory, data-informed support.

Prospective multicenter studies and interventional trials are needed to establish clinical benefit, safety and implementation feasibility. Clinician oversight remains essential.

Keywords: Artificial intelligence; Critical care nutrition; Machine learning; Personalized nutrition; Predictive modeling