



A Descriptive Analysis of Postgraduate Theses on Cochlear Implants in Türkiye

Türkiye’de Koklear İmplant Konulu Lisansüstü Tezlerin Tanımlayıcı Analizi

Ayşenur AYKUL YAĞCIOGLU^{*1,2}, Seda Nur TOKSÖZ³, İrem Nur TORUN⁴, Esmanur BASUT⁵, Vildan ÖZDEMİR⁶, Betül ÇİÇEK ÇINAR⁷

ABSTRACT

Objective: This study aimed to conduct a descriptive analysis of the distribution, methodological characteristics, and thematic tendencies of postgraduate theses on cochlear implants in Türkiye, using an archive-based design.

Material and Method: The search was conducted in the title field of the Council of Higher Education National Thesis Center database using the keywords “Koklear İmplant” and “Cochlear Implant.” The database search was performed in January 2025. All postgraduate theses published between 2001 and 2024 that contained these terms in their titles were included. Data were analyzed using descriptive statistics and presented as frequencies (n) and percentages (%).

Results: A total of 260 postgraduate theses were examined. Most theses were conducted at the master's level (69.2%) and primarily within the departments of Ear, Nose, and Throat (ENT) and Audiology. The first thesis was published in 2001, and the highest number of theses was completed in 2022. Hacettepe University contributed the largest number of theses. Most studies were conducted within Institutes of Health Sciences. Frequently used assessment tools included language and speech evaluation tests, questionnaires, and audiological measurements. Early diagnosis and implantation were frequently associated with improved auditory and language outcomes.

Conclusion: Postgraduate research on cochlear implants in Türkiye has increased over time and predominantly focuses on clinical and rehabilitative aspects. The findings provide an overview of academic trends in the field and guide future postgraduate research.

Keywords: audiology, cochlear implant, ENT, hearing loss, postgraduate thesis, Türkiye

ÖZET

Amaç: Bu çalışma, arşiv tabanlı bir tasarım kullanarak Türkiye'deki koklear implant konulu lisansüstü tezlerin dağılımını, metodolojik özelliklerini ve tematik eğilimlerini betimleyici olarak analiz etmeyi amaçlamıştır.

Gereç ve Yöntem: Tarama, Yükseköğretim Kurulu Ulusal Tez Merkezi veritabanında başlık alanında “Koklear İmplant” ve “Cochlear Implant” anahtar kelimeleri kullanılarak gerçekleştirilmiştir. Veritabanı taraması Ocak 2025'te yapılmıştır. Başlıklarında bu terimleri içeren ve 2001–2024 yılları arasında yayımlanan tüm lisansüstü tezler çalışmaya dahil edilmiştir. Veriler tanımlayıcı istatistikler kullanılarak analiz edilmiş ve frekans (n) ve yüzde (%) olarak sunulmuştur.

Bulgular: Toplam 260 lisansüstü tez incelenmiştir. Tezlerin büyük çoğunluğunun yüksek lisans düzeyinde (%69,2) olduğu ve ağırlıklı olarak Kulak Burun Boğaz (KBB) ve Odyoloji anabilim dallarında gerçekleştirildiği belirlenmiştir. İlk tez 2001 yılında yayımlanmış olup, en fazla tezin tamamlandığı yıl 2022'dir. En fazla tez katkısı Hacettepe Üniversitesi tarafından sağlanmıştır. Çalışmaların büyük bölümü Sağlık Bilimleri Enstitülerinde yürütülmüştür. Sıklıkla kullanılan değerlendirme araçları arasında dil ve konuşma testleri, anketler ve odyolojik ölçümler yer almaktadır. Erken tanı ve implantasyon, sıklıkla işitsel ve dil sonuçlarında iyileşmeyle ilişkilendirilmiştir.

Sonuç: Türkiye'de koklear implant konulu lisansüstü araştırmalar zaman içinde artış göstermiş olup, ağırlıklı olarak klinik ve rehabilitatif alanlara odaklanmaktadır. Bulgular, alandaki akademik eğilimlere genel bir bakış sunmakta ve gelecekteki lisansüstü araştırmalara rehberlik etmektedir.

Anahtar Kelimeler: odyoloji, koklear implant, KBB, işitme kaybı, lisansüstü tez, Türkiye

¹Lecturer, Ayşenur Aykul Yağcıoğlu, KTO Karatay University, Faculty of Health Sciences, Department of Audiology, aysenurraykull@gmail.com, ORCID: 0000-0001-9866-2974 (**Corresponding Author**)

²Ayşenur Aykul Yağcıoğlu, Hacettepe University, Institute of Health Sciences, Doctorate Program of Audiology, aysenurraykull@gmail.com, ORCID: 0000-0001-9866-2974

³Audiologist, Seda Nur Toksöz, KTO Karatay University, Faculty of Health Sciences, Department of Audiology, sedanurtoksosz@gmail.com, ORCID: 0009-0008-3493-924X

