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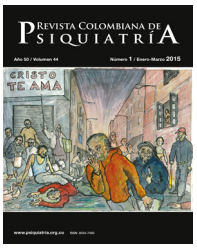

Original article

Frequency and Self-reported Outcomes of Transcranial Magnetic Stimulation for Obsessive Compulsive Disorder in the U.S. and Latin America

Hala Aziz[a], *Guadalupe Vidal-Martinez*[b,c], *Ogechi C. Onyeka*[d], *Jacey L. Anderberg*[d,e], *Javier Vargas-Medrano*[b,c], *Diana Sotelo*[b], *Demi Kourtesi*[f], *Renee M. Frederick*[d,g], *Josselyn S. Muñoz*[d], *Dayan Berrones*[d], *Vanessa Zavala Cruz*[d], *Peter Thompson*[b,c], *Silvina Tonarelli*[b], *Andrew D. Wiese*[d], *James J. Crowley*[h], *Eric A. Storch*[d,*], *Latin American Trans-ancestry INiative for OCD genomics (LATINO), Brazilian Obsessive-Compulsive Spectrum Disorder Working Group (GTTOC)*

[a] *Burrell College of Osteopathic Medicine, Las Cruces, NM, United States*
[b] *Psychiatry, Texas Tech University Health Sciences Center El Paso, El Paso, TX, United States*
[c] *Southwest Brain Bank, Texas Tech University Health Sciences Center El Paso, El Paso, TX, United States*
[d] *Psychiatry and Behavioral Sciences, Baylor College of Medicine, Houston, TX, United States*
[e] *Department of Psychology, University of Nebraska-Lincoln, Lincoln, NE, United States*
[f] *Psychology, University of Nevada, Las Vegas, NE, United States*
[g] *Department of Psychology, University of Houston, Houston, TX, United States*
[h] *Department of Genetics, University of North Carolina at Chapel Hill, Chapel Hill, NC, United States*

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ABSTRACT

Introduction: Obsessive compulsive disorder (OCD) affects about 1–2% of the global population, with roughly 30% of patients not responding to first-line treatments. Transcranial magnetic stimulation (TMS) has some support for treatment-resistant OCD but global use is unclear.

Methods: This study describes the frequency with which TMS was reported to be received among a large cohort of individuals who self-identified as Latino-Hispanic in Latin America and the United States. Among 3391 participants, 76 (2.2%) had completed TMS for OCD.

Results: Recipients who received TMS exhibited more severe current and lifetime OCD symptoms compared to non-recipients. On average, participants underwent 22.61 TMS sessions (SD = 20.96), and self-reported experiencing minimal to some improvement from TMS. The majority of TMS recipients were from Brazil ($n = 26$), Mexico ($n = 17$) and USA ($n = 16$).

* *Corresponding author.*
E-mail address: eric.storch@bcm.edu (E.A. Storch).
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Conclusions: Findings suggest that TMS does not appear to be widely used in OCD treatment among the Latino-Hispanic population, particularly in Latin American countries. Further study of TMS efficacy and dissemination in underserved regions is warranted.

Palabras clave:
Neuromodulación
Tratamiento
Ansiedad
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Frecuencia y resultados autoinformados de la estimulación magnética transcraneal para el trastorno obsesivo compulsivo en EE.UU. y Latinoamérica

RESUMEN

Introducción: El trastorno obsesivo compulsivo (TOC) afecta a alrededor del 1-2% de la población mundial, y aproximadamente el 30% de los pacientes no responden a los tratamientos de primera línea. La estimulación magnética transcraneal (EMT) cuenta con cierto apoyo para el TOC resistente al tratamiento, pero su uso global no está claro.

Métodos: Este estudio describe la frecuencia con la que se informó que se recibía EMT entre una gran cohorte de individuos que se autoidentificaron como latino-hispanos en América Latina y Estados Unidos. Entre 3.391 participantes, 76 (2,2%) habían recibido EMT para el TOC.

Resultados: Los receptores que recibieron EMT mostraron síntomas de TOC actuales y de por vida más graves en comparación con los no receptores. Por término medio, los participantes se sometieron a 22,61 sesiones de EMT (DE = 20,96) y declararon haber experimentado una mejoría mínima o cierta gracias a la EMT. La mayoría de los receptores de EMT procedían de Brasil (n = 26), México (n = 17) y EE.UU. (n = 16).

