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Child and Adolescent Mental Health

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Photo: Douglas Novins

In This Issue

Change is the law of life. And those who look only to the past and present are certain to miss the future.

—John F. Kennedy

In your hands (or on your screen) is the fourth issue of the Colorado Journal of Psychiatry and Psychology and the last that we will publish during my service as its Founding Editor-in-Chief. "CJPP" was born out of my vision to create a venue for our Department's faculty to advance their writing, reviewing, and editing skills in a constructive and open manner. CJPP has achieved all of that, and so much more.

It is beautiful. For this I thank Melissa Miller, our Managing Editor, who designed CJPP's layout and has led the copy editing of every article that we've published.

It is demanding. The topics covered in CJPP are often hard ones, from how to help our patients struggling with profound mental health challenges, to the challenges in changing systems to support the delivery of outstanding care, to how we support the career development of our faculty, to how we improve mental health policy.

It is us. CJPP is a reflection of a great Department of Psychiatry, the innovative work that our dedicated and talented faculty do every day. Editing CJPP has regularly reminded me of the privilege I have to work with such amazing individuals and teams.

While I am leaving CJPP, CJPP is not leaving us. I am thrilled to hand off the Journal to Michael Allen, an outstanding faculty member and experienced editor. CJPP will continue to evolve and change under Michael's leadership, and I for one am excited to read along with you into its future, and ours.

– Douglas Novins

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Editorial Staff

Call for Papers on Children's Mental Health

The *Colorado Journal of Psychiatry and Psychology* is accepting papers for issues to be published in 2020. A call for papers is posted on the Journal website.

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Clinical Innovation and Service Delivery for Medically- and Psychiatrically-Complex Youth in Colorado

From the Editorial Staff: Anne Penner, MD; Lina Patel, PsyD

At the Division of Child and Adolescent Psychiatry and the Pediatric Mental Health Institute, we care for many medically- and psychiatrically-complex patients. They receive treatment both within the Pediatric Mental Health Institute's specialty mental health services as well as numerous embedded services at all levels of care (eg, primary and specialty outpatient, emergency, inpatient). Having both co-located and integrated services challenges and inspires providers to be at the forefront of innovative clinical care. Additionally, the need for mental health support in Colorado is great. We rank 48th nationwide for the high prevalence of mental health disorders in youth. Self-inflicted injuries are the leading cause of hospital-admitted injuries for adolescents in Colorado. These statistics highlight the critical needs of the children in Colorado and the profound demands on our state's child and adolescent mental health providers. As a primary referral center for youth in our region, we fill an important role in leading initiatives for excellent clinical care. We believe you will find evidence of this in the Colorado Journal of Psychiatry and Psychology's third issue devoted to child and adolescent mental health. In this issue we highlight many of the novel interventions and models of care for our patients in different integrated settings.

Articles included in this issue of the Journal describe different aspects of the excellent, integrated mental health care we provide here. There are articles describing novel services: preliminary outcomes of a DBT group for adolescents, a review of outcomes for an emergency response team to the medical floors, a complementary and alternative group therapy model, and a unique therapeutic intervention specifically for body image distortions using a stages of change model. Readers will also discover the following contributions that help guide current practice including: a review of pharmacogenomics for choosing psychopharmacologic treatment interventions, considerations of parental stress when treating Autism Spectrum Disorders, and an in-depth case study of a rare genetic condition. We also reflect on our own knowledge base for treating a classic medical-psychiatric condition with an article investigating perceived comfort level with treating non-epileptic episodes. In total, this collection serves to highlight the unique and comprehensive treatment approaches that can be applied to complex presentations of mental health problems in youth.

Content from this issue of CJPP aligns with the strategic plan for Children Hospital Colorado and emphasizes important care delivery models for mental healthcare providers. Two key areas highlighted in the hospital's plan are "enhancing our learning and questioning culture" and "enhancing and developing our systems to consistently deliver value oriented, evidence enabled clinical care." This issue's clinical researchers highlight a commitment to promoting effective communication across interdisciplinary teams, quantifying and validating the highly-effective interventions we provide, and promoting process improvement. These are just a few ways that we are contributing to the community and to the field. With the Pediatric Mental Health Institute taking the lead in providing specialized mental healthcare to not only the state, but the region, we have the potential to lead the way for transformative national change for children's health.

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Behavioral Assistance Response Team Effectively Provides De-Escalation and Aggression Management at a Large Tertiary Children's Hospital

*Daniel Nicoli, DO; Beau Carubia, MD; Anne Penner, MD**

Abstract

Background. In pediatric inpatient settings, staff often feel uncomfortable managing youth with complex psychiatric comorbidities at increased risk of agitation, potentially requiring de-escalation or restraint. Medical staff often have insufficient experience and training to manage these patients, and there are currently no best practices for managing agitated children in medical settings. In response to this practice gap, our institution developed a *Behavioral Assistance Response Team* (BART) in 2010. BART consists of a multidisciplinary team of behavioral health and medical staff that intervenes when there is potential of immediate harm due to a patient's behavior.

Methods. The reason for the code BARTs, interventions utilized, and patient response were extracted from bedside nurse records logged in the hospital's electronic medical record from 2015-2017.

Results. There was a total of 105 code BARTs over the 3-year period. The most common reason was an aggressive or agitated patient (61%) followed by danger to self (11.4%). Only 18 patients required restraint. Of those who were restrained, 5 became further agitated, 7 had no change in behavior, 5 became calm and cooperative, and 1 had no response documented.

Conclusions. This innovative service integrates pediatric medical and mental health staff to better serve agitated patients. This model describes a beneficial and feasible service that could be replicated more broadly. Our data demonstrate a reduction in the use of restraint over time and that even assaultive patients are typically managed with less restrictive interventions.

Nicoli D, Carubia B, Penner A. Behavioral Assistance Response Team Effectively Provides De-Escalation and Aggression Management at a Large Tertiary Children's Hospital. Colo J Psychiatry Psychology. 2019;3(1):5-10.

Background

Many medical etiologies in pediatric inpatient settings cause acute behavioral dysregulation. Common examples include traumatic brain injuries; acute intoxications; encephalopathies; and other neurologic, infectious, metabolic, and autoimmune conditions.[1] There is currently little data available in pediatric-focused literature regarding the prevalence of mental health comorbidities for patients admitted to inpatient medical settings. In the general population, 1 out of 7 children in the United States aged 2-8 years old have a diagnosed mental, behavioral, or developmental disorder and the number of children with mental health disorders increases with age.[2] Approximately 20% of youth aged 13-18 in the United States are affected by some type of mental disorder to an extent that they have difficulty functioning.[3] This indicates that a significant proportion of children and adolescents admitted medically may be impaired from a comorbid mental illness at any given time. Staff often feel uncomfortable in inpatient pediatric settings managing youth with complex psychiatric comorbidities who may be at increased risk of agitation, potentially requiring de-escalation or restraint.[4] Restraint is a rare occurrence on medical floors and staff often cite insufficient experience and training to manage these events.[4]