⁴Audiologist, İrem Nur Torun, KTO Karatay University, Faculty of Health Sciences, Department of Audiology, iremnurtorun2@gmail.com, ORCID: 0009-0004-6618-6124

⁵Audiologist, Esmanur Basut, KTO Karatay University, Faculty of Health Sciences, Department of Audiology, basutesmanur23@gmail.com, ORCID: 0009-0001-7926-875X

⁶Audiologist, Vildan Özdemir, KTO Karatay University, Faculty of Health Sciences, Department of Audiology, vildanozdemir42@gmail.com, ORCID: 0009-0001-6619-5539

⁷Professor, Dr. Betül Çiçek Çınar, Hacettepe University, Faculty of Health Sciences, Department of Audiology, betulcicek01@gmail.com, ORCID: 0000-0002-6570-9876

Corresponding Author: Lecturer, Ayşenur Aykul Yağcıoğlu, KTO Karatay University, Faculty of Health Sciences, Department of Audiology, aysenurraykull@gmail.com



Bu eser [Creative Commons Atıf 4.0 Uluslararası Lisansı](https://creativecommons.org/licenses/by/4.0/) ile lisanslanmıştır.

INTRODUCTION

Cochlear implants are among the most successful sensory prostheses, restoring hearing to over 800,000 people worldwide (Carlyon & Goehring, 2021). A coordinated, team-based approach is required for cochlear implant audiological evaluation, preoperative, intraoperative, postoperative assessment, and follow-up (Sennaroğlu et al., 2019). In recent years, cochlear implants have undergone significant technological and surgical advancements, with multidisciplinary care playing a crucial role in optimizing auditory outcomes. Cochlear implantation is a holistic process involving surgical, technical, audiological, and rehabilitative components, and requires close collaboration among otolaryngologists, audiologists, speech-language therapists, radiologists, engineers, and psychologists (Andries et al., 2023). The increasing prevalence of cochlear implant surgery, combined with early diagnosis of hearing loss, expanding indications, and technological advancements, has led to a significant body of postgraduate research focused on various aspects of cochlear implants, including rehabilitation, device programming, psychosocial effects, and educational integration.

Analyses of postgraduate theses help to understand research trends, methodological approaches, and academic priorities within a specific field (Nadi-Ravandi & Batooli, 2022; Zhou et al., 2024).

Research trends in postgraduate audiology theses have previously been examined. A study conducted in South Korea analyzed 228 master's and doctoral theses published between 1999 and 2014, evaluating their topics, methodologies, and participant characteristics (Lee & Seo, 2016). In Türkiye, bibliometric analyses have also been performed on postgraduate theses focusing on topics such as vestibular rehabilitation and tinnitus (Ünüvar et al., 2024; Ünüvar et al., 2025). Furthermore, a bibliometric analysis of cochlear implant research reported a continuous increase in scientific publications, with a broad and multidisciplinary research landscape involving diverse topics and contributions from multiple institutions and countries. However, this study focused on journal publications rather than postgraduate theses (Abari et al., 2024).

Examining postgraduate research output is important for identifying research priorities, methodological patterns, and potential gaps in the literature. In Türkiye, cochlear implant research has been influenced by developments in early hearing screening programs, clinical audiology education, and expanding rehabilitation services. Postgraduate theses provide valuable information regarding clinical applications, device programming approaches, auditory outcome assessment, and psychosocial adaptation processes. However, to the best of our knowledge, there is no comprehensive descriptive analysis of postgraduate theses focusing on cochlear implants in Türkiye. This study aimed to examine the institutional characteristics, methodological features, and thematic trends of postgraduate theses on cochlear implants in Türkiye.

MATERIALS AND METHODS

This study is a descriptive content analysis examining postgraduate theses on cochlear implants in the Council of Higher Education National Thesis Center database according to specific variables. The search was conducted in the title field of the Council of Higher Education National Thesis Center database using the keywords “Koklear İmplant” and “Cochlear Implant.” The database search was performed in January 2025, and no additional search filters were applied. The data were collected by four researchers and independently checked and

verified to ensure accuracy and reliability. All postgraduate theses published between 2001 and 2024 that contained these terms in their titles were included in the analysis. The inclusion criteria comprised postgraduate theses (Master's, Doctoral, and Medical Specialty theses) accessible through the Council of Higher Education National Thesis Center database. As this study involved the analysis of publicly available secondary data from the Council of Higher Education National Thesis Center database and did not include human participants or personal data, ethics committee approval was not required.

The theses were analyzed according to various variables, including thesis type, university, subject, department, institute, thesis level, language, advisor's academic title, distribution by year, data collection method, and keywords. In this study, “main discipline” refers to the institutional classification of theses in the Council of Higher Education National Thesis Center, whereas “topic” refers to the primary content and research focus of each thesis. The data were analyzed using Microsoft Excel and presented as frequencies (n) and percentages (%). The findings were presented in tables and figures, and WordArt was used to create a word cloud based on the keywords of the theses.