Conclusiones: Los hallazgos sugieren que la EMT no parece ser ampliamente utilizada en el tratamiento del TOC entre la población latino-hispana, particularmente en los países latinoamericanos. Se justifica la realización de más estudios sobre la eficacia de la EMT y su difusión en regiones desatendidas.

Introduction

Obsessive compulsive disorder (OCD) is a chronic condition characterized by distress-inducing obsessions and/or compulsions that are time consuming and impair daily function. Approximately 1–2% of people globally have OCD.[1,2] OCD pathophysiology is associated with cortical-striatal-thalamic-cortical (CSTC) circuit abnormalities.[3] Functional imaging studies have shown hyper-activity in the orbitofrontal cortex (OFC), anterior cingulate cortex (ACC), and caudate nucleus in individuals with OCD.[4] Studies have associated OCD with deficits in connectivity in corticobasal ganglia networks.[5] First-line treatments for OCD include selective serotonin reuptake inhibitors (SSRIs) and/or cognitive-behavioral therapy (CBT). However, up to 30% of OCD patients do not respond adequately to multiple courses of treatment.[1–3] Effective treatments for those with treatment resistant OCD (trOCD) are needed but remain scarce.

In 2018, The Food and Drug Administration (FDA) approved the use of transcranial magnetic stimulation (TMS), also referred to as repetitive TMS (rTMS), for the treatment of OCD.[2,6] TMS is a non-invasive neuromodulatory treatment that targets brain regions associated with OCD, such as supplementary motor area (SMA) and pre-SMA, dorsomedial prefrontal cortex (DMPC) or dorsolateral prefrontal cortex (DLPC).[2,7,8] During TMS, a magnetic coil is placed on the patient's head, delivering magnetic stimulation targeting the cortical neurons. The stimulus can reduce (≤1 Hz) or enhance (≥5 Hz) cortical activity depending on the frequency.[1,9] TMS modulates the irregular cortical activity of neurons and reestablishes normal brain activity by changing neuronal action potential.[7,10] Evidence suggests TMS fosters brain neuroplasticity, reestablishing regular neuronal network connections.[11]

Efficacy data have primarily been reported from North American and European studies, with evidence that TMS is efficacious among individuals with OCD, including trOCD.[12,13] This study describes the frequency of and self-reported response to TMS from a well-characterized cohort of individuals self-identified as Latino-Hispanic or descendants of Latino-Hispanic individuals with OCD. The study also describes OCD symptom severity differences between indi-

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viduals that have engaged in TMS and individuals who have not.

Method

Data were collected as part of a multi-country consortium focused on trans-ancestry research in OCD genomics in Latin America and the United States. The study was approved by the Institutional Review Board under a single IRB framework (Approval Number: H-49814). Each international site received local ethical approval.[14] Participants who self-identified as Latino-Hispanic or as descendants of Latino-Hispanic individuals (defined by having at least one biological grandparent born in Latin America), and had a history of and/or current obsessive-compulsive symptoms were enrolled. Participants provided written consent. Data were collected from $n = 3391$ adults with current and/or past OCD symptoms. We analyzed demographic data, as well as diagnostic and treatment history, only from adults aged 18 years or older who completed TMS. Frequencies and descriptive statistics were analyzed using IBM SPSS Statistics (Version 28) software. Descriptive statistics were used to determine the average age when OCD began to interfere with daily life, the average number of TMS sessions completed, average current OCD symptom severity, average worst ever OCD symptom severity, self-reported improvement in OCD symptoms associated with TMS, and reported difficulty in accessing treatment for OCD general (i.e., psychotherapy, medication). The National Institute of Mental Health Global Obsessive-Compulsive Scale (NIMH-GOCS) was used to assess current and worst ever OCD symptom severity.[15] The NIMH-GOCS is a single-item rating scale ranging from 1 (minimal symptoms) to 15 (very severe symptoms). Levels of symptom severity are categorized into five groups: minimal severity (1–3), subclinical severity (4–6), clinical severity (7–9), severe clinical severity (10–12), and very severe clinical severity (13–15).[15,16] Self-reported improvement due to TMS was measured on a Likert scale using ratings of: 1 (Much worse), 2 (Somewhat worse), 3 (No change), 4 (Somewhat improved), to 5 (Much improved). Similarly, self-reported difficulty in accessing treatment in general was measured on a Likert scale ranging from 1 (Not difficult at all) to 6 (Haven't found appropriate treatment yet).