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Attempts to address this growing concern have included educating nurses on working with psychiatrically-ill children, increased nursing exposure to psychiatric patients, implementation of psychiatric consultation-liaison services, and development of rapid response teams (RRTs) that specialize in behavioral emergencies.[5] The literature provides limited guidance regarding the effectiveness of these teams and no evidence of best practices for the management of agitated children in a medical setting. Medical RRTs have been shown to be effective in reducing the number of cardiopulmonary arrests and mortality rates in intensive care units, and thus have been broadly implemented in hospital settings.[6] Furthermore, the 2011 Institute for Clinical Systems Improvement Health Care Protocol for Rapid Response Teams acknowledges that patients with mental health or behavior-based problems create challenges on medical floors and recommends implementation of behavioral RRTs to "assist staff in proactively de-escalating patients who may be exhibiting potentially violent behaviors."[7] Behavioral RRTs have been described in adult medical inpatient settings. Implementation of these teams has reduced the use of restraint, violence towards staff, and involvement of security staff; and improved the confidence of medical staff in navigating these situations.[4,5,8-10]

Our institution is a tertiary children's hospital with over 400 beds and serves a large urban area as well as the surrounding 7-state region. An attached mental health institute provides inpatient psychiatric care for children and adolescents. The Behavioral Assistance Response Team (BART) was created in 2010 to address the need for a behavioral RRT throughout the hospital. Prior to its implementation, individual units were left to manage psychiatric emergencies and behavioral outbursts independently. There were concerns for patient and staff injuries and high utilization of restraint. The BART team was created with the aim of decreasing injuries and reliance on restraint by proactive intervention and use of behavioral de-escalation techniques. In 2015, the BART process was reviewed by team leadership to further streamline the behavioral RRT response, enhance focus on behavioral de-escalation, and create data tracking modalities. In this article, we describe this innovative program in the pediatric setting, report data from the past 3 years of BART outcomes, and discuss future directions including possible replication in other medical centers.

Program Description

The BART consists of a multidisciplinary team designed to intervene and respond to psychiatric or behavioral emergencies including behavior that is assaultive to staff, dangerous to oneself, out-of-control, or dangerous to others (Table 1). The team is made up of Security Personnel, Psychiatric and Charge Registered Nurses (RNs), Mental Health Counselors (MHCs), and Psychiatric Providers (MD/DO). The BART works closely with the primary medical/surgical providers during the response.

The BART is directed by a lead MHC, with other members of the team having direct roles as described in Figure 1. The BART works collaboratively to assist in behavioral de-escalation and determine the patient's immediate needs. Common needs include implementing de-escalation techniques; assisting the patient in calming; providing an adequate and safe space to regain control; and administering restrictive means such as therapeutic holds, restraint, or emergency medications. A "therapeutic hold" is defined as physically holding a patient to restrict movement for a period of less than 5 minutes.

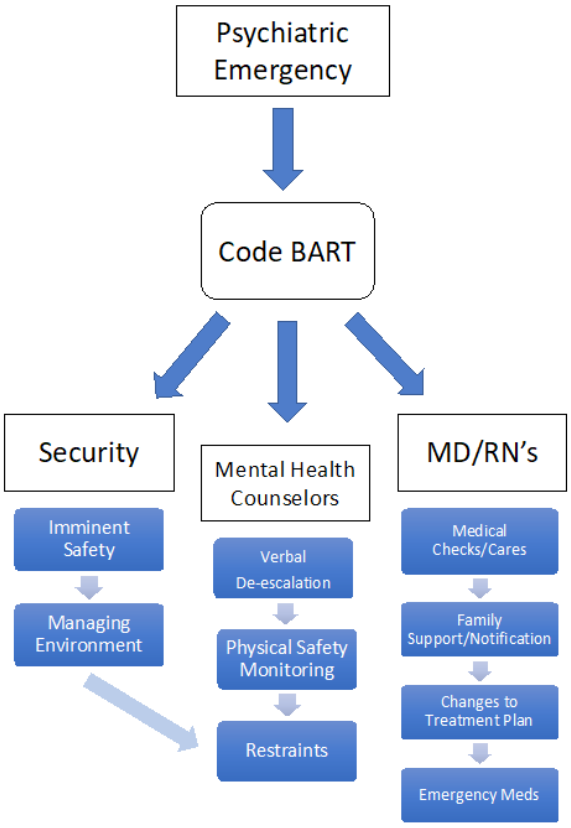

Figure 1. BART organizational structure.

Any staff member or provider may initiate a BART code by calling the standard hospital emergency number on any phone. A page is then sent to the team with the location, and team members are expected to respond immediately. The responders bring specialized equipment to aid in de-escalation including coping tools (eg, weighted blankets, distraction toys, and picture schedules) and restraints. Since 2017, responders have all been formally trained in Safety-Care™, an evidence-based behavioral de-escalation program based on principles of Applied Behavioral Analysis.[11] The team debriefs after the code BART and discusses further recommendations such as additional supervision (eg, 1:1 observation), removal or continued use of restraint, referrals for child life specialists and social work support, changes in medical management, and need for formal psychiatric consultation.

Methods

The RN enters data into the BART Flowsheet (Table 2), which is built into the electronic medical record (EMR). The MHC or provider enters a BART Note documenting the reasons for initiation of the BART, interventions implemented during the code, outcomes, and further recommendations from the debrief. A report is generated on a monthly basis from the EMR and BART Flowsheet and sent to both the compliance office and the Medical Director of Psychiatric Consultation Services. The report, in a spreadsheet containing data collected from 2015-2017, was de-identified prior to being sent to the primary investigator. Descriptive analytic techniques, including calculating percentages and summation of frequencies, were performed to identify trends. Data was stored on the hospital network drives and the evaluation of this retrospective data review was approved by Colorado Multiple Institutional Review Board.

Results

From 2015-2017, there was a total of 105 code BARTs documented in the EMR and an average of 1 BART per 405 admissions. The most common reason cited for calling a code BART was for an aggressive or agitated patient (61%), followed by danger-to-self (11.4%), other (9.5%), assaultive (8.6%), out-of-control behavior (8.6%), and no reason listed (1%) (Figure 2). The interventions documented include 4 mental health holds placed (72-hour involuntary hospitalization of patient) (3.8%), 31 therapeutic holds (29.5%), 26 medications offered or given (24.8%), 18 patients placed in restraint (17.1%), 44 patients required no intervention (42%), and 18 patients required multiple interventions (17%). The documented patient responses were: 25 individuals became further agitated, 18 had no change in behavior, 47 became calm and cooperative, and 6 were documented as "other." Additionally, 9 did not include a patient response.

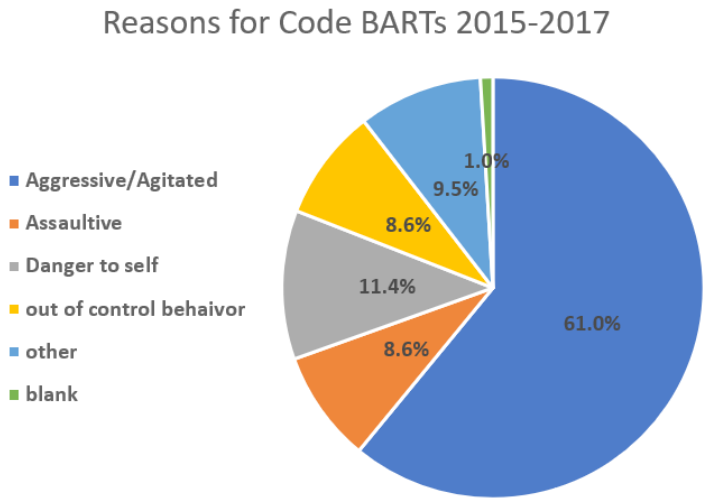

Figure 2. Reasons for code BARTs documented in the EMR from 2015-2017.

