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Knowledge, Attitudes, and Experiences Towards Transcranial Magnetic Stimulation Among Child and Adolescent Psychiatrists

Çocuk ve Ergen Psikiyatristlerinin Transkraniyal Manyetik Stimülasyon Hakkındaki Bilgi, Tutum ve Deneyimleri

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ABSTRACT

Objective: Transcranial magnetic stimulation (TMS) is a non-invasive modulation technique. While TMS is used in many fields among adult patients, its use in child and adolescent mental health is limited. This study aims to evaluate levels of knowledge, clinical experiences, and attitudes of child and adolescent psychiatrists regarding TMS and to identify potential barriers and facilitators to the application of TMS.

Methods: The study included 115 child and adolescent psychiatrists actively working in various institutions across Türkiye. Data were collected via a structured online questionnaire that inquired about participants' demographic characteristics and their knowledge levels, experiences, perceptions of efficacy and safety, and training regarding TMS protocols.

Results: While 68.7% of participants reported having a "low" general knowledge about TMS, 96.5% had received no formal training in this area. Although the indication for major depressive disorder was known to 93.9% of participants, only 8.7% of physicians had experience with TMS in the pediatric patient group. The biggest barriers to clinical practice were reported to be problems accessing equipment and a lack of information or training. The successful clinical case studies and increased training opportunities emerged as the most important facilitating factors.

CONCLUSION: Although professionals in child and adolescent psychiatry have a positive view of TMS therapy and show strong interest in learning about it, there are deficiencies in training and

ÖZ

Amaç: Transkraniyal manyetik stimülasyon (TMS), invaziv olmayan bir nöromodülasyon tekniğidir. TMS erişkin hastalarda birçok alanda kullanılmakla birlikte, çocuk ve ergen ruh sağlığı alanındaki kullanımı sınırlıdır. Bu çalışmanın amacı, çocuk ve ergen psikiyatristlerinin TMS'ye ilişkin bilgi düzeylerini, klinik deneyimlerini ve tutumlarını değerlendirmek; TMS uygulamasının önündeki olası engelleri ve kolaylaştırıcı faktörleri belirlemektir.

Yöntemler: Çalışmaya, Türkiye'de çeşitli kurumlarda aktif olarak çalışan 115 çocuk ve ergen psikiyatristi dahil edilmiştir. Veriler, katılımcıların demografik özellikleri ile TMS protokollerine ilişkin bilgi düzeylerini, deneyimlerini, etkinlik ve güvenlilik algılarını ve eğitim durumlarını sorgulayan yapılandırılmış bir çevrim içi anket aracılığıyla toplanmıştır.

Bulgular: Katılımcıların %68,7'si TMS hakkında genel bilgi düzeyini "düşük" olarak bildirirken, %96,5'i bu alanda herhangi bir eğitim almadığını belirtmiştir. Majör depresif bozukluk endikasyonu katılımcıların %93,9'u tarafından bilinmesine rağmen, hekimlerin yalnızca %8,7'sinin pediatrik hasta grubunda TMS deneyimi olduğu saptanmıştır. Klinik uygulamanın önündeki en önemli engellerin ekipmana erişim sorunları ile bilgi veya eğitim eksikliği olduğu bildirilmiştir. Başarılı klinik olgu örnekleri ve eğitim olanaklarının artırılması ise en önemli kolaylaştırıcı faktörler olarak öne çıkmıştır.

Sonuç: Çocuk ve ergen psikiyatrisi alanındaki profesyoneller TMS tedavisine olumlu yaklaşmakta ve bu konuda bilgi edinmeye güçlü bir ilgi göstermektedir; ancak eğitim ve deneyim açısından

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ABSTRACT

experience. To ensure the safe and evidence-based use of TMS, it is implement structured TMS training and to increase its accessibility in hospitals.

Keywords: Transcranial magnetic stimulation, adolescent psychiatry, attitude, clinical competence, major depressive disorder, mental health

ÖZ

eksiklikler bulunmaktadır. TMS'nin güvenli ve kanıta dayalı biçimde kullanılabilmesi için yapılandırılmış TMS eğitimlerinin uygulanması ve hastanelerde erişilebilirliğinin artırılması gerekmektedir.

