Iran J Nucl Med. 2025;33(1):1-3 [Serial No. 64]

Homepage: https://irjnm.tums.ac.ir/

LETTER TO THE EDITOR

Radiology, Nuclear Medicine and Medical Imaging at the vanguard of artificial intelligence integration: A preliminary study of AI in medical research

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ARTICLE INFO

Article History:
Received: 27 August 2024, Revised: 16 October 2024, Accepted: 19 October 2024, Published Online: 23 October 2024

Keyword:
Large language model; Artificial intelligence; Bibliometric analysis; Medical research

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How to cite this article: Shamsi A, Sebo P, Wang T. Radiology, Nuclear Medicine and Medical Imaging at the vanguard of artificial intelligence integration: A preliminary study of AI in medical research. Iran J Nucl Med. 2025;33(1):1-3.

https://doi.org/10.22034/irjnm.2024.129795.1645

Dear Sir,

The rapid advancement of artificial intelligence (AI) technology has brought transformative changes to medical practices and outcomes [1]. AI's ability to process and analyze vast datasets has significantly enhanced the accuracy and efficiency of diagnostic and therapeutic interventions [2]. This study investigates the distribution of AI-related publications across various medical disciplines to understand which fields are at the forefront of AI integration.

We analyzed 41 medical specialties as defined by a previous study [3]. On August 8, 2024, we conducted a comprehensive search on Web of Science for documents (including research articles, review articles, meeting abstracts, proceedings papers, and early access publications) discussing artificial intelligence. We used the terms 'artificial intelligence,' 'machine learning,' 'natural language processing,' 'deep learning,' and 'neural network' to search for publications between 2005 and August 2024. We then calculated and ranked the percentage of AI-related articles

relative to the total number of publications in each medical field. Our analysis revealed that five medical specialties have more than 1% of their publications related to AI. Radiology, Nuclear Medicine & Medical Imaging leads with 4.7%, followed by legal medicine (1.3%), ophthalmology (1.2%), pathology (1.2%), and microbiology (1.1%) (Table 1).

Table 1. Proportion of AI-related publications across various medical fields (January 2005 to August 2024)

Fields	Total publications	AI publications	Proportion (%)
Radiology, Nuclear Medicine & Medical Imaging	662903	31120	4.69
Medicine, Legal	37741	491	1.30
Ophthalmology	298436	3525	1.18
Pathology	351091	4083	1.16
Microbiology	1016915	11447	1.13
Medicine, General & Internal	932954	9225	0.99
Genetics & heredity	493289	4136	0.84
Clinical neurology	977592	8014	0.82
Medicine, Research & Experimental	632322	4882	0.77
Psychiatry	602864	4653	0.77
Oncology	1478737	11228	0.76
Geriatrics & Gerontology	175540	1331	0.76
Rehabilitation	204104	1498	0.73
Cardiac & Cardiovascular Systems	781975	5439	0.70
Public, Environmental & Occupational Health	848895	5813	0.68
Pharmacology & Pharmacy	1075088	6353	0.59
Gastroenterology & Hepatology	565542	3289	0.58
Orthopedics	282882	1584	0.56
Dentistry, Oral Surgery & Medicine	226434	1238	0.55
Otorhinolaryngology	124607	676	0.54
Surgery	1190849	6352	0.53
Emergency Medicine	89915	473	0.53
Critical Care Medicine	255052	1310	0.51
Anesthesiology	126861	637	0.50
Peripheral Vascular Disease	435968	1993	0.46
Urology & Nephrology	398730	1705	0.43
Respiratory System	430481	1816	0.42
Rheumatology	234032	966	0.41
Dermatology	256607	921	0.36
Endocrinology & Metabolism	587199	2089	0.36
Obstetrics & Gynecology	410124	1450	0.35
Nutrition & Dietetics	300128	1052	0.35
Immunology	695704	2247	0.32
Infectious Diseases	349917	1043	0.30
Primary Health Care	41370	118	0.29
Tropical Medicine	101472	286	0.28
Pediatrics	465773	1198	0.26
Integrative & Complementary Medicine	89821	229	0.25
Allergy	107765	256	0.24
Transplantation	250093	553	0.22
Hematology	496891	1029	0.21

The specialties with the lowest percentage of AI-related documents are allergy (0.2%), transplantation (0.2%), and hematology (0.2%), highlighting potential areas for AI application growth.