To examine group differences between individuals that engaged in TMS and individuals that did not, an equivalent sized sample of participants who did not engage in TMS, matched on age, biological sex, and race, was obtained from the larger sample ($n = 76$) and independent samples t-tests were run.

Results

Descriptives of the TMS group

The total number of enrolled adult participants was 3391 from June 4, 2021 to November 19, 2024. A total of 76 (2.2%) of participants reported receiving TMS specifically for OCD. Participants who received TMS reported a mean number of 22.61 sessions (SD = 20.96), with a self-reported mean improvement score on OCD symptoms of 3.57 (SD = 1.15) due to TMS (Table 1).[17] Participants endorsed a mean current OCD symptom severity of 7.34 (out of 15; SD = 3.52) and worst ever score of 11.61 (SD = 3.38). On average, participants in this group reported being nearly 18 years old when OCD symptoms began to interfer or disrupt daily activities ($M_{age} = 17.51$, SD = 7.53). When asked how difficult it was to access appropriate treatment for OCD, participants who received TMS reported a difficulty score of 3.17 out of 6 on average (SD = 1.58) which corresponds to about the same as for treatment for other conditions. The country with the highest number of participants receiving TMS was Brazil ($n = 26$), followed by Mexico ($n = 17$) and USA ($n = 16$).

Descriptives of non-TMS group

The matched control group reported similar ratings with regard to age when OCD began to interfere with daily life ($M_{age} = 17.44$, SD = 7.46) and difficulty in accessing treatment for OCD (M = 3.17, SD = 2.01). However, participants who did not receive TMS reported lower mean current OCD symptom severity ($M = 5.92$, $SD = 3.01$) and worst ever ($M = 10.20$, SD = 3.30). See Table 2.

Group differences

When compared to individuals who had not engaged in TMS, there was a statistically significant difference in mean current OCD symptom severity, whereas those who had completed TMS reported higher current severity (7.34 ± 3.52) than those who had not (5.92 ± 3.01), t (128) = 2.47, $p = .015$, $d = 0.43$ (medium to large effect size). Similarly, TMS treatment engagers reported higher "worst ever" OCD symptom severity (11.61 ± 3.38) than those who did not participate in TMS (10.20 ± 3.30), t (136) = 2.49, $p = .014$, $d = .42$.

Discussion

The Latino population is underrepresented in studies for OCD,[18] including those on TMS. Less than 3% of participants in the present study received TMS and these individuals were primarily in countries characterized as upper or upper middle-income countries. Obstacles may include lack of access to TMS, costs, and stigma associated with mental illness. However, reported difficulty in accessing treatment broadly was equivalent across both TMS and non-TMS engagers, suggesting that limited access to care is relevant across the U.S. and Latin American countries.[18]

Among those who received TMS, participants reported modest treatment effects, which aligns with prior work.[1,9] There is no established protocol for TMS for trOCD, so efficacy may vary depending on the applied protocol.[9,13] For example, the number of sessions reported in studies range from 10 to 30[1,3]; in the present study, the mean number of TMS sessions reported was 22.61, with considerable variation (SD = 20.96). Mean session number was below that received in U.S. community practice which may explain more modest outcomes.[19] When compared to participants that have not received TMS, individuals with TMS reported higher current and 'worst ever'

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Table 1 – Demographics and study variable descriptives for the TMS group and non-TMS group.