Anahtar Sözcükler: Transkraniyal manyetik stimülasyon, ergen psikiyatrisi, tutum, klinik yeterlilik, majör depresif bozukluk, ruh sağlığı

INTRODUCTION

Transcranial magnetic stimulation (TMS) is a non-invasive treatment method that induces an electric current in the brain through a magnetic field. TMS aims to induce changes in intracranial actvity through neuronal pathways and neurotransmitter release (1,2). Physiological mechanism of TMS includes neuroplasticity creating long-lasting effects in the brain (3). TMS was first approved by the US Food and Drug Administration (FDA) in 2008 for the treatment of refractory depression in adults. Since then, with the help of developing technological advances, it has become a treatment method applicable to a variety of conditions (4). Currently, various studies are being conducted regarding the use of TMS in many psychiatric and neurological disorders such as major depressive disorder (MDD), obsessive-compulsive disorder (OCD), anxiety disorders, stroke, substance abuse, and schizophrenia (5,6), but its effectiveness in treatment-resistant depression is most consistent (6-8). TMS in anxiety disorders was also suggested to be a viable and safe method (9). Furthermore, the role of TMS treatment in post-stroke rehabilitation and substance use disorders is also being investigated (10,11). Although TMS in adult psychiatry have an extended clinical use, its use in child and adolescent patients is approached cautiously due to the complexity of the developing brain and its safety profile (12,13).

Until recently, TMS had been used experimentally in child and adolescent mental health, including MDD, ASD, and attention deficit hyperactivity disorder (ADHD) (14,15). In 2024, TMS was approved by the FDA for the treatment of depression in adolescents (16). This approval is expected to pave the way for greater use of TMS in clinical practice.

Although experimental studies have been conducted and the recent approval for use in adolescents has been confirmed, child and adolescent psychiatrists may have variable attitudes toward the use of TMS in adolescents. T hat it is not available in every clinic may raise questions regarding TMS. Several studies are currently being conducted to investigate clinicians' perspectives on the use of TMS. A study showed that while 71% of clinicians believed they would refer patients for TMS treatment in the future, 67% were lack of knowledge on TMS referral (17). Another study indicated that 80% of clinicians had sufficient knowledge about TMS, but only 53% said they would accept TMS treatment if they were patients themselves (18). A study about perceptions of psychiatrists in China found that many clinicians had insufficient knowledge of TMS (19). A recent study conducted in Europe found that clinical experience with TMS was limited, and most participants expressed a desire for increased clinical training on TMS (20). A study in 2024 found that knowledge of TMS was higher among those working in academic centers (21); another study conducted in Türkiye emphasized that while most psychiatrists viewed TMS as a positive treatment method, more training and clinical experience were needed (22). Studies show that as training and clinical experience increase, so does the positive attitude towards TMS (17).

Although numerous studies have examined adult psychiatrists' knowledge, attitudes, competencies, and expectations regarding TMS, research in child and adolescent mental health remains limited. The growing body of evidence regarding TMS, coupled with its approval for use in adolescent depression, is leading to increased interest in TMS and its adoption in clinical practice. The gaps in current literature highlight the need to conduct further research on TMS and to clarify clinicians' needs, experiences, perspectives, and expectations toward TMS. Our study aimed to assess the knowledge, attitudes, and clinical experiences of child and adolescent psychiatrists regarding TMS treatment. The primary objectives of the study are to identify clinical training needs and provide data that will facilitate the integration of TMS into clinical practice in child and adolescent psychiatry.

MATERIALS AND METHODS

Methods

Study Design

A descriptive, cross-sectional survey methodology was utilized to examine TMS-related knowledge, perceived barriers, and potential facilitators of clinical implementation among child and adolescent psychiatry professionals in Türkiye. The study was non-interventional in nature and was conducted entirely through an online, self-administered questionnaire format. Ethical approval was granted by the Gazi University Rectorate Ethics Committee (approval number: 2024-1813, meeting date: 26.11.2024, meeting no: 19), and all participants provided electronic informed consent before completing the survey.

