

Examination of thesis on Aspergillosis: A Turkish sample

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ABSTRACT

Objectives: While Aspergillosis was once considered to be a threat only to neutropenic patients, it is now becoming more common in non-neutropenic patients. There should be a clearer understanding of this disease. The focus of this study was to conduct a bibliographic examination of medical specialty thesis on Aspergillosis from our country and to determine the national competency level regarding this subject. The research's secondary goal was to gather perspective for future studies.

Materials and methods: The study group was composed of thesis scanned between January 1971 and January 2021 using the keywords "Aspergillosis", "Aspergillus", and "Pulmonary Aspergillosis". The thesis were scanned using the database of the Higher Education Council (YÖK) Thesis Scanning Center. In this study, the qualitative research method of document analysis (bibliometric research) was used. The obtained thesis were examined using Excel forms prepared by the researchers. The percentage and frequency values were calculated to assess the data.

Results: A total of 27 thesis studies were assessed. The first thesis on this topic was published in 1986, and the most recent one was published in 2019. Between 1986 and 2001, there was no thesis on the topic. This subject accounted for 96.3% of all thesis written after 2001. The sample size ranged from 26-476, with a median value of 97.5. The majority of the thesis were prospective (85.2%), patient-related, and laboratory studies. Galactomannan (26.2%), Aspergillus antigen detection (18.5%), polymerase chain reaction (PCR) (11.1%), and culture (11.1%) were the most common laboratory studies.

Conclusion: Even though Aspergillus infections cause significant mortality and medical expenditures, research in this field has been slower than expected. The number of studies on this topic, as well as their content, needs to be increased.

Keywords: Aspergillosis, Aspergillus, thesis, Turkey.

Aspergillus spp. is a saprophytic fungus with roughly 250 species and 40 subspecies that can cause infections in humans. Common infections, especially opportunistic respiratory tract infections in immunocompromised patients, are caused by this environmental factor. While *Aspergillus fumigatus* is the most common causative agent, infections can also be caused by *A. circumdati*, *A. candidi*, *A. terrei*, *A. nidulantes*, *A. warcupi* and *A. ornati* subspecies. Clinical manifestations of Aspergillosis caused by *Aspergillus* spp. include saprophytic, allergic, and invasive Aspergillosis.^[1,2]

Despite significant scientific advances that have resulted in the development of new antifungal strategies, this cause of disease, for which data was available as early as 1913, remains on the agenda due to an increase in the number of immunosuppressive patients, invasive procedures, and hospitalization opportunities. It has been shown to reproduce in hematology, oncology, transplantation units, intensive care units, places with limited ventilation, and waste collection areas.^[1-3] Although Aspergillosis was once thought to only be a concern to neutropenic patients, being seen in non-neutropenic patients

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as well. More detailed studies into the disease is needed. The main objective of this study was to conduct a bibliographic analysis of medical specialty thesis related to Aspergillosis from our country and to determine the level of national awareness about this concern. The study's secondary purpose was to provide perspective for future research.

MATERIALS AND METHODS

The study group included medical specialty thesis scanned with the keywords "Aspergillosis," "Aspergillus," and "Pulmonary Aspergillosis" from January 1971 to January 2021. The scan was made using Higher Education Council (YÖK) Thesis Scanning Center database. In this study, document analysis (bibliometric research) was used as a qualitative research method. The obtained thesis were transferred and examined using Excel forms created by the researchers. The percentage and frequency values were calculated to evaluate the data.

RESULTS

A total of 27 thesis were accessed. The first thesis on this subject was published in 1986, and the most recent thesis was published in 2019. From 1986 until 2001, there was no thesis on this topic. After 2001, thesis on this subject accounted for 96.3% of all thesis (Figure 1).