Variable	TMS group		Non-TMS group	
	M (%)	SD	M (%)	SD
Age	34	12.58	31.1	10.15
Sex				
Female	(51.4)	–	(60.8)	–
Male	(48.6)	–	(39.2)	–
%Race				
White	(45)	–	(44.9)	–
Other/unknown	(27.9)	–	31.9)	–
More than one race	(16.2)	–	(28.8)	–
Parda	(4.4)	–	(1.4)	–
African American	(4.4)	–	(0)	–
Asian	(1.5)	–	(0)	–
American Indian/Alaskan Native	(1.5)	–	(2.9)	–
Age when OCD symptoms began to nterfere with daily life	17.51	7.55	17.44	7.46
Difficulty in accessing treatment for OCD (1–6)	3.17	1.58	3.17	2.01
Current OCD symptom severity (1–15)	7.34	3.52	5.92	3.01
Worst ever OCD symptom severity (1–15)	11.61	3.38	10.20	3.30
Number of TMS treatment sessions	22.61	20.96	–	–
Rating on the improvement of TMS on OCD symptoms (1–5)	12.5	1.15	–	–
Participants by country				
Brazil	(34.2)	–	(6.8)	–
Mexico	(22.3)	–	(12.4)	–
United States	(21)	–	(13.6)	–
Peru	(5.3)	–	(20.3)	–
Bolivia	(5.3)	–	(9.5)	–
Argentina	(2.6)	–	(2.4)	–
Colombia	(2.6)	–	(13.5)	–
Ecuador	(2.6)	–	(0)	–
Paraguay	(2.6)	–	(2.7)	–
Chile	(1.3)	–	(16.2)	–
El Salvador	(0)	–	(1.4)	–

Note: Table 1 reflects self-reported race and ethnicity using a previously established approach.[17]

Table 2 – Group differences in OCD symptom severity between participants who received TMS and participants that did not receive TMS.

Variable	TMS group		Non-TMS group		*t*	*p*	Cohen's *d*
	M	SD	M	SD			
Current OCD symptom severity	7.34	3.52	5.92	3.01	2.47	.015	.43
Worst ever OCD symptom severity	11.61	3.38	10.20	3.30	2.49	.014	.42

OCD symptoms. This suggests that TMS dissemination is in keeping with literature-based recommendations for its use in those with increased symptom severity or greater treatment resistance.[9]

This report has several limitations. First, the sample size is small. Second, little is known about the TMS protocols utilized. Protocols can vary in the type of coil, number of sessions, treatment location, intensity, and number of pulses per session,[9,18] all of which can affect the efficacy of TMS. Third, outcomes were self-reported and reflected retrospective recall. Within these limitations, these data suggest that TMS use is limited in most Latin American countries. Dissemination efforts are advised, as well as efforts to address stigma that may impact willingness to engage in treatment.

Conclusion

The present study is the first to describe the reported use of TMS for OCD treatment within a large Latino-Hispanic cohort across Latin America and the United States. Findings suggest that TMS remains infrequently utilized in this population. Recipients of TMS reported more severe OCD symptoms, consistent with its use in treatment-resistant cases. The findings emphasize the importance for greater standardization of TMS protocols and increased access in underserved regions. Continued exploration of TMS efficacy and its dissemination in medically underserved populations is warranted to better understand its role and optimize its impact in OCD care.

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Ethical approval

Ethical approval was received from the Institutional Review Board, Approval Number: H-49814.

Conflicts of interest

Dr. Storch reports receiving research funding to his institution from the Ream Foundation, International OCD Foundation, and NIH. He is a consultant for Brainsway and Biohaven Pharmaceuticals. He owns stock less than $5000 in NView. He receives book royalties from Elsevier, Wiley, Oxford, American Psychological Association, Guildford, Springer, Routledge, and Jessica Kingsley.

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Appendix A. Latin American Trans-Ancestry INitiative for OCD genomics (LATINO)