Participants

The study targeted professionals in child and adolescent psychiatry who were actively engaged in clinical practice in Türkiye during the data collection period. Inclusion criteria encompassed three groups: board-certified child and adolescent psychiatrists, psychiatry residents undergoing specialty training in child and adolescent psychiatry, and academics in child and adolescent psychiatry. Participants were not excluded based on age, gender, years of clinical experience, or institutional affiliation; institutional affiliations included university hospitals, training and research hospitals, state hospitals, and private practice settings. Participation was entirely voluntary; no identifying information was collected, and no form of compensation was offered.

Survey Administration

Data were collected via an electronic questionnaire developed and distributed through Google Forms. The survey link was disseminated through professional email distribution lists and a closed WhatsApp group consisting of child and adolescent psychiatry specialists, residents, and academic faculty from across Türkiye. All responses were collected without personal identifiers to ensure anonymity, and data were stored in a password-protected institutional database with access restricted to the research team.

Survey Content

The survey consisted of basic demographic items followed by 15 questions assessing child and adolescent psychiatry professionals' knowledge, attitudes, and experiences regarding TMS. The questionnaire was partially adapted from existing literature investigating mental health professionals' attitudes toward diverse treatment modalities (18,23,24).

Demographic variables included age, sex, years of clinical experience in mental health, and geographic location of practice. Knowledge-based items evaluated participants' familiarity with TMS protocols, indications, and underlying mechanisms. Perception-oriented questions assessed professional attitudes regarding the efficacy and safety of TMS in adolescents. Finally, experience-related items focused on the participants' previous clinical use of TMS and formal training history.

Statistical Analysis

All statistical analyses were carried out using IBM SPSS Statistics, Version 26.0. For continuous variables, descriptive statistics were reported as means, standard deviations, medians, and ranges, whereas categorical variables were summarized using frequencies and percentages. The normality assumption was evaluated through skewness and kurtosis indices. Comparisons between groups for categorical variables were conducted using chi-square tests; Fisher's exact test was applied when cell frequencies were insufficient to meet the assumptions of the chi-square test. A p-value of less than 0.05 was considered statistically significant throughout all analyses.

Although year of experience were initially recorded across four categories (≤5, 6–10, 11–20, and ≥21 years), the small cell sizes in the upper categories precluded their use as independent groups in inferential analyses. For chi-square comparisons, experience was dichotomized into two groups: five or fewer years (n = 57) and more than five years (n = 58).

RESULTS

A total of 115 child and adolescent psychiatry professionals participated in the study. The majority of participants were between the ages of 30 and 39 years (59.1%), while 35.7% were under 30 years of age and 5.2% were 40 years or older. Female participants constituted 76.5% of the sample (n = 88). In terms of professional experience, 49.6% of participants had 5 or fewer years, 44.3% had 6 to 10 years, and 6.1% had 11 or more years. Geographically, the largest proportion of respondents worked in the Central Anatolia Region (40.9%), followed by the Marmara Region (21.7%) and the Aegean Region (12.2%). Baseline demographic and professional characteristics of the sample are presented in Table 1.

The knowledge levels and the comparisons between the experience groups are summarized in Table 2. The overall level of knowledge regarding TMS was low across both experience groups. Among participants with 5 or fewer years of experience, 38 (66.7%) reported limited knowledge of TMS, 12 (21.1%) reported moderate knowledge, and only 1 participant reported high knowledge. A similar distribution was observed among participants with more than 5 years of experience, with 41 (70.7%) reporting limited knowledge. No statistically significant difference was found between the two groups with respect to overall TMS knowledge level (p = 0.871). Over half of participants (56.5%) reported no knowledge of TMS protocols, while only 3.5% described their knowledge as high. This distribution also did not differ significantly between the two experience groups (p = 0.954). Regarding knowledge of clinical indications, the majority of participants (93.9%) correctly identified MDD as an indication for TMS. Recognition of MDD was higher among participants with less experience (98.2% vs. 89.7%). A trend toward significance was observed (p = 0.054). In contrast, recognition of alcohol and substance use disorders as an indication for TMS was more prevalent in the more experienced group (24.1% vs. 10.5%), and a trend toward significance was observed for this comparison (p = 0.054). Knowledge of OCD as an indication was significantly more common among participants with more experience than among those with less experience (p = 0.032). No significant between-group differences were observed for anxiety disorders, autism spectrum disorder (ASD), ADHD, or alcohol and substance use disorders. Only a small proportion of participants reported prior experience with TMS in a pediatric population (8.7%), and formal training in TMS was rare in both groups (3.5%).