The majority of the studies was conducted in microbiology departments at universities. Features of the studies are shown in Table 1. The sample size ranged from 26-476, with a median value of 97.5. The majority of the thesis were prospective (85.2%), patient-related, and

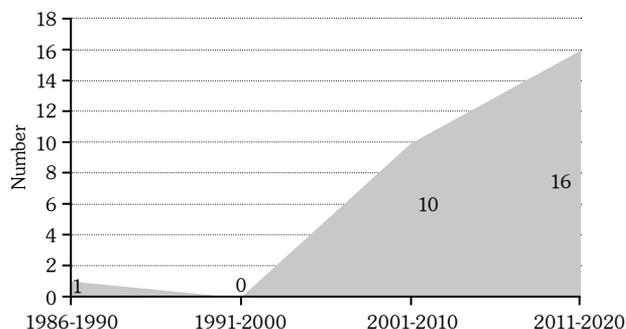


Figure 1. Distribution of years.

Table 1. General characteristics of the theses (n=7)

Characteristics	n	%
Department		
Microbiology	14	51.9
Clinical Bacteriology and Infectious Diseases	7	26
Thoracic Diseases	3	11.1
Hematology	1	3.7
Thoracic and Cardiovascular Surgery	1	3.7
Pediatric Health and Diseases	1	3.7
Institution		
University	25	92.6
Ministry of Health	2	7.4
University		
Uludag University	4	14.8
Gazi University	4	14.8
Akdeniz University	3	11.1
Hacettepe University	3	11.1
Marmara University	2	7.4
Eskişehir Osmangazi University	2	7.4
Ege University	2	7.4
Erciyes University	2	7.4
Istanbul University/Cerrahpasa Faculty of Medicine	1	3.7
Afyon Kocatepe University	1	3.7
Karadeniz Technical University	1	3.7
Permission status		
Authorized	21	77.7
No permission	6	22.3

* Some studies used more than one method.

Table 2. Content analysis of the theses

Study characteristics	n	%
Study type*		
Prospective	23	85.2
Retrospective	3	11.1
Descriptive/cross-sectional	1	3.7
Meta-analysis	1	3.7
Control Group		
Yes	7	25.9
Among themselves	5	18.5
No	12	44.4
Unspecified	3	11.1
Sample*		
Patients	16	59.2
Aspergillus strains	6	22.2
Hospital environment (air/water)	3	11.1
Serum samples	1	3.7
Animal model	1	3.7
Specific samples		
Febrile neutropenic patients	4	14.8
Asthma patients	1	3.7
Hematologic malignancy patients	3	11.1
Intensive care patients	1	3.7
Pediatric patients	2	7.4
Content*		
Laboratory examination	20	74.1
Environment examination	3	11.1
Clinical features	2	7.4
Treatment	2	7.4
Radiologic findings	1	3.7

* Some studies used more than one method.

Table 3. Detailed evaluation of laboratory contents (n=27)

Test*	n	%
Antifungal sensitivity	2	7.4
Detection of Aspergillus antigen	5	18.5
Galactomannan	8	26.2
Polymerase chain reaction	3	11.1
Mutations associated with azole resistance	1	3.7
MALDI-TOF MS system and DNA sequence analysis	1	3.7
ELISA	1	3.7
Culture	3	11.1
Latex agglutination	1	3.7
Enzyme immunoassay	1	3.7
Extracellular elastase, acid proteinase, and phospholipase	1	3.7

* 20 studies were laboratory-based and some studies used more than one method; MALDI-TOF MS: Matrix-Assisted Laser Desorption/Ionization time-of-flight, Mass Spectrometry; DNA: Deoxyribonucleic acid; ELISA: Enzyme Linked Immunosorbent Assay.

laboratory studies (Table 2). Galactomannan (26.2%), Aspergillus antigen detection (18.5%), polymerase chain reaction (PCR) (11.1%), and culture (11.1%) were the most common laboratory tests (Table 3).