Victor R. Adorno[9,10], Victoria Agostini[11], William W. Aguilar[12], Cinthia Aguirre[9], Valentina Alvarado-Quiroz[13], NaEshia Ancalade[8], Jacey L. Anderberg[4,5], Diego Aponte[11], Alejandro A. Arellano Espinosa[14], Paul D. Arnold[15], Eimmy Y. Ascencio-Chicana[16], Elizabeth G. Atkinson[17], Juliana Avery[4], Jose N. Ayala[9,18], Hala Aziz[2], Tania L. Barbieri Aguirre[19], Cynthia N. Barrera[20], Julian A. Barrero Contreras[21], Kelly Barry[7,4], Amanda N. Belanger[22], Laura M. Benitez[9,23], Dayan Berrones[4], John R. Best[24], Tim B. Bigdeli[25], Hemamalini Bommiasamy[8], Tania Borda[26,27], Laura Boyajian[28], Diego Briceño Muñoz[19], Lauren Browning[29], Christie L. Burton[30], Carolina Busto[31], Joseph D. Buxbaum[32], Ricardo E. Calderón Rivera[11], Jennifer L. Callahan[33], Carlos A. Camacho Gomez[34,35], Ernesto Canchari[19], Mabel C. Carrrera[36], Alexandria Chang[29], Evelyn Chazelle[37,38], Jessica S.C. Cheng[4], Jessica M. Chire[39,40], Macarena Churruca Muñoz[13,41], David C. Cicero[42], Amanda P. Cifuentes-Espinoza[13], Pamela Claisse Quiroz[43], Gianna M. Colombo[4], Jonathan S. Comer[31], Luz Condori-Apaza[19], Jennifer Cortina[31], Jennifer Crosbie[30], James J. Crowley[8], Victor O. Cruz[39,44], Isabella A. Cruz[45], Allison Cunning[28], Guillermo J. Dager Perez[46], Megan M. Dailey[4], Brian D. Dang[4,47], Alyssa Dawson[31], Daniela del Río[43], Amelia Dev[22], Sara Diaz[11], Lucila Fay[37,48], Adrian Fernandez[19], Edith G. Figueroa[39], Letizia M. Flecha[9,23], Alvaro M. Flores-Garcia[19], Martin E. Franklin[49,50], Renee M. Frederick[4,7], Jami M. Furr[31], Olivia M. Gamarra[9,51], Camila Garay-Contreras[13,41], Nataly García-Bravo[13], Cynthia García-Jaimes[36], Sheldon R. Garrison[52], Paola Giusti-Rodriguez[53], Amin Gonzalez[9,10], Ramon A. González[54], Polaris Gonzalez-Barrios[11], Wayne K. Goodman[4], Javier D. Gorosito[55], Dorothy E. Grice[32], Jerry Guintivano[56], Daniel Guttfreund[57],

Matthew W. Halvorsen[8], Jorge AR. Haslop Miles[58,59], John M. Hettema[60], Joseph D. Hovey[45], Jonathan Irreño-Sotomonte[21], Reinhard Janssen-Aguilar[61], Matias Jensen[13], Alexandra Z. Jimenez Reynolds[4], Rozmin B. Jiwani[62], Jessica S. Johnson[56], Sonia Joutte[2], Joali Alexandra Juárez Lujambio[14], Sabrina Kehrer[31], James L. Kennedy[63,64], Nuria Lanzagorta[36], Gabriel Lázaro-Muñoz[65,66,67], Melanie Longhurst[2], David A. Lozada Martinez[16], Elba S. Luna[39,44,40], Anna MacLellan[24], Dora Mamani Quispe[68], Andrea H. Marques[69], Mainor R. Marquez[9], Molly Martinez[70], Galo N. Martínez[71], Mayra C. Martinez Mallen[72], Karen G. Martinez-Gonzalez[11], Maria de Los Angeles Matos[37], Manuel Mattheisen[73], Joseph F. McGuire[29], Dean McKay[74], Ciara McOmber[8], Charlene Minaya[74], Tomás Miño[13], Sara M. Mithani[62], Alonso Morales-Rivero[75], Pablo R. Moya[13,41,76], María B. Moyano[37,77], Josselyn S. Muñoz[4], Maria J. Muñoz[78], Humberto Nicolini[36,79], Ambar A. Núñez Bracho[54], Belinda E. Núñez Bracho[54], Diana P. Obando[78], Monica E. Ochoa[45], Marcos E. Ochoa-Panaifo[16], Marcelo O'Higgins[9,10], Luis A. Olavarria Castaman[16], Trinidad Olivos Balmaceda[13], María J. Olmedo Tobar[13], Ogechi C. Onyeka[4], Iliana Ortega[15,80], Vanessa S. Paredes-Linares[81], Michele T. Pato[82], Mariel Paz y Miño[83,84], Edilberto Peña de Leon[85], José L. Perales Orellana[34,35], Stacey Pereira[86], Tania Pérez Duarte[20], Angel Phan[87], Maritza Placencia[40,44], Lorena Ponce[20], Kendall Poovey[28], María Belén Prieto[37], Thomas Qiao[15], Maria F. Quiroz-Padilla[78], María F. Quispe-Correa[16], Alessandra S. Ramirez Heros[19], Renato T. Ramos[88], Iaroslava C. Ramos[88], Kesley A. Ramsey[29], Diana Rancourt[28], Rocío C. Reyes Espinosa[89], Peggy Richter[88], Carolyn I. Rodriguez[90], Servando Rodriguez Barajas[4], Maritza J. Romero[78], Camilo J. Ruggero[33], Angel Ruiz-Chow[75], Melisa N. Sagarnaga[58,59], Nadeen Salhadar[45], Nicolas Sanchez[4,91], Russell J. Schachar[30], Lucia M. Segovia[9,23], Laura D. Seligman[45], Isaac J. Siegel[52], Cody Staples[28], S. Evelyn Stewart[24], Eric A. Storch[4], Vissente Tapia-Cuevas[13], Peter Thompson[2,3], Kiara R. Timpano[22], Silvina Tonarelli[2], Beatriz Treviño-de la Garza[92], Angela Trujillo[78], Constanza Uribe Villar[13], Carolina Valdés[20], Alexie Vallejo-Silva[21], Katerin N. Vargas Mamani[93], Javier Vargas-Medrano[2,3], Jefferson Vásquez-Ayala[19], María I. Vásquez-Suyo[40,94], Anne Ver Mellstrieng[9,10], Maria V. Vergara[9,51], Guadalupe Vidal-Martinez[2,3], Caroline Vollaro[31], Andrew D. Wiese[4], Sara Wilkerson[74], Gwyneth Zai[63,64], Luz M. Zappa[37,48], Vanessa Zavala Cruz[4], Raquel M. Zepeda-Burgos[95], Anthony W. Zoghbi[4]