Table 1. Baseline demographical and professional characteristics.

Variable	Category	n	%
Age	<30	41	35.7
	30–39	68	59.1
	≥40	6	5.2
Sex	Male	27	23.5
	Female	88	76.5
Years of professional experience	≤5	57	49.6
	6–10	51	44.3
	≥11	7	6.1
Geographical regions of Türkiye	Aegean Region	14	12.2
	Black Sea Region	9	7.8
	Central Anatolia Region	47	40.9
	East Anatolia Region	3	2.6
	Mediterranean Region	12	10.4
	Marmara Region	25	21.7
	Southeastern Anatolia Region	5	4.3

Table 2. Comparison of knowledge for TMS in terms of experience.

	≤5 years, (n = 57)	>5 years (n = 58)	Total (n = 115)	X^2	p-value
Overall knowledge level for TMS				0.7	0.871
None	6 (10.5)	5 (8.6)	11 (9.6)		
Few	38 (66.7)	41 (70.7)	79 (68.7)		
Moderate	12 (21.1)	10 (17.2)	22 (19.1)		
High	1 (1.8)	2 (3.4)	3 (2.6)		
Familiarity with TMS protocols				0.1	0.954
None	33 (57.9)	32 (55.2)	65 (56.5)		
Few	22 (38.6)	24 (41.4)	46 (40.0)		
High	2 (3.5)	2 (3.4)	4 (3.5)		
Knowledge of clinical indications					
MDD	56 (98.2)	52 (89.7)	108 (93.9)	3.7	0.054
OCD	36 (63.2)	47 (81.0)	83 (72.2)	4.6	**0.032**
Anxiety disorders	25 (43.9)	27 (46.6)	52 (45.2)	0.1	0.772
ASD	8 (14.0)	11 (19.0)	19 (16.5)	0.5	0.477
ADHD	7 (12.3)	10 (17.2)	17 (14.8)	0.6	0.454
Alcohol/substance use disorders	6 (10.5)	14 (24.1)	20 (17.4)	3.7	0.054
Prior experience with TMS in pediatric populations	4 (7.0)	6 (10.3)	10 (8.7)	FET	0.743
Formal training in TMS	2 (3.5)	2 (3.4)	4 (3.5)	FET	1.000

ADHD: Attention-deficit/hyperactivity disorder, ASD: Autism spectrum disorders, FET: Fisher's exact test, MDD: Major depressive disorder, OCD: Obsessive-compulsive disorder, TMS: Transcranial magnetic stimulation, X^2: Chi-square test.

Perceptions regarding the clinical effectiveness of TMS for MDD in children and adolescents were mixed. The most common response was "moderately effective" (42.6%), while 29.6% of participants indicated they were unsure of TMS's effectiveness. Only 5.2% considered TMS to be highly effective in this population. No statistically significant difference was found between the two experience groups (p = 0.822). With respect to safety, the majority of participants rated TMS as moderately safe (42.6%) or very safe (25.2%) for use in children and adolescents, while 27.0% were unsure. Group differences in safety perceptions were not statistically significant (p = 0.640). Regarding the role of TMS in treatment algorithms, most participants (60.0%) disagreed that TMS should be considered a first-line treatment option for MDD in children and adolescents, while 36.5% neither agreed nor disagreed. Only 3.5% expressed agreement. This distribution did not differ significantly between the two groups (p = 0.408). When asked about the perceived benefits of TMS as an adjunctive treatment for pediatric psychiatric disorders, 49.6% of participants described it as moderately beneficial and 17.4% as highly beneficial. Approximately one-fifth of participants (20.9%) were unsure, whereas only 0.9% considered TMS not beneficial. No significant group differences were identified (p = 0.104; Table 3).