Restraint was required in 4 of the 9 assaultive codes, 10 of the 64 aggressive or agitated, 1 of the 9 out-of-control, 1 of the 12 danger-to-self, and 2 of the 10 listed as other. Of the patients who were restrained, the documented responses were: 5 individuals became further agitated, 7 had no change in behavior, 5 became calm and cooperative, and 1 had no response documented. In 2015, 2016, and 2017, there were totals of 37, 31, and 37 code BARTs respectively. Also during these years, there was a total of 11, 3, and 4 instances where restraint was applied (Figure 3).

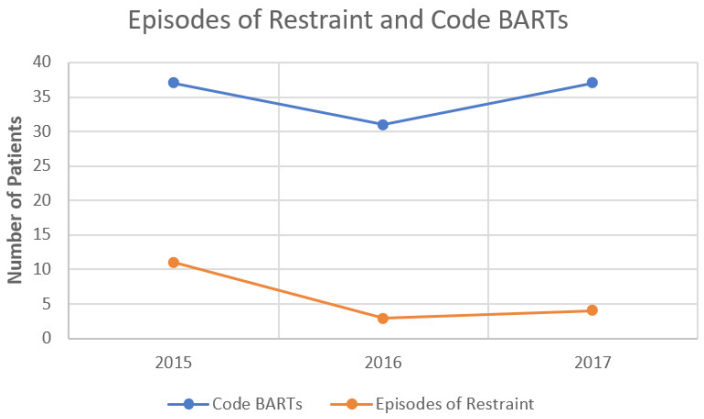

Figure 3. Episodes of restraint for code BARTs documented in the EMR from 2015-2017.

The patients who became calm and cooperative in response to code BARTs in years 2015, 2016, and 2017 were 13, 11, and 33, respectively, while the number of patients who became further agitated were 11, 8, and 6 (Figure 4).

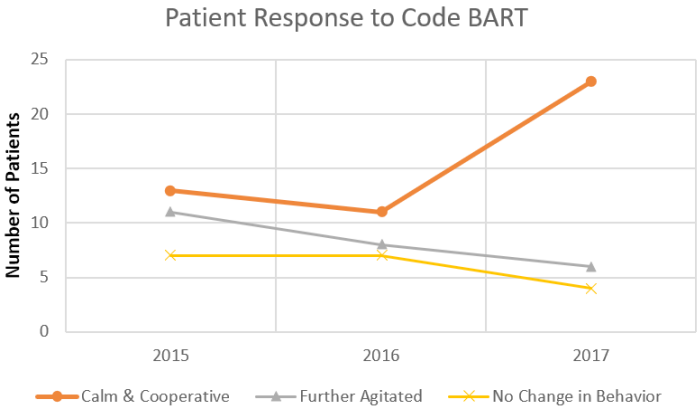

Figure 4. Patient responses to code BARTs documented in the EMR from 2015-2017.

Discussion

The BART model describes an innovative service for managing behavioral emergencies in a pediatric hospital. Our results demonstrate some emerging evidence of change in outcomes for these emergencies. These results add to the literature base and will help define best practices for other hospitals looking to implement similar models.

Over the 3 years of the study, the number of BARTs remained fairly stable, but the number of patients who calmed after the interventions increased in 2017 as shown in Figures 4 and 5. The incidence of restraint also decreased. This may be due to the implementation of Safety-Care™ during that year. The previous training program emphasized how to safely restrain patients when necessary while the new training program focuses on techniques to verbally de-escalate and avoid restraint. Our results also show that even in instances of dangerous or potentially dangerous behavior, restraint was not the most common intervention. Yet, brief therapeutic holds were used with some frequency. Additionally, the data demonstrate that even assaultive patients are generally managed with less restrictive interventions.

There are some limitations of this study. A code BART is a rare occurrence, which makes it difficult to collect enough data to sufficiently power a study. In addition, this study only has 3 years of data collection and does not have reliable data prior to the review and improvement of BART in 2015. When more data is collected, it will be useful to evaluate the specific interventions that are most effective in response to specfic reasons for code BARTs (eg, verbal de-escalation is the most effective intervention for the code BARTs called for aggressive patients). It would also be useful to collect additional data such as staff injuries and strategies attempted prior to BART team arrival.

In our experience, this is a feasible service to implement and could be replicated more broadly. One potential barrier to implementation is access to mental health-trained staff. The use of restraint, therapeutic holds, and medications highlights the need for specially trained staff as part of the response team. Our institution has the advantage of having an attached inpatient psychiatric unit, so experienced staff are available to assist at all times. The cost of training and staffing this kind of service could also be a barrier. Yet, our model is a promising way for hospitals to reduce negative outcomes, such as restraint, and thereby improve patient care while also cutting costs. Future areas of study include querying hospital-wide instances of restraint, staff injuries, or length of stay for psychiatrically-complicated patients. If replicated in other systems, a behavioral RRT, such as the BART, could become the standard of care for psychiatric emergencies in the pediatric, medical setting.

Tables

Table 1. Psychiatric and behavioral emergencies with which the BART team intervenes and responds.

	Definition	Example
Agitated	Movements that signify an increased risk of aggression	Pacing, handwringing, clenched fists
Aggressive	Readiness or high likelihood of becoming violent. Very forceful manner of addressing one's concerns.	Yelling, screaming, raising volume of voice, posturing, insulting
Assaultive/Violent	Inclined to or suggestive of a violent attack (physical or verbal)	Physically striking at staff; spitting; using racial, derogatory, or profane language
Danger to self	Behaviors that indicate that the patient may be at risk to seriously injure themselves	Self-harming behaviors; suicidal statements, gestures, or actions
Danger to others	Behaviors that indicate that the patient may be at risk to seriously injure others	Making verbal threats, attacking or preparing to attack another individual
Self-harming behaviors	Deliberate actions that cause or could cause injury or physical pain to oneself	Cutting, burning, scratching, head-banging
Out-of-control behavior	Dangerous behaviors not directed toward any particular individual	Attempting to pull out IV lines, destroying property in environment

Table 2. BART Flowsheet, built into the electronic medical record (EMR).

BART Event
Contact/Response
Time called
Time responded
Time resolved
Initiated by
Unit
Who responded
Reason for call
Patient behavior prior to calling BART
Escalated Behavior: less restrictive means attempted
Previous BART called?
Event Details
Interventions
Patient response to interventions
Type of PPE used
Contract created with patient
Were there any safety concerns or injuries
Support and Debriefing
Support provided to parents and staff?
Debrief completed?
Summary of Events

Summary of events

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Pharmacogenomic Testing in Child and Adolescent Psychiatry

*Danielle L. Stutzman, PharmD, BCPP**

Abstract

Mental illness is common among youth. While behavioral interventions are often considered first-line treatment, psychotropic medications may also be used to manage ongoing symptoms. Variability in medication response and toxicity can be attributed to genetic variations that impact medication-metabolizing enzymes, medication transporters, or medication targets. Pharmacogenomics, the study of this genetic variation, provides the potential to tailor psychotropic medication choice. While algorithm-based pharmacogenomic tests (eg, GeneSight®, RightMed®, etc) have broadened our ability to create larger pharmacokinetic and pharmacodynamic genetic profiles to guide treatment, providers must consider both potential benefits and limitations of such testing. While particular pediatric populations may benefit from pharmacogenomic testing, widespread use is not recommended at this time. Prospective, long-term studies are needed to more completely examine the effects of medication selection and/or dose adjustments based on a pediatric patient's genotype. This article reviews current literature describing the use of pharmacogenomic testing in child and adolescent psychiatry.