Brazilian Obsessive-Compulsive Spectrum Disorder Working Group (GTTOC):

Gustavo S. Alves[96], Gilberto S. Alves[97,98], Izabela G. Barbosa[99], Carolina Cappi[100], Maria Cecília B. Carneiro[101], Daniel L. Costa[102], Fernanda Z. Delage[101], Carolina B. Dreher[103], Ygor A. Ferrao[104], Gabriela M. Ferreira[101], Leonardo F. Fontenelle[105], Daniele T.H. Fragoso[101], Monicke O. Lima[102], Gabriela Menezes[105], Euripedes C. Miguel[102], Maria E. Moreira-de-Oliveira[105], Bárbara Perdigão Stumpf[99], Lucas C. Quarantini[96], Yana Quarantini-Alvim[96], Vanessa R. Ramos[102], Maria Cecília C. Rosario[106], Aline S. Sampaio[96], Leonardo C. Saraiva[102], Roseli G. Shavitt[102]

[1]Burrell College of Osteopathic Medicine, Las Cruces, New Mexico, United States

[2]Psychiatry, Texas Tech University Health Sciences Center El Paso, El Paso, Texas, United States

[3]Southwest Brain Bank, Texas Tech University Health Sciences Center El Paso, El Paso, Texas, United States

[4]Psychiatry and Behavioral Sciences, Baylor College of Medicine, Houston, Texas, United States

[5]Department of Psychology, University of Nebraska-Lincoln, Lincoln, Nebraska, United States

[6]Psychology, University of Nevada, Las Vegas, Nevada, United States

[7]Department of Psychology, University of Houston, Houston, Texas, United States

[8]Department of Genetics, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, United States

[9]Hospital Psiquiátrico de Asunción, Asunción, Paraguay

[10]Universidad Nacional de Asunción, Cátedra y Servicio de Psiquiatría, Paraguay

[11]Psychiatry, University of Puerto Rico, San Juan, Puerto Rico

[12]Hosptial Nacional Ḧipólito Unanue, Lima, El Agustino, Perú

[13]Centro Interdisciplinario de Neurociencia de Valparaíso, Valparaíso, Chile

[14]Talk TOC, Ciudad de México, Ciudad de México, México

[15]Psychiatry, University of Calgary, Calgary, Alberta, Canada

[16]Universidad Privada del Norte, Lima, Perú

[17]Molecular and Human Genetics, Baylor College of Medicine, Houston, Texas, United States