The perceived barriers to, and potential facilitators of, clinical use of TMS, according to participants, are shown in Table 4. Among the identified barriers to gaining experience with TMS, limited accessibility was the most frequently cited concern (75.5%), followed by lack of knowledge and/or education (46.1%), insufficient evidence for efficacy (16.7%), and safety concerns (6.9%). Regarding potential facilitators, the availability of clinical case studies demonstrating successful use was ranked highest (73.9%), followed by greater accessibility of TMS services (61.7%), more education and training opportunities (59.1%), collegial support or consultation (58.3%), and greater accessibility of clinical guidelines (48.7%).

DISCUSSION

This study is one of the pioneering studies evaluating the knowledge, attitudes, and clinical experience of child and adolescent psychiatrists regarding the application of TMS in adolescents. The findings are generally consistent with those reported in other studies. In our study, 68.7% of the professionals had "little knowledge" about TMS, and 96.5% had not received any training on this subject. This data was found to be consistent with studies conducted with adult psychiatrists in the literature (19). Our results were also in line with a study conducted on adult psychiatrists in Türkiye, which highlighted "insufficient clinical experience despite positive attitudes"(22). A similar barrier to practice appears to exist in the field of child and adolescent psychiatry. In our study, 82.6% of professionals expressed a desire to receive training on TMS, which indicates the global training need and gap (20,25).

A large proportion of professionals participating in our study (93.9%) were aware of TMS as a treatment for MDD. This high rate can be explained by the fact that TMS has been approved by the FDA since 2008 (26). Participants with more experience were more aware of the use of TMS to treat OCD than participants with <5 years of experience. This might be due to not having an FDA clearence for TMS use in adolescents with OCD altough it is approved for adults

Table 3. Comparison of perceptions for TMS in terms of experience.

	≤5 years, (n = 57)	>5 years (n = 58)	Total (n = 115)	X^2	p-value
Perceived clinical effectiveness of TMS for MDD in children and adolescents				1.5	0.822
Ineffective	1 (1.8)	2 (3.4)	3 (2.6)		
Slightly Effective	11 (19.3)	12 (20.7)	23 (20.0)		
Moderately effective	24 (42.1)	25 (43.1)	49 (42.6)		
Highly effective	2 (3.5)	4 (6.9)	6 (5.2)		
Not sure	19 (33.3)	15 (25.9)	34 (29.6)		
Perceived safety of TMS in children and adolescents				2.5	0.640
Unsafe	0 (0.0)	1 (1.7)	1 (0.9)		
Slightly safe	2 (3.5)	3 (5.2)	5 (4.3)		
Moderately safe	26 (45.6)	23 (39.7)	49 (42.6)		
Very Safe	12 (21.1)	17 (29.3)	29 (25.2)		
Not sure	17 (29.8)	14 (24.1)	31 (27.0)		
TMS should be considered as a first-line treatment option for MDD in children and adolescents				2.9	0.408
Agree	2 (3.5)	2 (3.4)	4 (3.5)		
Disagree	36 (63.1)	33 (56.9)	69 (60.0)		
Neither agree nor disagree	19 (33.3)	23 (39.7)	42 (36.5)		
Perceived benefits of TMS as an adjunctive treatment for psychiatric disorders in children and adolescents				7.7	0.104
Not beneficial	0 (0.0)	1 (1.7)	1 (0.9)		
Slightly beneficial	3 (5.3)	10 (17.2)	13 (11.3)		
Moderately beneficial	34 (59.6)	23 (39.7)	57 (49.6)		
Highly beneficial	8 (14.0)	12 (20.7)	20 (17.4)		
Not sure	12 (21.1)	12 (20.7)	24 (20.9)		