RESULTS

A total of 260 postgraduate theses published between 2001 and 2024 were included in the analysis. The distribution of postgraduate theses by educational level revealed that 69.2% (n = 180) were master's theses, 13.8% (n = 36) were doctoral theses, and 16.9% (n = 44) were medical specialty theses. Of these theses, 95.8% (n = 249) were written in Turkish, while 4.2% (n = 11) were written in English. Figure 1 shows the annual distribution of postgraduate theses on cochlear implants. According to the findings, the first postgraduate thesis on cochlear implants was published in 2001. The highest number of postgraduate theses was completed in 2022 (n = 37) (Figure 1).

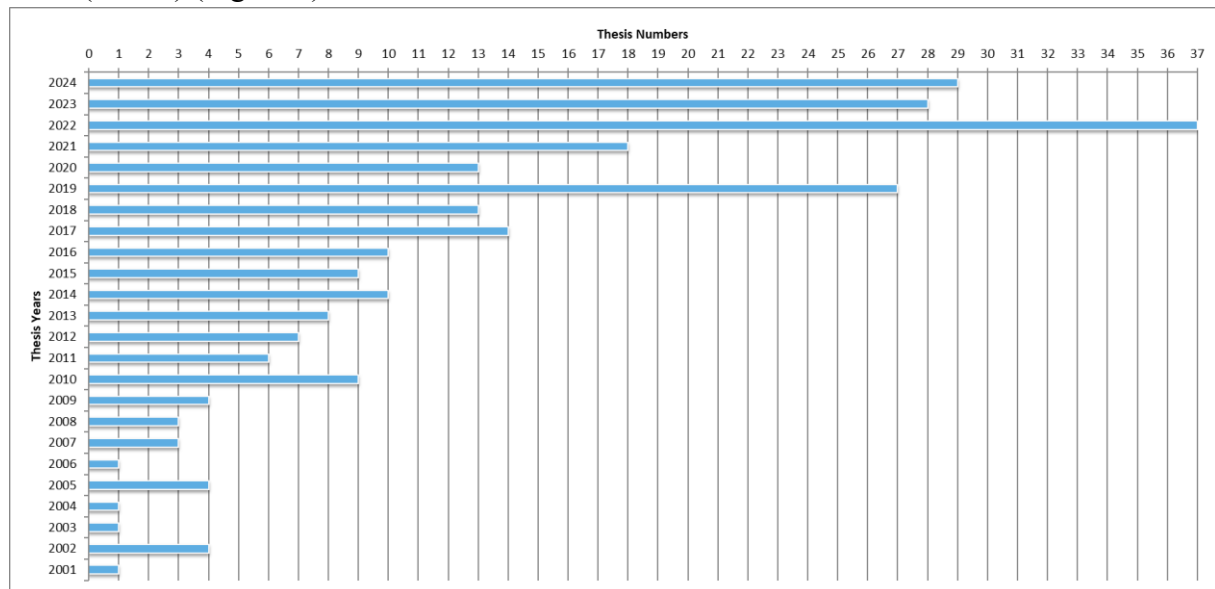


Figure 1. Distribution of theses by years

Table 1 shows that Hacettepe University (n = 60) contributed the highest number of cochlear implant-related theses. Table 2 presents the distribution of theses by institute. The theses were completed within eight different institutes, with the majority (55.8%) being completed within the Health Sciences Institute.

Table 1. Distribution of Theses by University

University	Number	Percentage
Anadolu University	7	2.7
Ankara University	7	2.7
Ankara Yıldırım Beyazıt University	2	0.8
Baskent University	5	1.9
Canakkale Onsekiz Mart University	1	0.4
Cukurova University	8	3.1
Dicle University	3	1.2
Dokuz Eylul University	12	4.6
Ege University	15	5.8
Gulhane Medical Academy University	1	0.4
Gazi University	12	4.6
Gaziantep University	10	3.8
Hacettepe University	60	23.1
Harran University	1	0.4
Inonu University	2	0.8
Istanbul University	13	5.0
Istanbul Atlas University	1	0.4
Istanbul Aydın University	18	6.9
Istanbul Gelisim University	9	3.5
Istanbul Medipol University	3	1.2
Istanbul University - Cerrahpaşa	13	5.0
Kapadokya University	11	4.2
Kocaeli University	2	0.8
KTO Karatay University	1	0.4
Marmara University	23	8.8
Middle East Technical University (METU)	7	2.7
Ondokuz Mayıs University	6	2.3
Recep Tayyip Erdogan University	1	0.4
University of Health Sciences	2	0.8
Turgut Ozal University	2	0.8
Uskudar University	2	0.8

Table 2. Distribution of Theses by Institute

Institute	Number	Percentage
Institute of Educational Sciences	5	1.9
Graduate School of Natural and Applied Sciences	8	3.1
Institute of Fine Arts	2	0.8
Institute of Graduate Education	53	20.4
Institute of Health Sciences	145	55.8
Institute of Science	2	0.8
Faculty of Medicine	44	16.9
Neuroscience	1	0.4

Table 3 shows the distribution of theses by major field of study. The Department of Ear, Nose, and Throat (ENT) ranked first, accounting for 49.9% of all theses. The Department of Audiology ranked second with 34.2%, followed by the Department of Audiology and Speech Pathology with 7.3% (Table 3).