Radiology and microbiology showed a marked increase in AI-related publications beginning in 2015, peaking in 2022 and 2023, respectively (Figure 1). Other specialties demonstrated a more gradual increase in AI research activity.

AI is increasingly becoming a cornerstone in medical practice, enhancing data processing and analytical capabilities that improve diagnosis, treatment, and patient care outcomes [4, 5]. For example, the extensive and complex imaging data generated in radiology presents significant challenges for manual analysis. AI, particularly deep learning algorithms, is adept at addressing these challenges by quickly identifying patterns and anomalies that may be missed by human observers. This capability reduces the risk of human error and enhances diagnostic accuracy, which is critical for the early detection of conditions such as cancer.

A limitation of this study is the lack of detailed screening or validation of the AI-related publications. The focus was on providing a broad overview of the current landscape. Therefore, the findings should be considered as a preliminary step, with future research needed to conduct more in-depth analyses and validations to refine these conclusions.

The integration of AI varies significantly across medical fields. This disparity underscores the need for continued research and strategic implementation of AI technologies to fully harness their potential across all medical disciplines.

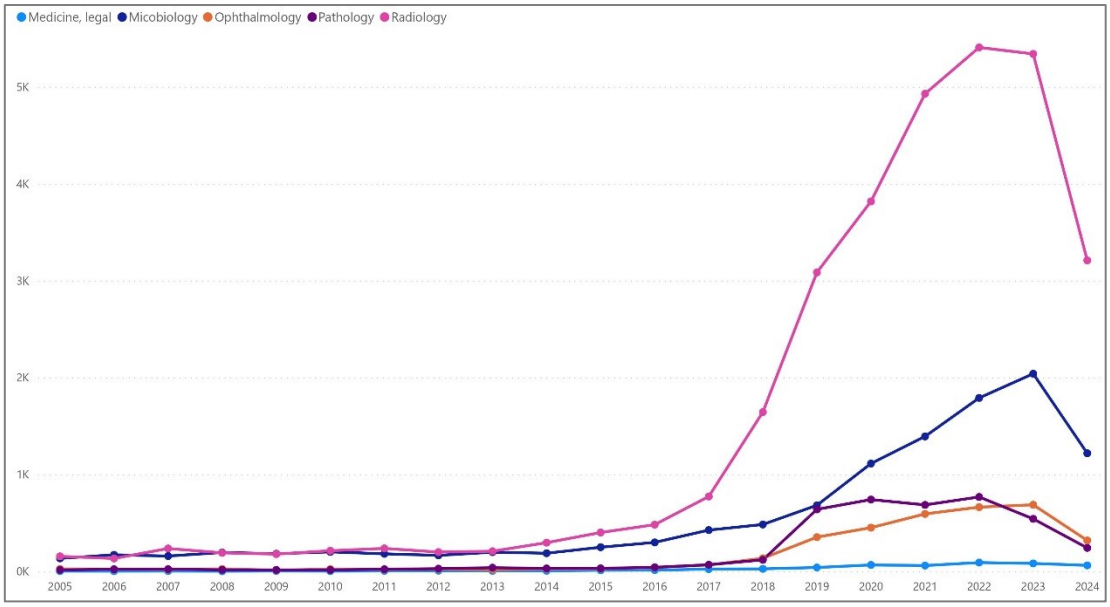

Figure 1. Trends of AI-related publications across medical fields (January 2005 to August 2024)

REFERENCES

1. Briganti G, Le Moine O. Artificial intelligence in medicine: today and tomorrow. Front Med (Lausanne). 2020 Feb 5;7:27.
2. Khalifa M, Albadawy M. AI in diagnostic imaging: revolutionising accuracy and efficiency. Comput Methods Programs Biomed Update. 2024 Mar 5:100146.
3. Pinho-Gomes AC, Vassallo A, Thompson K, Womersley K, Norton R, Woodward M. Representation of women among editors in chief of leading medical journals. JAMA Netw Open. 2021 Sep 1;4(9):e2123026.
4. Alowais SA, Alghamdi SS, Alsuhebany N, Alqahtani T, Alshaya AI, Almohareb SN, Aldairem A, Alrashed M, Bin Saleh K, Badreldin HA, Al Yami MS, Al Harbi S, Albekairy AM. Revolutionizing healthcare: the role of artificial intelligence in clinical practice. BMC Med Educ. 2023 Sep 22;23(1):689.
5. Mintz Y, Brodie R. Introduction to artificial intelligence in medicine. Minim Invasive Ther Allied Technol. 2019 Apr;28(2):73-81.