Stutzman D. Pharmacogenomic Testing in Child and Adolescent Psychiatry. Colo J Psychiatry Psychology. 2019;3(1):11-30.

Introduction

The National Institute of Mental Health estimates that 20% of youth have a mental illness, with nearly 50% developing symptoms by age 14.[1] In the treatment of youth with mental illness, treatment guidelines include behavioral interventions and/or medications. As part of a comprehensive treatment plan providers often choose medication management. Annually, it is estimated that ~7% of youth age 13-18 years are prescribed an antidepressant, stimulant, or antipsychotic.[2] Treatment guidelines, risk for adverse effects, comorbid medical conditions, concomitant medications, and previous medication trials typically guide psychotropic medication choice. Pharmacogenomic testing may also have a role in guiding medication choice, given the ability to identify genetic variations in medication metabolism or targets to potentially predict treatment response and tolerability.[3-6]

While the role of pharmacogenomic testing in child and adolescent psychiatry continues to be evaluated, such testing has been used clinically (particularly in adult populations) to tailor pharmacologic treatment.[3-7] Well-replicated, pharmacogenomic associations exist across several fields of medicine (eg, psychiatry, infectious disease, and oncology). For example, the association of *HLA-B*1502* with carbamazepine/oxcarbazepine-induced Stevens-Johnson syndrome (SJS) and toxic epidermal necrolysis (TEN), *VKORC1* and *CYP2C9* with warfarin dosing, and *HLA-B*5701* with abacavir hypersensitivity are widely known and used in clinical practice.[6] While most medications with mandatory genetic testing are used in oncology, testing in other areas of medicine is increasingly becoming part of standard clinical practice.[3,6]

Variability in medication response and toxicity can be attributed to genetic variations in medication-metabolizing enzymes, medication transporters, or medication targets.[5] Such variability coupled with modest response rates, particularly with antidepressants in adult populations, has sparked interest in the use of pharmacogenomic testing to inform

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medication decisions.[4,8,9] The potential to tailor psychotropic medication choice is not only desirable to patients but also to providers who may wish for an objective guide for treatment decisions.

The first Food and Drug Administration (FDA)-approved pharmacogenomic test, AmpliChip CYP450 (Roche Molecular Systems Inc.), tested for 2 genetic polymorphisms in *CYP2D6* and *CYP2C19* via DNA microarray.[4,10] With the development of combinatorial, algorithm-based strategies, genotypes are now evaluated for a series of genes (eg, Cytochrome P450 enzymes, serotonin transporter, human leukocyte antigens, etc). While such algorithm-based strategies (eg, GeneSight®, RightMed®) provide detailed pharmacodynamic genetic profiles with the goal of guiding pharmacologic treatment decisions, providers must consider both their potential benefits and limitations.

Attitudes regarding pharmacogenomic testing among psychiatrists and psychiatric pharmacists across the United States shed light on clinical themes regarding the role of pharmacogenomic testing in psychiatry.[11-13] Departments of Psychiatry at Mayo Clinic, University of Louisville, and Georgia Medical College completed a 67-item survey to assess demographics, practice patterns, and views on pharmacogenomic testing including clinical utility, psychosocial risks, self-assessed competency, and ethical issues.[12] On average, participants had ordered pharmacogenomic testing approximately 20 times in the past year, with approximately 15% of respondents reporting they had never ordered pharmacogenomic testing. Most respondents strongly agreed with the statement, "I feel that it is a psychiatrist's role to offer pharmacogenomic testing in appropriate clinical circumstances." Instances of medication intolerance and treatment-resistant depression were identified as having the highest utility for pharmacogenomic testing. Alternatively, little utility was perceived when making treatment decisions for a patient with a new mental health diagnosis including new-onset psychosis. From an ethical standpoint, providers agreed that psychiatrists must demonstrate competence in interpreting pharmacogenomic test results, but that current training programs may not be offering such training for residents.[12] With the expanded availability of pharmacogenomic tests since the completion of this survey, it is important to consider changes in attitudes with increased familiarity (eg, marketing, advertising).

Where does pharmacogenomic testing fit in child and adolescent psychiatry? This article reviews available literature to describe this role, with description of pertinent pharmacokinetic and pharmacodynamic genetic variants and key clinical principles in child and adolescent psychiatry.

Evaluation of core pharmacokinetic and pharmacodynamic principles is critical when considering the effects of genetic variation on medication-metabolizing enzymes, medication transporters, and/or medication targets as they relate to medication response and propensity for adverse effects.[5,7,14,15]

Pharmacokinetics is the study of medication absorption, distribution, metabolism, and excretion. The hepatic cytochrome P450 (*CYP450*) isoenzymes, involved in Phase I metabolism (eg, *CYP2D6*, *CYP3A4*, *CYP2C19*), are the most important and well-studied metabolic enzymes that exhibit clinically significant genetic polymorphisms.[10,14,15] In order to systematically evaluate these genetic polymorphisms, the Clinical Pharmacogenetics Implementation Consortium (CPIC) has developed standardized terminology to classify patients into 5 main groups based on metabolic phenotype: extensive (normal), poor, intermediate, rapid, and ultrarapid metabolizers (Table 1).[16]

Medication tolerability is thought to be dependent on an individual's *CYP450* enzymatic activity. For example, a *CYP2D6* poor metabolizer may require lower doses of a medication that is metabolized primarily via *CYP2D6*. Of course, it is important to consider whether the medication is being metabolized to an active or inactive metabolite as this may alter this interpretation. Additionally, activity of *CYP450* isoenzymes is highly influenced by development. For example, *CYP2D6* activity reaches developmental maturity by 3-5 years of age.[10] This and other principles are discussed more completely below (Table 2).[17,18]

Pharmacodynamics describes the relationship between a medication, its site of action, and subsequent response (eg, efficacy and tolerability). This relationship can be influenced by several factors including medication concentration, density of medication receptors, and mechanism by which a signal is transmitted.[10,15] For example, variations in activity of the presynaptic serotonin transporter have been evaluated as a predictor of antidepressant response (eg, selective serotonin reuptake inhibitors). While CPIC guidelines have yet to formally provide guidance on

pharmacodynamic polymorphisms, ongoing studies have aimed to identify clinical significance among a variety of psychotropic medication classes.

Research regarding the ability of specific pharmacokinetic (PK) and pharmacodynamic (PD) genetic polymorphisms to predict psychotropic medication response/tolerability has been done primarily in adult populations. Interpretation of PK/PD genetic polymorphisms requires careful evaluation given the potential for developmental stage (age), ethnicity, and environmental factors to impact medication tolerability and response. Such considerations are particularly important in pediatric populations.