Table 3. Distribution of Theses by Main Disciplines

Main Discipline	Number	Percentage
Anatomy	1	0.4
Surgical Diseases Nursing	1	0.4
Speech and Language Therapy	7	2.7
Electrical-Electronics Engineering	5	1.9
Disability Studies	1	0.4
Education for the Hearing Impaired	1	0.4
Otorhinolaryngology-Head and Neck Surgery	122	49.9
Micro and Nano Technology	3	1.2
Music Sciences	2	0.8
Audiology	89	34.2
Audiology and Speech Disorders	19	7.3
Special Education	6	2.3
Psychology	1	0.4
Radiology	1	0.4
Sociology	1	0.4

Table 4 presents the distribution of theses by subject. The postgraduate theses were distributed across 17 specialty areas, with ENT accounting for the largest proportion (80.4%) (Table 4). The discrepancy between Tables 3 and 4 is due to the distinction between the institutional origin of the theses and their thematic research focus.

Table 4. Distribution of Theses by Topic

Topic	Number	Percentage
Science and Technology	1	0.4
Speech and Language Therapy	1	0.4
Linguistics	5	1.9
Education and Teaching	10	3.8
Electrical and Electronics	6	2.3
Ophthalmology	1	0.4
Nursing	1	0.4
ENT	209	80.4
Mechanical Engineering	1	0.4
Music	2	0.8
Audiology	5	1.9
Audiology and Speech Disorders	8	3.1
Special Education	1	0.4
Psychology	1	0.4
Radiology and Nuclear Medicine	1	0.4
Health Education	6	2.3
Sociology	1	0.4

An examination of thesis advisors' academic titles revealed that 51.5% (n = 134) were Professors, followed by Associate Professors (26.2%, n = 68) and Assistant Professors (22.3%, n = 58). Analysis of the distribution of theses by sample size revealed that 57.3% (n = 149) included 50 or fewer participants, 35.4% (n = 92) included 51–100 participants, and 7.3% (n = 19) included 101 or more participants. The methods sections of the postgraduate theses were examined, and the assessment tools were classified as shown in Table 5. The most frequently used assessment tools were speech and language assessment tests (17.8%), followed by

Table 5. Distribution of Tests and Methods Used in Theses

Test and Method	Number	Percentage
Various questionnaires and scales	125	17
Speech and Language Assessment Tests (TEDIL, TODIL, TIFALDI, EARS, SST, AAT, HAT, etc.)	131	17.8
Speech Understanding in Noise Tests	39	5.3
Pure-tone and free-field audiometry tests (games, visual reinforcement, etc.)	84	11.4
Speech test batteries (SRT, SD, UCL, MCL)	57	7.8
Acoustic immittance assessments	36	4.9
Otoacoustic emission measurement	14	1.9
Electrophysiological tests	33	4.5
Cochlear implant electrophysiological measurements (Telemetry, ECAP, ESRT, EABR, Electrical Stimulation Test)	49	6.7
Radiological imaging (CT and MRI)	31	4.2
Vestibular assessment	34	4.6
Pupil dilation measurements	3	0.4
Psychometric Assessment Tools (Neurocognitive, psychiatric, and developmental tests)	27	3.7
Auditory Perception and Localization Tests	49	6.7
Spectral and temporal resolution assessments	16	2.2
Biochemical tests	4	0.5
Electromechanical tests	2	0.3

Multiple assessment methods could be used within a single thesis; therefore, represent the number of occurrences of each method rather than the number of unique theses. As a result, the total exceeds the number of included studies (n = 260).

The proportions of postgraduate theses that were presented as conference papers and/or published as journal articles were examined, and it was found that 76 of the 260 theses resulted in scientific outputs. A word cloud was created based on the keywords of the postgraduate theses. The most prominent keywords included cochlear implant, sensorineural hearing loss, hearing aid, and hearing quality (Figure 2).



Figure 2. Word clouds of keywords used in postgraduate theses

(VEMP =Vestibular Evoked Myogenic Potential ; MAIS= Meaningful Auditory Integration Scale; MTP= Monosyllable Trochee Polysyllable; CROS= Contralateral Routing of Signal; FM System= Frequency Modulation System; EABR =Electrically-Evoked Auditory Brainstem Response; ECAP =Electrically-Evoked Compound Action Potential; MEMS =Micro-Electro-Mechanical Systems; LIFE-R = Listening Inventory for Education-Revised; MMN =Mismatch Negativity; ADHD =Attention Deficit Hyperactivity Disorder; V-hit =Video Head Impulse Testi; NFS = Nucleus Fitting Software; NRT =Neural Response Telemetry; SRT = Speech Reception Threshold; MCL=Most Comfortable Level)

DISCUSSION

This study demonstrates that postgraduate research on cochlear implants in Türkiye has increased over time. Since the early 2000s, developments in cochlear implant technology, the expansion of early diagnosis programs, and the broadening of implantation criteria have stimulated academic interest in this field. Cochlear implantation has evolved from a purely surgical procedure into a multidisciplinary rehabilitation-based intervention. Post-implant auditory and language outcomes were among the most frequently investigated topics, particularly the timing of implantation. Many studies reported that earlier implantation is associated with better auditory perception, language development, and educational performance (Harman, 2023; Yaşamsal, 2010; Polat, 2011; Öz, 2012; İynen, 2017; Aslan, 2016).