MDD: Major depressive disorder, TMS: Transcranial magnetic stimulation, X^2: Chi-square test

and has growing evidence on adolescents (27) leading a high percent of knowledge (72.2%) in total for OCD. In addition, some of the participants agreed that TMS is related to neurodevelopmental disorders, including ASD and ADHD. The recent increase in experimental studies on the use of TMS in neurodevelopmental disorders may have improved the awareness of professionals in this area (28). One of the most striking results of our study is that 91.3% of the professionals have never used TMS. Although the FDA's approval of TMS for the treatment of MDD in adolescents in March 2024 (16) is an important development, our findings indicate that this approval has not yet been fully reflected in clinical practice. A study demonstrating a lack of familiarity with the referral process of physicians (17) aligns with the findings in our study, where physicians viewed "lack of knowledge and training" as the primary obstacle to practice. This demonstrates the need for infrastructure and training support for the method to be implemented in clinical practice. Another study found that TMS knowledge was higher among those working in academic centers (21). This also supports increasing TMS units in training and research hospitals in Türkiye and incorporating structured training into the curriculum.

Table 4. Barriers and potential facilitators of TMS ımplementation in clinical practice.

	n (total = 115)	%
Barriers to gaining experience with TMS		
Limited accessibility	77	67.0
Lack of knowledge and/or education	47	46.1
Lack of sufficient evidence for efficacy	17	16.7
Safety concerns	7	6.9
Potential facilitators of TMS ımplementation in clinical practice		
Clinical case studies demonstrating successful use	85	73.9
Greater accessibility of TMS services	71	61.7
More education	68	59.1
Collegial support or consultation	67	58.3
Accessibility of clinical guidelines	56	48.7

TMS: Transcranial magnetic stimulation.

Although the literature highlights that TMS is a non-invasive and safe method that is well-tolerated in the pediatric age group (5,29,30) the fact that 42.6% of the participants were hesitant about safety indicates a need for more clinical practice in child and adolescent mental health clinics. This situation can also be attributed to the fact that the neuroplasticity capacity and developmental complexity of the child and adolescent brain necessitate a cautious approach to the use of TMS (12). To improve clinical comfort, 73.9% of the respondents requested "access to successful case studies", suggesting that these concerns can only be reduced by presenting practical experiences. This result also supports the principle that attitudes become more positive as education and clinical experience increase (17).

Our study is of significant clinical importance, as it is, to our knowledge, the first study to evaluate child and adolescent psychiatrists' perspectives and clinical approaches regarding TMS treatment. Notably, this study was conducted immediately following the FDA's March 2024 approval to treat adolescent depression, providing a timely dataset that reflects the impact of global regulatory developments on clinical practice in Türkiye. Additionally, the inclusion of participants from various regions of the country and of physicians with varying levels of experience enhances the reliability and generalizability of the results.

Study Limitations

Some limitations must be considered when evaluating the findings of our study. First, the study's sample size may not accurately reflect the approaches of the majority of the child and adolescent psychiatrists. Second, the majority of participants had never used TMS, which suggests that responses regarding safety and efficacy may have been based on theoretical knowledge or observations rather than clinical experience. Finally, measuring physicians' interest levels by questionnaire rather than by an objective method may have introduced self-report bias.

CONCLUSION

To address the knowledge and practice gaps identified in this study, several steps are suggested. Given that 96.5% of physicians have not received specific training and 82.6% are willing to receive it, courses and modules related to TMS applications in child and adolescent mental health should be routinely incorporated into specialist training curricula. The biggest obstacle to TMS application is seen as "limited accessibility" (75.5%). Overcoming this problem could increase the use of TMS units in university and training and research hospitals. Most participants reported that awareness of successful case studies would increase their comfort with clinical use. In this context, increasing the number of clinical practice guidelines and fostering research that compiles clinical studies on the use of TMS in children and adolescents will reduce professionals' concerns and encourage evidence-based use. Furthermore, future studies should be designed to include not only the approaches of physicians but also the clinical outcomes of treated child and adolescent patients, as well as the adherence processes and perspectives of families regarding treatment, in order to fill the gap in the literature.

Child and adolescent psychiatrists have a substantial interest in TMS, but they have difficulty translating this interest into clinical practice because of limited education, knowledge, experience, and equipment. To remove obstacles in practice, it is recommended to create structured training programs, to increase access to equipment in hospitals, and to prepare case guides. Structural support and comprehensive training are needed for the safe and widespread use of this non-invasive method in the pediatric population.