Pharmacokinetic Considerations

Recently updated CPIC guidelines regarding pharmacogenomic-guided dosing for selective serotonin reuptake inhibitors (SSRIs) and tricyclic antidepressants (TCAs) provide an initial framework for clinicians. Based on available literature and primary routes of metabolism via *CYP2D6* or *CYP2C19*, recommendations are made for particular SSRIs: paroxetine, fluvoxamine, citalopram, escitalopram, and sertraline.[17]

CYP2D6 is highly polymorphic, well characterized, and plays a primary role in the metabolism of more than 70 medications (eg, codeine, dextromethorphan, tamoxifen, tramadol), including many psychotropic medications (eg, fluoxetine, paroxetine, venlafaxine, risperidone, aripiprazole, atomoxetine, dextroamphetamine) (Table 2). Of note, *CYP2D6* is the only non-inducible *CYP450* enzyme. Significant phenotypic variability has been shown to exist across geographically, racially, and ethnically diverse groups.[17-19]

Selective Serotonin Reuptake Inhibitors (SSRIs)

Paroxetine and fluvoxamine are extensively metabolized via *CYP2D6* to metabolites with little pharmacologic activity, which helps explain their increased potential for serotonin withdrawal among pediatric patients who are medication nonadherent. As expected, many studies have identified that *CYP2D6* ultrarapid metabolizers have low or undetectable paroxetine serum concentrations, increasing their risk for therapeutic failure. Alternatively, *CYP2D6* poor metabolizers are known to have significantly greater exposure to both paroxetine and fluvoxamine, increasing their risk for medication-induced side effects (eg, gastrointestinal). The FDA has recommended that fluvoxamine be used cautiously in individuals who have reduced levels of *CYP2D6* activity, though they do not provide specific dosing recommendations.[17]

Fluoxetine, while also a substrate of *CYP2D6*, undergoes more complex metabolism to active metabolites. *CYP2D6* is primarily responsible for the metabolism of fluoxetine to S-norfluoxetine (more pharmacodynamically active metabolite) while *CYP2D6* and *CYP2C19* are responsible for the metabolism to R-norfluoxetine. Studies have evaluated the effect of various *CYP2D6* phenotypes and have failed to demonstrate significant alterations of serum fluoxetine and norfluoxetine concentrations.[17] Additionally, genetic variants of the *ABCB1* gene resulting in altered P-glycoprotein (P-gp) activity are thought to play a critical role in the transport of fluoxetine (and other antidepressants) across the blood-brain barrier.[20] Evaluations in pediatric patients have demonstrated influence of both *CYP2D6* and *ABCB1* genetic variants on fluoxetine serum levels, though significant interindividual variability in serum concentrations warrants ongoing evaluation.[20,21] Currently, no pharmacogenomic-guided dosing recommendations exist.

While specific dosing recommendations are not yet supported based on *CYP2D6* activity, consideration should be made regarding the possible increased risk of adverse effects among *CYP2D6* poor metabolizers. Fluoxetine prescribing information recommends cautious use in individuals at increased risk for QT prolongation (eg, long QT syndrome) with conditions that may predispose an individual to increased fluoxetine exposure (eg, hepatic impairment, concomitant use of *CYP2D6* inhibitors, *CYP2D6* poor metabolizer status).

CYP2C19 ultrarapid metabolizers have significantly lower exposure to citalopram, escitalopram, and sertraline, and may be at higher risk for therapy failure as compared to extensive metabolizers.[17,22] Among *CYP2C19* poor metabolizers, CPIC guidelines recommend an initial dose decrease of 50% in order to minimize the risk for adverse effects.[17] Based on the risk for QT prolongation among adults receiving citalopram, a 50% dose reduction or a maximum daily dose of 20 mg has been recommended by the FDA. Of note, these recommendations do not apply to escitalopram. CPIC guidelines recommend careful monitoring among *CYP2C19* poor metabolizers receiving citalopram, escitalopram, and sertraline given the theoreti-

cal increased risk for QT prolongation—though limited data are available for escitalopram or sertraline to quantify this risk.[17] A baseline ECG should be considered for individuals who are prescribed *CYP2C19* inhibitors (eg, cimetidine, omeprazole), other medications that may prolong the QT interval, or possess other risk factors for QT prolongation (eg, electrolyte abnormalities).

Tricyclic Antidepressants (TCAs)

Though prescribed less commonly than SSRIs in pediatric populations, it is important to consider the impact of *CYP2D6* and *CYP2C19* genetic polymorphisms among TCAs. Tertiary amines (eg, amitriptyline) are primarily metabolized by *CYP2C19* to desmethyl-metabolites/secondary amines (eg, nortriptyline). Both classes of amines are metabolized by *CYP2D6* to less active hydroxy-metabolites. The ratio of tertiary to secondary amine serum concentrations, particularly among various *CYP2C19* phenotypes, may significantly alter the balance of serotonergic and noradrenergic effects—influencing medication response and/or toxicity.[18] Optimal therapeutic plasma concentrations for TCAs have long been well defined, providing additional guidance for minimizing toxicity while optimizing therapeutic benefit. At this time, it is unclear how to apply combined *CYP2D6* and *CYP2C19* genetic polymorphisms to guide dosing decisions.[18]

Serotonin Norepinephrine Reuptake Inhibitors (SNRIs)

While guidelines do not exist for serotonin norepinephrine reuptake inhibitor (SNRI) pharmacogenomic-guided dosing, attention should be given to studies in adult populations. Venlafaxine, primarily metabolized to its active metabolite O-desmethylvenlafaxine (ODV, also known as desvenlafaxine), has been shown to have higher rates of response and remission (HAM-D) among extensive metabolizers as compared to poor metabolizers.[23] Notably, no consistent differences in tolerability have been observed. Ongoing evaluations are warranted, particularly among youth who are poor metabolizers. As the major active metabolite of venlafaxine, desvenlafaxine is primarily metabolized via conjugation with little *CYP3A4* involvement. For this reason, desvenlafaxine may be recommended as a desirable alternative particularly among *CYP2D6* poor metabolizers.[23] Caution with this practice is warranted, not only given conflicting evidence regarding desvenlafaxine efficacy/tolerability in this population but also given recent evidence that desvenlafaxine may not be an effective therapeutic option for youth with depressive or anxiety disorders.[24,25]

Norepinephrine Reuptake Inhibitors (NRIs)

Evaluations of atomoxetine in pediatric patients with attention-deficit/hyperactivity disorder (ADHD) have demonstrated that while *CYP2D6* poor metabolizers may have significant reductions in symptom severity scores (eg, ADHD-RS-IV-Parent) as compared to extensive metabolizers, they also have increased risk for adverse effects (eg, increased heart rate and diastolic blood pressure).[26] Poor metabolizers have a significantly higher serum concentration, or 10-fold higher area under the curve, compared to extensive metabolizers.[26] A recently published CPIC guideline provides atomoxetine dosing recommendations based on *CYP2D6* genotype and recommends measuring peak plasma concentrations to guide ongoing dosing decisions.[27]

Antipsychotics

While there is not a CPIC guideline regarding kinetic-based dosing recommendations for antipsychotics, pharmacogenomic recommendations are included in some antipsychotic labeling (Table 2). For example, medications may have "actionable" recommendations within the prescribing information (eg, aripiprazole, clozapine, pimozide) while others have "informative" recommendations (eg, risperidone).