In terms of academic level, master's theses constituted the majority of the studies, while medical specialty and doctoral dissertations represented a smaller portion of the sample. This distribution may be related to the larger number of students enrolled in master's programs and the limited number of institutions offering doctoral education in this field. The majority of theses were written in Turkish, indicating that research production in this field is mainly conducted in a national academic context. However, the low proportion of English-language theses may limit international scientific visibility. Increasing postgraduate research written in English may facilitate global knowledge dissemination.

Analysis of the institutional distribution revealed that a large proportion of postgraduate theses were conducted at Hacettepe University. The high number of theses produced by this university may be associated with its early establishment of audiology education programs, its strong academic staff in audiology, its experienced faculty, and its extensive clinical research opportunities. Previous studies investigating postgraduate theses in audiology-related fields in Türkiye have also reported similar findings, suggesting that the high thesis production capacity of this institution is related to its long-standing academic tradition, higher number of academic staff, and advanced clinical research environment (Perker et al., 2023). Most theses were conducted within the Institute of Health Sciences, reflecting the clinical and rehabilitation-oriented nature of cochlear implant research. Among academic departments, ENT and Audiology were the most common research areas, indicating the growing academic visibility of audiology. The low conversion rate of theses into scientific publications may be attributed to structural factors in postgraduate education in Türkiye, such as limited publication incentives and high supervisory workload.

Pediatric populations were the most frequently studied sample group in master's theses. Early intervention for childhood hearing loss is crucial because auditory stimulation in early development plays a fundamental role in speech and language acquisition. Delayed auditory input can negatively impact language, cognitive, and educational development. Theses have shown that cochlear implantation at an earlier age is associated with improvements in speech perception, language outcomes, and academic performance (Yaşamsal, 2010; Polat, 2011; Öz,

2012; Aslan, 2016; İynen, 2017; Harman, 2023). Family-centered rehabilitation approaches were also frequently investigated in master's research, reflecting the importance of family involvement in the auditory rehabilitation process.

Standardized assessment tools were commonly used in postgraduate research. Language and speech tests, questionnaire-based scales, pure-tone and free-field audiometry, speech test batteries, and electrophysiological measurements were frequently preferred. Scales such as the Familial Perspective Questionnaire (ABPA), Pediatric Quality of Life Inventory (PedsQL), World Health Organization Quality of Life Scale (WHOQOL-BREF), and Speech, Spatial and Qualities of Hearing Scale (SSQ) were used to evaluate family satisfaction, quality of life, and hearing outcomes. The Wechsler Intelligence Scale for Children was also frequently used for cognitive assessment (Beyazıt, 2013; Akçakaya, 2015; Demir, 2017; Erdem, 2018; Akan, 2019; Baltacı, 2019; Satıcı, 2019; Kumtepe, 2022; Gülşen, 2022).

The use of standardized assessment instruments in postgraduate theses enhances methodological reliability, allows comparisons across different study cohorts, and contributes to the identification of factors associated with outcome variability. In addition, auditory performance and integration were commonly evaluated using tests such as the Listening Developmental Profile (LiP), MTP, and MAIS, which were frequently used in clinical and research-based postgraduate theses (Agüloğlu, 2014; Akkaplan, 2019).

Frequently used keywords in postgraduate theses included cochlear implant, sensorineural hearing loss, hearing aid, hearing quality, fitting, impedance, and electrode. The prominence of these terms suggests that postgraduate research in Türkiye primarily focuses on hearing loss management, objective audiological assessment, and rehabilitation-oriented auditory science. In addition, research topics demonstrated considerable diversity, reflecting the multidisciplinary nature of cochlear implant studies. Postgraduate theses also investigated technological and clinical applications such as remote and face-to-face device programming, FM (Frequency Modulation) system technologies, and the effects of anatomical variations on cochlear implant outcomes. These findings indicate an increasing emphasis on technological innovation and individualized device programming strategies aimed at improving clinical effectiveness (Pirim, 2012; Beker, 2013; Kirazlı, 2015; İlik, 2018; Uluşan, 2018; Çatalkaya, 2024). The increasing interest in technological applications such as FM systems, remote programming, individualized device fitting, and digital rehabilitation approaches reflects the global transition toward technology-supported auditory rehabilitation. Modern cochlear implant research increasingly emphasizes functional hearing outcomes together with psychosocial adaptation, cognitive development, quality of life, and social integration in addition to auditory threshold improvement (Zeng, 2004; Wilson & Dorman, 2008).