Ethics

Ethics Committee Approval: Ethical approval was granted by the Gazi University Rectorate Ethics Committee (approval number: 2024-1813, meeting date: 26.11.2024, meeting no: 19).

Informed Consent: All participants provided electronic informed consent before completing the survey.

Footnotes

Authorship Contributions

Concept: D.C., S.K., B.B., A.Ö., E.G., E.İ., Design: : D.C., C.Y., A.Ö., E.G., E.İ., Data Collection or Processing: D.C., S.K., B.B., A.Ö., Analysis or Interpretation: : D.C., C.Y., Literature Search: : D.C., S.K., B.B., Writing: D.C., S.K.,B.B, C.Y., A.Ö., E.G., E.İ.

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REFERENCES

1. Di Lazzaro V, Ziemann U, Lemon RN. State of the art: physiology of transcranial motor cortex stimulation. Brain Stimul. 2008; 1: 345-62.
2. Diana M, Raij T, Melis M, Nummenmaa A, Leggio L, Bonci A. Rehabilitating the addicted brain with transcranial magnetic stimulation. Nat Rev Neurosci. 2017; 18: 685-93.
3. Klomjai W, Katz R, Lackmy-Vallée A. Basic principles of transcranial magnetic stimulation and repetitive transcranial magnetic stimulation. Ann Phys Rehabil Med. 2015; 58: 208-13.
4. McClintock SM, Reti IM, Carpenter LL, McDonald WM, Dubin M, Taylor SF, et al. Consensus recommendations for the clinical application of repetitive transcranial magnetic stimulation in the treatment of depression. J Clin Psychiatry. 2018; 79: 16cs10905.
5. Lefaucheur JP, Aleman A, Baeken C, Benninger DH, Brunelin J, Di Lazzaro V, et al. Evidence-based guidelines on the therapeutic use of repetitive transcranial magnetic stimulation: an update. Clin Neurophysiol. 2020; 131: 474-528.
6. Guo Q, Li C, Wang J. Updated review on the clinical use of repetitive transcranial magnetic stimulation in psychiatric disorders. Neurosci Bull. 2017; 33: 747-56.
7. Brunoni AR, Sampaio-Junior B, Moffa AH, Aparício LV, Gordon P, Klein I, et al. Noninvasive brain stimulation in psychiatric disorders: a primer. Braz J Psychiatry. 2019; 41: 70-81.
8. Rizvi S, Khan AM. Use of transcranial magnetic stimulation for depression. Cureus. 2019; 11: e4736.
9. Rodrigues PA, Zaninotto AL, Neville IS, Hayashi CY, Brunoni AR, Teixeira MJ, et al. Transcranial magnetic stimulation for the treatment of anxiety disorder. Neuropsychiatr Dis Treat. 2019; 15: 2743-61.