Novel in-vivo drug interaction analyses indicate that pimozide, a first-generation antipsychotic FDA approved for Tourette's Disorder, is primarily metabolized by *CYP2D6* and *CYP3A4* and secondarily by *CYP1A2* (previously thought to be the primary route of metabolism). Review by the FDA revealed that genetic- or medication-induced *CYP2D6* poor metabolizer status significantly increases the risk for QT prolongation and other pimozide-induced arrhythmias.[28] Therefore, prescribing information has been revised with specific dosing recommendations based on *CYP2D6* phenotype. Additionally, concomitant use of *CYP2D6* inhibitors (eg, fluoxetine, bupropion) is contraindicated and providers are strongly encouraged to obtain baseline and periodic ECG throughout pimozide treatment.[29]

Aripiprazole is metabolized by *CYP3A4* and *CYP2D6* via 3 major biotransformation pathways. Pharmacokinetic evaluations demonstrate that *CYP2D6* poor metabolizers have an 80% increase in aripiprazole exposure and a 30% decrease in dehydro-aripiprazole (active metabolite) exposure compared to extensive metabolizers.[30] Based on these and other evaluations, specific dosing recommendations are available based on *CYP2D6* phenotype and concomitant treatment with *CYP2D6* and/or *CYP3A4* inhibitors/inducers.[31] While individuals exposed to higher aripiprazole concentrations are more likely to experience adverse effects (eg, nausea, vomiting), routine pharmacogenomic testing prior to the initiation of aripiprazole is not recommended.[30-32] Testing may be considered in youth at high risk for adverse effects who have tolerated other substrates of *CYP2D6* poorly, and who may be currently taking a *CYP2D6* inhibitor.

Clozapine prescribing information suggests dose reductions among individuals who are *CYP2D6* poor metabolizers given the potential for increased concentrations in this population. Clozapine is metabolized by 3 biotransformation processes (N-demethylation, N-oxidation, and aromatic hydroxylation) that are mediated primarily by *CYP1A2* and *CYP3A4*; *CYP2D6*, *CYP2C19,* and *CYP2C9* play a secondary role.[33] Norclozapine (N-desmethylclozapine), the more active primary metabolite, is thought to be associated with significant increases in weight, body mass index, fasting blood glucose, and triglyceride levels at high norclozapine levels. Additionally, it has been suggested that higher clozapine:norclozapine ratios are associated with an improved clinical response and fewer adverse events.[33] While routine pharmacogenomic testing is not recommended prior to the initiation of clozapine, prescribers should consider the influence of drug-drug interactions and genetic polymorphisms on serum clozapine and norclozapine levels.[34]

Pharmacodynamic Considerations

SLC6A4

The *SLC6A4* gene plays an important role in determining the function of the presynaptic serotonin transporter, ensuring transfer of serotonin back into the neuron. The most commonly-studied variant of *SLC6A4* is a polymorphism within the promoter region, referred to as the serotonin transporter-linked polymorphic region (5-HTTLPR).[10,14,35,36] Genetic variation within this region has been shown to be associated with decreased expression of the presynaptic serotonin transporter, potentially altering an individual's response to serotonergic antidepressants. *SLC6A4* genetic variations have also been implicated in mood, anxiety, and eating disorders in addition to fear processing and behavioral response to threats.[10,35]

One significant polymorphism involves an insertion or deletion within the promoter region, resulting in a long (l) or a short (s) allelic variant.[10] Studies suggest that the l allele is associated with improved antidepressant response among Caucasian adults, though evidence is mixed. Among Asian populations, association between the s allele and improved antidepressant response was initially reported, though later studies have indicated little association.

A recent meta-analysis evaluating the impact of 5-HTTLPR on antidepressant efficacy demonstrated evidence to support an association between the l/l genotype, l allele, and remission among adults with major depressive disorder.[35] Upon separate analysis of Caucasian and Asian populations an influence on SSRI response and remission was identified among Caucasians, particularly carriers of the l allele. While other adult data failed to identify such an association, differences among patient populations must be considered (eg, treatment resistant depression, mixed antidepressant inclusion, and heterozygous categorization). Across populations, it has been estimated that 5-HTTLPR might explain ~3% of variance in antidepressant response, which highlights the need for further evaluation.[36] No studies have directly evaluated this gene as a predictive tool for antidepressant response among pediatric patients.[10]

COMT

Catechol-o-methyltransferase (COMT) is responsible for inactivation of synaptic catecholamines (eg, norepinephrine, dopamine). Genetic polymorphisms of COMT have been identified in the pathophysiology of ADHD and as a possible contributing factor to stimulant response among pediatric patients with ADHD.[10,37-39] The most widely studied polymorphism in this gene is valine158methionine. Given the increased density of COMT in the PFC and the well-known positive effects of methylphenidate and amphetamine-based stimulants in catecholamine PFC functioning,

it is not surprising that genetic variations in COMT function have been evaluated.[39] Studies have shown that children with ADHD and a Val/Val homozygous genotype have more ADHD symptoms in addition to increased aggression and emotional dysfunction psychopathy scores compared to Met allele carriers.[39] The Met allele carries a fourfold decrease in enzymatic activity relative to the Val allele, resulting in a net increase in prefrontal cortex (PFC) catecholamine activity.[37]

Other studies have identified an association between reduced COMT activity and decreased response rates to methylphenidates.[37-39] An investigation of Korean children with ADHD demonstrated that the Val/Val genotype was significantly associated with a positive response to treatment with methylphenidate as assessed by teacher rating scales. Such an association was not identified when comparing parent rating scale responses.[37] Other studies indicate a more favorable response to amphetamines in carriers of the Val/Val homozygous genotype.[10] An investigation of boys with ADHD, one Met allele was associated with significant differences in improvement on oppositional symptoms (measured as SNAP-IV oppositional scores) as compared to Val homozygotes when treated with methylphenidate.[39] Ongoing evaluations are warranted to further define this relationship.

HLA-B*1502 & HLA-A*3101

Human leukocyte antigen (*HLA*) genetic variations are implicated in the development of specific cutaneous adverse reactions to aromatic anticonvulsants (eg, carbamazepine, lamotrigine, oxcarbazepine, phenytoin). Genotyping results for *HLA-B* and *HLA-A* alleles are presented as positive if 1 or 2 copies of the variant allele are present. *HLA-B* and *HLA-A* genes as part of the major histocompatibility I complex (MHCI) encode cell surface proteins that present intracellular antigen to the immune system. When antigens are recognized as "non-self" an immune response may be triggered—in this case, resulting in a severe cutaneous reaction in the presence of a variant allele.[40]

The presence of the *HLA-B*1502* allele has been strongly associated with increased risk for SJS and TEN in individuals treated with carbamazepine/oxcarbazepine. Recommendations regarding *HLA-B*1502* genetic testing were added to carbamazepine prescribing information as a boxed warning in 2007.[40] Patients of Chinese ancestry, in particular, are thought to have a strong association between the risk of developing SJS/TEN with carbamazepine treatment in the presence of *HLA-B*1502*. Highest percentages of such populations were found in Hong Kong, Thailand, Malaysia, and the Philippines; intermediate prevalence was found in North China and South Asia. Prescribing information recommends that prior to the initiation of carbamazepine, testing for *HLA-B*1502* should be performed in "populations in which HLA-B*1502 may be present".[41]