Anatomical and etiological factors were also prominent research topics in postgraduate theses on cochlear implants. Inner ear anomalies may influence cochlear implantation outcomes, and postoperative auditory performance may vary depending on the type of malformation, duration of implant use, and rehabilitation processes (Gülşen, 2022). Post-implant rehabilitation education was frequently emphasized in postgraduate research. Continuous and intensive rehabilitation programs were reported to support auditory development, language acquisition, and functional hearing integration after cochlear implantation. The results of postgraduate theses indicate that rehabilitation education plays a critical role in improving treatment outcomes, and many studies have focused on optimizing

rehabilitation protocols (Öz, 2012; Keleş, 2021). Postgraduate theses also examined surgical and postoperative complications associated with cochlear implantation. Reported complications included perilymph leakage, vertigo, and seroma formation following surgery (Agüloęlu, 2014; Topal, 2016; İynen, 2017; Akan, 2019). Early detection, monitoring, and appropriate clinical management of postoperative complications are considered important for improving surgical safety and long-term clinical outcomes. Research findings from postgraduate theses contribute to the development of surgical techniques and postoperative care strategies.

In recent years, postgraduate research has extended beyond auditory performance assessment and has increasingly focused on psychosocial adaptation and quality of life outcomes. This trend reflects a more comprehensive evaluation perspective in cochlear implant research, considering psychological, social, and functional well-being in addition to physiological auditory outcomes (Demir, 2017; Kumtepe, 2022; Dur, 2022; Tunca, 2024; Kan, 2024). The relatively high number of publications derived from postgraduate theses indicates that academic research in this field contributes substantially to the scientific literature through journal publications and knowledge dissemination.

This study is limited to postgraduate theses indexed in the National Thesis Center database in Türkiye. The analysis was restricted to theses containing the keywords “Koklear İmplant” and “Cochlear Implant” in their titles, which may have excluded indirectly related studies. The study is descriptive and based on frequency analysis; full-text content analysis, methodological quality assessment, inter-rater reliability testing, and citation-based bibliometric indicators were not included. Future research may apply bibliometric mapping and thematic analysis methods to provide a more comprehensive evaluation of research trends in this field.

CONCLUSION AND RECOMMENDATIONS

This descriptive analysis of postgraduate theses on cochlear implantation in Türkiye provides a comprehensive overview of research trends, institutional distribution, and methodological approaches in the field. The findings demonstrate a growing academic interest in cochlear implantation, with a strong emphasis on early intervention, rehabilitation-oriented management, technological innovation, and psychosocial integration. The diversity of assessment tools used in postgraduate research indicates that cochlear implant studies extend beyond auditory performance evaluation and increasingly address neurocognitive development, language acquisition, quality of life, and multidisciplinary care. This study contributes to understanding the academic landscape of cochlear implant research and may guide future postgraduate research, institutional planning, and research policy development in the field.

Conflict of Interest Statement

The authors declare no conflict of interest.