[18]Santorio Santa Julia, Paraguay

[19]Asociación Latinoamericana de Trastorno Obsesivo Compulsivo - ALTOC, Lima, Perú

[20]Centro TOC México, Ciudad de México, Ciudad de México, México

[21]Universidad del Rosario, Bogotá, Cundinamarca, Colombia

[22]Psychology, University of Miami, Miami, Florida, United States

[23]Sensorium, Paraguay

[24]University of British Columbia, Vancouver, British Columbia, Canada

[25]Institute for Genomics in Health, SUNY Downstate Health Sciences University, Brooklyn, New York, United States

[26]Instituto Realize, Buenos Aires, Argentina

[27]Facultad de Psicología, Universidad Católica Argentina, Buenos Aires, Argentina

[28]Psychology, University of South Florida, Tampa, Florida, United States

[29]Johns Hopkins University School of Medicine, Baltimore, Maryland, United States

[30]Hospital for Sick Children, Toronto, Ontario, Canada

[31]Center for Children and Families, Department of Psychology, Florida International University, Miami, Florida, United States

[32]Psychiatry, Icahn School of Medicine at Mount Sinai, New York, New York, United States

[33]Psychology, University of Texas at Dallas, Dallas, Texas, United States

[34]Universidad Tecnológica Privada de Santa Cruz (UTEPSA), Santa Cruz, Andres Ibañez, Bolivia