The presence of the *HLA-A*3101* allele is associated with a wider range of hypersensitivity reactions including maculopapular exanthema, drug reaction with eosinophilia and systemic symptoms (DRESS), and SJS/TEN in individuals treated with carbamazepine. Cross sensitivity to oxcarbazepine is thought to be about 33% for individuals who experience rash with carbamazepine. While not a boxed warning, carbamazepine prescribing information has a warning and recommendations related to *HLA-A*3101*. *HLA-A*3101* is thought to be carried by more than 15% of individuals of Japanese, Native American, Southern Indian, and some Arabic ancestry; up to 10% in patients of Han Chinese, Korean, European, and Latin American ancestry; and up to 5% in African-American and patients of Thai, Taiwanese, and Chinese ancestry.[40]

Genetic testing for *HLA-B*1502* and *HLA-A*3101* alleles should be done prior to initiation of carbamazepine and oxcarbazepine, specifically in the patient populations described above. CPIC guidelines recommend if individuals are *HLA-B*1502* positive and carbamazepine or oxcarbazepine naïve, then these agents should be avoided. While other aromatic anticonvulsants, including eslicarbazepine, lamotrigine, phenytoin, fosphenytoin, and phenobarbital have limited evidence linking SJS/TEN with this allele, caution should still be used.[40] In the case that an individual is *HLA-B*1502* negative, but *HLA-A*3101* positive, it is best to avoid carbamazepine. It is important to recognize that severe dermatologic reactions may still occur in the absence of *HLA-B*1502* and *HLA-A*3101* and that 90% of individuals treated with carbamazepine who develop SJS/TEN have the reaction during the first few months of treatment.

MTHFR

Genetic polymorphisms, primarily of the *C677T* and *A1298C* genes, predict variations in methylenetetrahy-

drofolate reductase (MTHFR) activity—a key enzyme in the conversion of dietary or synthetic folate into L-methylfolate. It has been proposed that L-methylfolate plays an important role in the synthesis of monoamines, thereby influencing antidepressant response and propensity to develop depression.[42-44] Variation of the *C677T* gene is thought to have a particularly large impact on MTHFR function, with homozygous individuals (*TT*) demonstrating ~30% enzyme activity and heterozygous individuals (*CT*) demonstrating ~65% enzyme activity compared to the wild-type variant (*CC*).[45] Variations in *A1298C* has a smaller overall impact on MTHFR activity. Additionally, variants of the *C677T* have been associated with an increased risk for depression among adults.[14] As such, augmentation of antidepressants with 15 mg of L-methylfolate in adults has demonstrated positive results. However, more robust evidence is needed.[42,43] Currently, no evidence is available regarding application to pediatric populations. Ongoing evaluation is needed to determine the clinical utility of measuring MTHFR activity, particularly in pediatric populations.

DRD2/5HT2C

Many research studies have investigated genetic variants (primarily single nucleotide polymorphisms) associated with antipsychotic efficacy and tolerability, including *DRD2* (dopamine D2 receptor), *DRD3* (dopamine D3 receptor), *5HT2A* (serotonin receptor 2A), and *5HT2C* (serotonin receptor 2C) among others.[46] Much interest lies in the function of *DRD2*, as blockade of this receptor is a common mechanism among this class of medication.[46-48] Polymorphisms of the *DRD2* gene may increase the risk for schizophrenia, response to antipsychotics, and for adverse effects. In a study among adults treated with aripiprazole or risperidone for first-episode psychosis, homozygotes for the C allele (C/C) had a significantly greater reduction in positive symptoms compared to T allele carriers at 12 weeks. It is important to note that both groups improved significantly, but homozygotes (C/C) had an added 10% mean improvement in positive symptoms. Homozygotes (C/C) were also more likely to develop akathisia among the aripiprazole group but had lower elevations in prolactin levels among the risperidone group compared to T carriers.[47]

In youth, several factors have been associated with second generation antipsychotic-induced weight gain including early weight gain at the onset of treatment, prior and concurrent psychotropic treatment, and antipsychotic dose.[49] The serotonin *5HT2C* receptor gene has been associated with antipsychotic-induced weight gain given its association with feeding behavior, the development of obesity in *5HT2C* receptor knockout mice, and a C to T transversion within the promoter region (-759C/T) resulting in obesity and diabetes in the general population.[49] Short-term (8 week) studies in youth with ASD have demonstrated protective effects among T allele carriers (eg, carriers may have a lower risk for weight gain when treated with an atypical antipsychotic). Other studies have demonstrated conflicting outcomes. One study of youth treated with risperidone for ≥ 6 months did not demonstrate a protective effect of the T allele in regards to weight gain or risk for cardiometabolic abnormalities.[49] Overall, the use of such prediction panels for antipsychotic response and tolerability requires more research that more fully combines genetic variants, epigenetic changes, and other clinical factors involved.[46] Among pediatric patients, this is particularly true, given their enhanced sensitivity to metabolic effects of atypical antipsychotic treatment compared to adults.[50]

GRIK4

Antidepressants may induce long-term potentiation of glutamate receptors, interfere with presynaptic glutamate release, and/or reduce stress-related glutamate levels.[51] Such an association sparked interest in pharmacogenomic studies of the glutamatergic system in depression treatment. The STAR*D trial identified an association between antidepressant treatment response and polymorphisms in the *GRIK4* gene, which encodes proteins contributing to glutamatergic signaling.[52] Evidence varies greatly regarding the association between *GRIK4* polymorphism and antidepressant response. A large meta-analysis has reproduced the findings of STAR*D, indicating that the *GRIK4* polymorphism rs1954787 may predict antidepressant responsiveness. Specifically, individuals with the C allele and CC genotype are more likely to respond to antidepressants compared to those with the T allele and TT genotype.[51] Further studies are needed, particularly among pediatric populations, to determine clinical application of *GRIK4* variability. Likely, many glutamatergic genetic markers (eg, *GRIN2A*, *GRIK1*) play a role in antidepressant responsiveness in addition to other

genetic markers (eg, *SLC6A4*, *5HT2A*) warranting close evaluation of genetic variations.[53]

Discussion

Treatment guidelines, risk for adverse effects, comorbid medical conditions, concomitant medications, and previous medication trials typically guide psychotropic medication decisions among children and adolescents with psychiatric diagnoses. Interest regarding the role of pharmacogenomic testing in child and adolescent psychiatry stems from the observed effects of genetic variation in medication-metabolizing enzymes, medication transporters, or medication targets.[5] CPIC Guidelines have been developed to not only standardize terminology regarding pharmacogenomic testing but also to "…improve translation of genetic laboratory test results into actionable prescribing decisions for affected drugs" (https://cpicpgx.org). Established in 2009, this shared project between the Pharmacogenomics Knowledgebase and the Pharmacogenomics Research Network aimed to develop guidelines to aid clinicians in the application of pharmacogenomic test results to optimize prescribing (eg, *CYP2D6* and *CYP2C19* genotypes and dosing of SSRIs).[17] CPIC guidelines currently provide support for dosing decisions (based on adult literature) for certain SSRIs and TCAs with respect to *CYP2D6* and *CYP2C19* genotypes.[17,18] Table 3 provides high-yield references to aid clinicians.