Financial Disclosure

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Author Approval

All authors have read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

Author Contributions

Research Idea/Concept: AAY

Research Design: AAY, SNT, INT, EB, VO

Supervision/Consultancy: B

Data Collection and/or Processing: SNT, INT, EB, VO

Analysis and/or Interpretation of Data: AAY, SNT, INT, EB, VO

Literature Review: AAY, SNT, INT, EB, VO

Article Writing: AAY, SNT, INT, EB, VO

Critical Review: AAY, SNT, INT, EB, VO

REFERENCES

- Abari, J., Tekin, A. M., Baęşı, I., & Topsakal, V. (2024). More than 40 years of cochlear implant research: A bibliometric analysis. *Cochlear implants international*, 25(3), 222–230. <https://doi.org/10.1080/14670100.2024.2330793>
- Agüloęlu, B. (2014). *Koklear implant uygulanan hastaların cerrahi ve işitsel yönden retrospektif analizi*. [Tıpta uzmanlık tezi, Dicle Üniversitesi]. YÖK Ulusal Tez Merkezi.
- Akan, L. (2019). *Koklear implant operasyonu yapılan hastalarda vestibüler sistem deęerlendirilmesi*. [Tıpta uzmanlık tezi, Saęlık Bilimleri Üniversitesi]. YÖK Ulusal Tez Merkezi.
- Akçakaya, H. (2015). *Erken yaşıta koklear implant uygulanan çocuklarda sözel çalışma belleęi ve dil ile ilişkisinin incelenmesi*. [Yüksek lisans tezi, Hacettepe Üniversitesi]. YÖK Ulusal Tez Merkezi.
- Akkaplan, S. (2019). *Pediyatrik koklear implant kullanıcılarında konuşmayı ayırt etme becerisinin video görsel pekiştireç odyometrisi ile deęerlendirilmesi*. [Yüksek lisans tezi, Hacettepe Üniversitesi]. YÖK Ulusal Tez Merkezi.
- Andries, E., Lorens, A., Skarżyński, P. H., et al. (2023). Implementation of the international classification of functioning, disability and health model in cochlear implant recipients: A multi-center prospective follow-up cohort study. *Frontiers in Audiology and Otology*, 1, 1257504. <https://doi.org/10.3389/fau.2023.1257504>
- Aslan, F. (2016). *Erken ve geç dönem koklear implant uygulanan okul çaęı çocuklarının işitsel muhakeme becerilerinin karşılaştırılması*. [Doktora tezi, Hacettepe Üniversitesi]. YÖK Ulusal Tez Merkezi.
- Baltacı, I. (2019). *Koklear implant kullanan çocuklarda kısa süreli bellek, çalışma belleęi ve bilgi işleme hızı ile okumayı anlama becerileri arasındaki ilişkinin deęerlendirilmesi*. [Yüksek lisans tezi, İstanbul Üniversitesi-Cerrahpaşı]. YÖK Ulusal Tez Merkezi.
- Beker, L. (2013). *MEMS piezoelectric energy harvester for cochlear implant applications*. [Yüksek lisans tezi, Orta Doęu Teknik Üniversitesi]. YÖK Ulusal Tez Merkezi.
- Beyazıt, B. (2013). *Postlingual koklear implant hastalarının yaşam kalitesinin deęerlendirilmesi*. [Yüksek lisans tezi, Gazi Üniversitesi]. YÖK Ulusal Tez Merkezi.
- Carlyon, R. P., & Goehring, T. (2021). Cochlear implant research and development in the twenty-first century: A critical update. *Journal of the Association for Research in Otolaryngology*, 22, 481–508. <https://doi.org/10.1007/s10162-021-00796-x>
- Çatalkaya, I. (2024). *Koklear implantlı ve işitme cihazlı bireylerin dinleme ve anlama becerilerinin cinsiyete göre deęerlendirilmesi*. [Yüksek lisans tezi, İstanbul Gelişim Üniversitesi]. YÖK Ulusal Tez Merkezi.
- Demir, İ. (2017). *Koklear implant kullanan çocuklarda dil gelişimi, motor becerisi ve yaşam kalitesinin deęerlendirilmesi*. [Tıpta uzmanlık tezi, İnönü Üniversitesi]. YÖK Ulusal Tez Merkezi.
- Dur, S. (2022). *Bimodal ve unilateral koklear implant kullanan pediyatrik popülasyonda günlük yaşam işitsel davranış özelliklerinin incelenmesi*. [Yüksek lisans tezi, Kapadokya Üniversitesi]. YÖK Ulusal Tez Merkezi.

- Erdem, B. (2018). *Unilateral, bimodal ve bilateral koklear implant kullanıcılarında konuşma, uzaysal algı ve işitme kalitesinin değerlendirilmesi*. [Yüksek lisans tezi, Marmara Üniversitesi]. YÖK Ulusal Tez Merkezi.
- Gülşen, G. (2022). *İç kulak anomalisi olan çocuklarda koklear implantasyona ebeveynlerin bakış açısı*. [Yüksek lisans tezi, Kapadokya Üniversitesi]. YÖK Ulusal Tez Merkezi.
- Harman, D. (2023). *Koklear implantlı hastalarda implant sonrası rehabilitasyondan fayda görme üzerine etkili faktörlerin incelenmesi*. [Yüksek lisans tezi, İstanbul Gelişim Üniversitesi]. YÖK Ulusal Tez Merkezi.
- İlik, B. (2018). *MEMS thin film piezoelectric acoustic transducer for cochlear implant applications*. [Yüksek lisans tezi, Orta Doğu Teknik Üniversitesi]. YÖK Ulusal Tez Merkezi.
- İynen, İ. (2017). *Harran Üniversitesi Tıp Fakültesi Kulak Burun Boğaz Hastalıkları Kliniğinde koklear implant uygulanan hastaların retrospektif analizi*. [Yüksek lisans tezi, Başkent Üniversitesi]. YÖK Ulusal Tez Merkezi.
- Kan, M. C. (2024). *İki yaş öncesi veya sonrası cihazlanmış bilateral veya unilateral koklear implant kullanan çocukların sosyal ve akademik becerileri açısından değerlendirilmesi*. [Yüksek lisans tezi, İstanbul Gelişim Üniversitesi]. YÖK Ulusal Tez Merkezi.
- Keleş, M. (2021). *Koklear implant kullanıcısı işlem öncesi dönem çocuklarında öğrenme stilleri ve dil gelişimi arasındaki ilişkinin incelenmesi*. [Yüksek lisans tezi, Hacettepe Üniversitesi]. YÖK Ulusal Tez Merkezi.
- Kirazlı, G. (2015). *Koklear implantlı ilköğretim birinci sınıf öğrencilerinde frekans modülasyon sistemi kullanımının öğrenmeye katkısı*. [Yüksek lisans tezi, Dokuz Eylül Üniversitesi]. YÖK Ulusal Tez Merkezi.
- Kumtepe, S. (2022). *Koklear implant kullanan çocuklarda bilişsel beceriler ile okuduğunu anlama becerisi arasındaki ilişkinin incelenmesi*. [Yüksek lisans tezi, Hacettepe Üniversitesi]. YÖK Ulusal Tez Merkezi.
- Lee, M. S., & Seo, Y. G. (2016). An analysis of research trends of master's thesis and doctoral dissertations in audiology: A review of research from 1999 to 2014. *Audiology and Speech Research*, 12(4), 241-252.
- Nadi-Ravandi, S., & Batooli, Z. (2022). Gamification in education: A scientometric, content and co-occurrence analysis of systematic review and meta-analysis articles. *Education and Information Technologies*, 27, 10207–10238. <https://doi.org/10.1007/s10639-022-11234-5>
- Öz, A. (2012). *Prelingual koklear implantasyon uygulanan hastalarda işitme sonuçlarımız*. [Tıpta uzmanlık tezi, Gaziantep Üniversitesi]. YÖK Ulusal Tez Merkezi.
- Perker, Y., Tutar, V., & Taş, İ. H. (2023). Türkiye’de odyoloji alanında yapılmış lisansüstü tezlerin çeşitli değişkenler açısından incelenmesi. *Türk Odyoloji ve İşitme Araştırmaları Dergisi*, 6(3), 89–94.
- Pirim, F. (2022). *MEMS based multi-mode multi-channel piezoelectric sensor for fully implantable cochlear implants*. [Yüksek lisans tezi, Orta Doğu Teknik Üniversitesi]. YÖK Ulusal Tez Merkezi.
- Polat, B. (2011). *Kliniğimizde koklear implant ameliyatı olmuş hastaların implant yaşına göre işitsel performanslarının analizi, yaş ve demografik özelliklere göre karşılaştırılması*. [Tıpta uzmanlık tezi, İstanbul Üniversitesi]. YÖK Ulusal Tez Merkezi.
- Satıcı, S. (2019). *İşitme cihazı ve koklear implant kullanıcılarında benlik saygısının değerlendirilmesi*. [Yüksek lisans tezi, Marmara Üniversitesi]. YÖK Ulusal Tez Merkezi.