DISCUSSION

Pulmonary Aspergillosis, which was once only seen in neutropenic patients, is now being seen in an increasing number of non-neutropenic patients.^[1-3] Therefore, in preventing the increasing number of cases, the public's knowledge of the disease must improve. The number of publications on Aspergillus risen significantly after the 1960s, according to an analysis of journals indexed in the PubMed global database with the keyword. According to our findings, while the number of thesis on this subject in our country has increased since 2010, there was only one thesis on the subject previous to the year 2000. Most thesis were found in the field of microbiology (51.9%), which was higher than all other clinical branches. As more research have been conducted, it has been discovered that the epidemiology of this infection, which previously emerged in patients with well-defined risks such as malignancies, allogeneic bone marrow transplantation, solid organ transplantation, and solid cancer, has altered. Infections have also been reported in patients with severe

chronic obstructive pulmonary disease, patients requiring high-dose steroid therapy, patients with Child-Pugh class C liver cirrhosis, patients receiving immunosuppressive therapy, including novel monoclonal agents, and intensive care unit (ICU) patients.^[4]

While Aspergillosis cases may be followed up in sub-branches other than Oncology, ICU, Internal Medicine, and Hematology, no internal thesis has been published in these branches yet.

When we looked at the distribution by clinical branches where the related diseases are followed up on, we found that the branches of Clinical Bacteriology and Infectious Diseases, Pediatric Health and Diseases, Thoracic Diseases, Thoracic and Cardiovascular Surgery, and Hematology had a very small number of thesis. While Aspergillosis cases may be followed up in sub-branches other than Oncology, ICU, Internal Medicine, and Hematology, no internal thesis has been published in these branches yet. There were thesis on febrile neutropenic patients, asthma patients, patients with hematological malignancies, intensive care patients, and pediatric patients, according to study samples, but no studies on other risk groups. Aspergillosis is usually diagnosed by evaluating the clinical findings together with laboratory results.^[3] The traditional methods of direct microscopic examination, stained preparations, and culture methods are still

important in the identification of fungal infections in high-risk patient groups.^[4] However, the clinical manifestation is mild in some immunosuppressive patient groups, and diagnostic delays may occur as a result of delayed microbiological culture. Therefore, serological and molecular diagnostic methods have been developed, such as galactomannan (GM), (1,3)- β -d-glucan (BDG), and real-time PCR (rtPCR).^[5] Recently, Matrix Assisted Laser Desorption and Ionization Time-of-Flight Mass Spectrometry (MALDI-TOF MS, Bruker, Germany) and sequence analysis methods have increased interest.^[6] The laboratory method was determined to be the content of 20 thesis in our study, with Galactomannan (26.2%) and Aspergillus antigen detection (18.5%) being the most common. Only a few new methodology-related thesis were found.

Conclusion

Although opportunistic infection is characterized by Aspergillus spp. cause major mortality and healthcare expenditures, studies have not progressed quickly enough to successfully prevent or cure life-threatening fungal diseases. The number of studies on this subject, as well as their content, should be increased.

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REFERENCES

1. Lass-Flörl C, Cuenca-Estrella M. Changes in the epidemiological landscape of invasive mould infections and disease. *J Antimicrob Chemother* 2017;72(suppl_1):i5-i11.
2. Latgé JP, Chamilos G. Aspergillus fumigatus and Aspergillosis in 2019. *Clin Microbiol Rev* 2019;33:e00140-18.
3. Godet C, Philippe B, Laurent F, Cadranet J. Chronic pulmonary aspergillosis: An update on diagnosis and treatment. *Respiration* 2014;88:162-74.
4. Bassetti M, Peghin M, Vena A. Challenges and solution of invasive Aspergillosis in non-neutropenic patients: A review. *Infect Dis Ther* 2018;7:17-27.
5. Sav H, Koç N, Atalay MA, Yıldız O, Demir G. Sistemik Aspergilloz tanısında çeşitli yöntemlerin araştırılması. *FLORA* 2014;19:66-73.
6. Bilgi EA, Kiraz N. Klinik örneklerden izole edilen Aspergillus türlerinin tanımlanmasında geleneksel yöntemler, MALDI-TOF MS ve dizi analizi yöntemlerinin karşılaştırılması. *Dicle Med J* 2019;46:543-51.