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[35]José Perales - Clínica Privada, Santa Cruz, Andres Ibañez, Bolivia
[36]Investigación Clínica, Grupo Médico Carracci, Ciudad de México, Ciudad de México, México
[37]Centro Interdisciplinario de Tourette, TOC, TDAH y Trastornos Asociados (CITA), Buenos Aires, Argentina
[38]Hospital General de Niños Pedro de Elizalde, Buenos Aires, Argentina
[39]Instituto Nacional de Salud Mental Ḧonorio Delgado-Hideyo Noguchi¨, Lima, San Martín de Porres, Perú
[40]Universidad Nacional Mayor de San Marcos, Lima, Perú
[41]Centro de Estudios Traslacionales en Estrés y Salud Mental C-ESTRES, Valparaíso, Chile
[42]Psychology, University of North Texas, Denton, Texas, United States
[43]Centro UTOC, Ciudad de México, Ciudad de México, México
[44]Centro de Investigaciones Tecnológicas, Biomédicas y Medioambientales (CITBM), Lima, Perú
[45]Psychological Science, University of Texas Rio Grande Valley, Edinburg, Texas, United States
[46]Corporación Universitaria Rafael Nuñez, Cartagena, Bolívar, Colombia
[47]Psychological, Health, and Learning Sciences, University of Houston, Houston, Texas, United States
[48]Hospital de Niños Dr. Ricardo Gutiérrez, Buenos Aires, Argentina
[49]Research Center, Rogers Behavioral Health, Philadelphia, Pennsylvania, United States
[50]School of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania, United States
[51]Universidad Católica Nuestra Señora de la Asunción, Paraguay
[52]Research Center, Rogers Behavioral Health, Oconomowoc, Wisconsin, United States
[53]Psychiatry, University of Florida College of Medicine, Gainesville, Florida, United States
[54]SIN TOC, Zapopan, Jalisco, México
[55]Universidad Nacional de Córdoba, Córdoba, Argentina
[56]Department of Psychiatry, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, United States
[57]Private Practice, San Salvador, El Salvador
[58]Facultad de Psicología, Universidad de Buenos Aires, Buenos Aires, Argentina
[59]Peer Support Argentina, Buenos Aires, Argentina
[60]Psychiatry and Behavioral Sciences, Texas A&M University, Bryan, Texas, United States
[61]Instituto Nacional de Neurología y Neurocirugía Manuel Velasco Suarez
[62]School of Nursing, University of Texas Health Science Center at San Antonio, San Antonio, Texas, United States
[63]Neurogenetics Section, Molecular Science Department, Campbell Family Mental Health Research Institute, Centre for Addiction and Mental Health (CAMH), Toronto, Ontario, Canada
[64]Department of Psychiatry and Institute of Medical Science, University of Toronto, Toronto, Ontario, Canada
[65]Center for Bioethics, Harvard Medical School, Boston, Massachusetts, United States
[66]Department of Neurosurgery, Massachusetts General Hospital, Boston, Massachusetts, United States
[67]Department of Psychiatry, Massachusetts General Hospital, Boston, Massachusetts, United States
[68]José Perales - Clínica Privada, Cochabamba, Cercado, Bolivia
[69]National Institute of Mental Heatlh (NIMH), Betheseda, Maryland, United States
[70]DFW OCD Treatment Specialists (DOTS), Richardson, Texas, United States
[71]Hospital Hermilio Valdizan, Lima, Santa Anita, Perú
[72]Centro Neurológico, Centro Médico ABC, Ciudad de México, México
[73]Department of Community Health and Epidemiology, Dalhousie University, Halifax, Nova Scotia, Canada
[74]Fordham University, Bronx, New York, United States
[75]Psiquiatría de Adultos, Centro Médico ABC, Ciudad de México, México
[76]Instituto de Fisiología, Facultad de Ciencias, Universidad de Valparaíso, Valparaíso, Chile
[77]Departamento de Investigación, Asociación de Psiquiatras de Argentina (APSA), Buenos Aires, Argentina
[78]Facultad de Psicología y Ciencias del Comportamiento, Universidad de La Sabana, Chía, Cundinamarca, Colombia
[79]Laboratorio de Enfermedades Psiquiátricas, Neurodegenerativas y Adicciones, Instituto Nacional de Medicina Genómica, Ciudad de México, México
[80]Psychiatry, Mathison Centre for Mental Health Research & Education, Calgary, Alberta, Canada
[81]Pontifical Catholic University of Peru, Lima, Perú
[82]Rutgers University - Robert Wood Johnson Medical School, New Brunswick, New Jersey, United States
[83]Psicología, Universidad San Francisco de Quito USFQ, Quito, Ecuador
[84]Centro de Salud Mental de la USFQ, Quito, Ecuador
[85]Centro de Investigaciones del Sistema Nervioso (CISNE), Mexico City, Mexico City, México
[86]Center for Medical Ethics and Health Policy, Baylor College of Medicine, Houston, Texas, United States
[87]Psychiatry, Paul L. Foster School of Medicine, Texas Tech University Health Sciences Center El Paso, El Paso, Texas, United States
[88]Psychiatry, Sunnybrook Health Science Centre, Toronto, Ontario, Canada
[89]Investigación, Centro de Investigaciones del Sistema Nervioso (CISNE), Mexico City, Mexico City, México
[90]Stanford University School of Medicine, Palo Alto, California, United States
[91]University of Texas at Austin, Austin, Texas, United States
[92]Psicología, Universidad de Monterrey, Monterrey, Nuevo León, México
[93]José Perales - Clínica Privada, La Paz, Murillo, Bolivia
[94]Hospital Nacional Arzobispo Loayza, Lima, Perú
[95]Centro Universitario de Neurociencia, Universidad Francisco Gavidia, San Salvador, El Salvador
[96]Universidade Federal da Bahia, Salvador, Bahia, Brasil
[97]Hospital Nina Rodrigues, São Luís, Maranhão, Brasil
[98]Universidade Federal do Maranhão (UFMA), São Luís, Maranhão, Brasil

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[99]Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brasil
[100]Icahn School of Medicine at Mount Sinai, New York, New York, United States
[101]Universidade Federal do Paraná, Curitiba, Paraná, Brasil
[102]Universidade de São Paulo, São Paulo, São Paulo, Brasil
[103]Universidade Federal do Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brasil
[104]Universidade Federal de Ciências da Saúde de Porto Alegre, Psychiatry, Porto Alegre, Rio Grande do Sul, Brasil
[105]Universidade Federal do Rio de Janeiro, Rio de Janeiro, Rio de Janeiro, Brasil
[106]Universidade Federal de São Paulo, Psychiatry, São Paulo, São Paulo, Brasil

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