Sennaroęlu, G., Batuk, M., & Kaya, Ő. (2019). Koklear implantasyon: Odyolojik deęerlendirme, preoperatif, intraoperatif ve postoperatif takip. *Türk Odyoloji ve İŐitme Arařtırmaları Dergisi*, 2, 24–29.

Topal, M. (2016). *Koklear implant (biyonik kulak) cerrahisi sonrası uzun dönem vestibüler fonksiyonların vestibüler uyarılmış kas cevapları ile deęerlendirilmesi*. [Yüksek lisans tezi, Bařkent Üniversitesi]. YÖK Ulusal Tez Merkezi.

Tunca, S. (2024). *4–8 yař grubu koklear implantlı çocuklarda dil gelişimi ile günlük yařam kalitesi arasındaki iliřki*. [Yüksek lisans tezi, Kapadokya Üniversitesi]. YÖK Ulusal Tez Merkezi.

Uluřan, H. (2018). *Ultra-low power interface electronics design for fully implantable cochlear implants*.

[Doktora tezi, Orta Doęu Teknik Üniversitesi]. YÖK Ulusal Tez Merkezi.

Ünüvar, B. S., Aydemir, B., & Aydemir, F. (2024). Vestibüler rehabilitasyon bařlıklı lisansüstü tezlerin nitel ve nicel ięerik analizi. *Gümüřhane Üniversitesi Saęlık Bilimleri Dergisi*, 13(4), 1818-1828.

Ünüvar, B. S., Algan, H., Dař, G., & Akdoęan, H. (2025). Tinnitus Bařlıklı Lisansüstü Tezlerin Nitel Ve Nicel İęerik İncelemesi: Metodolojik Çalışma. *Türk Odyoloji ve İŐitme Arařtırmaları Dergisi*, 8(1), 1-6.

Wilson, B. S., & Dorman, M. F. (2008). Cochlear implants: A remarkable past and a brilliant future. *Hearing Research*, 242(1–2), 3–21. <https://doi.org/10.1016/j.heares.2008.06.005>

Yařamsal, A. (2010). *Koklear implant olma yařının yazılı dil becerisi ile iliřkisinin incelenmesi*. [Yüksek lisans tezi, Hacettepe Üniversitesi]. YÖK Ulusal Tez Merkezi.

Zeng, F. G. (2004). Trends in cochlear implants. *Trends in Amplification*, 8(1), 1–34. <https://doi.org/10.1177/108471380400800102>

Zhou, L., Sun, Y., Wang, J., et al. (2024). Trends in patient safety education research for healthcare professional students over the past two decades: A bibliometric and content analysis. *Medical Education Online*, 29, 2358610. <https://doi.org/10.1080/10872981.2024.2358610>