10. Carmi L, Tendler A, Bystritsky A, Hollander E, Blumberger DM, Daskalakis J, et al. Efficacy and safety of deep transcranial magnetic stimulation for obsessive-compulsive disorder: a prospective multicenter randomized double-blind placebo-controlled trial. Am J Psychiatry. 2019; 176: 931-8.
11. Fisicaro F, Lanza G, Grasso AA, Pennisi G, Bella R, Paulus W, et al. Repetitive transcranial magnetic stimulation in stroke rehabilitation: review of the current evidence and pitfalls. Ther Adv Neurol Disord. 2019; 12: 1756286419878317.
12. Krishnan C, Santos L, Peterson MD, Ehinger M. Safety of noninvasive brain stimulation in children and adolescents. Brain Stimul. 2015; 8: 76-87.
13. Chail A, Saini RK, Bhat PS, Srivastava K, Chauhan V. Transcranial magnetic stimulation: a review of its evolution and current applications. Ind Psychiatry J. 2018; 27: 172-80.
14. Hameed MQ, Dhamne SC, Gersner R, Kaye HL, Oberman LM, Pascual-Leone A, et al. Transcranial magnetic and direct current stimulation in children. Curr Neurol Neurosci Rep. 2017; 17: 11.
15. Soltaninejad Z, Nejati V, Ekhtiari H. Effect of anodal and cathodal transcranial direct current stimulation on DLPFC on modulation of inhibitory control in ADHD. J Atten Disord. 2019; 23: 325-32.
16. U.S. Food and Drug Administration. NeuroStar Advanced Therapy System (K231926). Silver Spring: U.S. Food and Drug Administration; 2024. Available from: https://www.accessdata.fda.gov/cdrh_docs/pdf23/K231926.pdf
17. Stern AP, Boes AD, Haller CS, Bloomingdale K, Pascual-Leone A, Press DZ. Psychiatrists' attitudes toward transcranial magnetic stimulation. Biol Psychiatry. 2016; 80: e55-6.
18. AlHadi AN, AlShiban AM, Alomar MA, Aljadoa OF, AlSayegh AM, Jameel MA. Knowledge of and attitude toward repetitive transcranial magnetic stimulation among psychiatrists in Saudi Arabia. J ECT. 2017; 33: 30-5.
19. Deng J, Gong Y, Lin X, Bao Y, Sun H, Lu L. Knowledge and attitudes about transcranial magnetic stimulation among psychiatrists in China. BMC Psychiatry. 2020; 20: 416.
20. Sierra P, Cañada Y, Benavent P, Sabater A, Ribes J, Livianos L, et al. Opinion, use and knowledge about transcranial magnetic stimulation in Spain: a national survey of mental health professionals. Psychiatr Q. 2024; 95: 271-85.
21. Al-Balushi M, Al-Huseini S, Chan MF, Al-Kaabi S, Al-Balushi N, Qashta A, et al. Awareness and attitudes toward transcranial magnetic stimulation among psychiatrists in Oman. New Emirates Med J. 2024; 5: e02506882361774.
22. Ünsalver BÖ, Evrensel A, Sayar GH, Karamustafalıoğlu O, Tarhan N. Attitudes of Turkish psychiatrists regarding transcranial magnetic stimulation. J Neurobehav Sci. 2020; 7: 37-41.
23. Gazdag G, Kocsis N, Tolna J, Lipcsey A, Habil M. Attitudes towards electroconvulsive therapy among Hungarian psychiatrists. J ECT. 2004; 20: 204-7.
24. Mota P, Encantado J, Carvalho LC, Cunha C, Garcia-Romeu A, Johnson MW, et al. Attitudes and perceptions of Portuguese psychiatrists and psychologists on the clinical use of ketamine. Acta Med Port. 2025; 38: 297-306.
25. Bourla A, Chaneac E, Poulet E, Haffen E, Ogorzelec L, Guinchard C, et al. Acceptability, attitudes and knowledge towards transcranial magnetic stimulation among psychiatrists in France. Encephale. 2020; 46: 88-95.
26. Croarkin PE, Aaronson ST, Carpenter LL, Hutton TM, Pages K, Chen B, et al. The effectiveness of transcranial magnetic stimulation in adolescents and young adults with major depressive disorder. JAACAP Open. 2025; 3: 1246-58.
27. Cotovio G, Ventura F, Rodrigues da Silva D, Pereira P, Oliveira-Maia AJ. Regulatory clearance and approval of therapeutic protocols of transcranial magnetic stimulation for psychiatric disorders. Brain Sci. 2023; 13: 1029.
28. Oberman LM, Enticott PG, Casanova MF, Rotenberg A, Pascual-Leone A, McCracken JT. Transcranial magnetic stimulation in autism spectrum disorder: challenges, promise, and roadmap for future research. Autism Res. 2016; 9: 184-203.
29. Zewdie E, Ciechanski P, Kuo HC, Giuffre A, Kahl C, King R, et al. Safety and tolerability of transcranial magnetic and direct current stimulation in children: prospective single center evidence from 3.5 million stimulations. Brain Stimul. 2020; 13: 565-75.
30. Rossi S, Antal A, Bestmann S, Bikson M, Brewer C, Brockmöller J, et al. Safety and recommendations for TMS use in healthy subjects and patient populations, with updates on training, ethical and regulatory issues: expert guidelines. Clin Neurophysiol. 2021; 132: 269-306.