When applying these guidelines to pediatric patients, clinicians should use caution as data describing the relationship between *CYP2D6* or *CYP2C19* genotypes and SSRI steady-state plasma concentrations are scarce. While *CYP2D6* activity is fully mature by early childhood, *CYP2C19* activity may be increased in children compared to adults.[44] While evaluations in pediatric populations have aimed to more clearly define pharmacogenomic-guided dosing of fluoxetine, ongoing studies are needed with particular emphasis on *CYP2D6*, *CYP2C19*, and *ABC1B*.[20,21] The potential for drug interactions must also be considered when evaluating *CYP450* genotypes. For example, pediatric patients may be prescribed a potent *CYP2D6* inhibitor (eg, fluoxetine) in combination with a *CYP2D6* substrate (eg, mixed amphetamine salt or aripiprazole), warranting consideration for a dose reduction of the *CYP2D6* substrate. The phenotype of individuals with a *CYP2D6* genetic polymorphism should also be closely evaluated if treated with a *CYP2D6* inhibitor (eg, a *CYP2D6* intermediate metabolizer may have the phenotype of a CYP2D6 poor metabolizer in the setting of fluoxetine treatment). Additionally, prescribers should evaluate smoking status for all patients prescribed medications that rely primarily on *CYP1A2* for metabolism (Table 2). Smoking as few as 8 cigarettes per day has been shown to completely induce the *CYP1A2* enzyme, causing 50% reductions in clozapine serum levels.[33]

Prescribing information, as mandated by the FDA, should also be considered when interpreting pharmacogenomic test results (Table 2). It is well known that carbamazepine and oxcarbazepine prescribing information contain specific recommendations as it pertains to the presence of *HLA-B*1502* and/or *HLA-A*3101*. In accordance with these and CPIC guidelines, it is recommended that the presence of these alleles be assessed prior to the initiation of carbamazepine or oxcarbazepine, particularly in certain populations (eg, Asian descent). Caution should be used when considering other aromatic anticonvulsants (eg, lamotrigine), though there is no current recommendation contraindicating their use in the presence of either allele.

CPIC authors have identified the need for guideline development among pediatric populations for both pharmacokinetic as well as pharmacodynamic markers. With the development of these guidelines, one must consider the inherent increased risk for some adverse effects among youth compared to adults regardless of genetic findings. For example, it is well documented that lamotrigine and carbamazepine are approximately twice as likely to induce a rash in youth as compared to adults.[50] Preschool children compared with older children experience more adverse effects associated with stimulants (eg, irritability and anxiety). While adolescents with autism spectrum disorder and a comorbid anxiety/depressive disorder tolerate and benefit from antidepressant treatment, it is well documented that younger children experience more adverse effects and little benefit. Additionally, pediatric patients are at an increased risk for weight gain with atypical antipsychotics compared to adult patients, warranting further consideration about the potential to predict weight gain within this population.[50, 54,55]

It is well known that metabolism of some medications differs by age, resulting in differences in tolerability or

dosing strategies. For example, peak plasma concentrations of aripiprazole have been demonstrated to be higher and reached more quickly among pediatric patients compared to adults. Clinically, this may mean that pediatric patients will benefit from split dosing (twice vs once daily) of aripiprazole to minimize risk for nausea or stomach upset.[32] Additionally, plasma clonidine concentrations in youth with ADHD are greater than those of adults with hypertension, with females having 23% lower clearance (normalized by body weight) compared to males.[56]

National attitudes regarding pharmacogenomic testing in psychiatry indicate a general positive view about the ultimate potential for genotype-guided prescribing, while also indicating a need to more clearly identify formal guidelines to ensure accurate and appropriate implementation of such testing.[11-13] Additionally, consideration for expanding education on pharmacogenomics in medical schools and residency programs must be considered to ensure comfort and competence of psychiatrists.[57] The Residency Education Committee of the International Society of Psychiatric Genetics has identified the need for all psychiatrists in training to be exposed to formal pharmacogenomic education rather than viewing this as a "special interest area" in psychiatric training.[58] Practical, institution-specific considerations are also warranted: cost of testing, inclusion of pharmacogenomic test results in the electronic health record, consideration of risk when pharmacogenomic results may fall outside of the ordering provider's scope of practice, obtaining informed consent, and clearly defining when pharmacogenomic testing is appropriate.[57] Practically, it is essential that clinicians also consider which algorithm-based tool they will be working with in order to be most prepared to interpret the results and provide clear recommendations and education to patients and families.

There are many commercially-available products that rely on algorithm-based (usually proprietary) strategies to generate an individual genetic profile.[57] It is important to note that not all tests analyze the same variants within a gene. One test may assess for a specific variant within a gene, while others may evaluate more expanded variants within the same gene. It is difficult to determine whether such algorithms are based on CPIC guidelines, recommendations in specific manufacturer labeling, etc. As clinicians, it is imperative to critically evaluate the application of these algorithm-based tools and to consider whether they align with evidence-based practice. Table 2 can be used as a reference for clinicians when interpreting pharmacogenomic test results.

Many commercially-available tests group psychotropic medications into 3 different colored boxes using a stoplight approach: green ("no gene-drug interaction"), yellow ("moderate gene-drug interaction"), and red ("significant gene-drug interaction"). For medications in the yellow or red category, a clinical description is typically included in the report (eg, "serum level may be too low, higher doses may be required"). Without close consideration of the pharmacokinetic or pharmacodynamic results, understanding of how these results apply to each psychotropic medication, and what action this result may require, it can be easy to misinterpret, overlook, or confuse the colored category that a medication may be assigned. For example, a psychotropic medication that has good evidence in children and adolescents may appear in the red category and may be overlooked as a treatment option, while a novel medication with little evidence may be recommended simply because it is in the green category and perceived to be the "better" option. This paper recommends that the provider review the full report closely before providing patients and families with the brief print out to clearly explain why it may be appropriate to use a medication in the red or yellow category. Examples of explanations include: "We may need to consider targeting lower doses of the medication based on the way your child metabolizes this agent." "This medication is appearing in the yellow category because your child metabolizes this agent less effectively, meaning they may need lower doses to minimize the risk for side effects." "This medication can be safely used and is well-studied in children."

Prospective, long-term studies are needed to more completely examine the effects of medication selection and/or dose adjustments based on a pediatric patient's genotype. Theoretical dose adjustments based on a patient's phenotype may be considered, though it is unclear at this time if this practice provides true clinical benefit for children and adolescents.[57,59] Psychiatrists must closely evaluate evidence-based guidelines to make appropriate pharmacogenomic testing-guided decisions (Table 2). While these guide-

lines do not provide clear recommendations for when to test, they do provide some guidance for interpretation of results.

Exactly which patients should be tested remains a clinical controversy, though general guidelines could be utilized. Pharmacogenomic testing should be considered prior to initiation of particular psychotropic medications: (1) Pimozide, given significant risk for QT prolongation among CYP2D6 poor metabolizers, (2) Carbamazepine/Oxcarbazepine, due to the risk for SJS/TEN, particularly among those of Asian Descent, (3) Tricyclic antidepressants, when concomitant treatment with CYP2C19 or CYP2D6 inhibitor and high risk for QT prolongation, and (4) Clozapine, when concomitant treatment with CYP2D6 and/or CYP1A2 inhibitor. Other scenarios include: (1) Patients treated with ≥ 3 concomitant psychotropic medications, with little benefit, (2) Failure of ≥ 3 psychotropic medications, ensuring adequate/appropriate trials, and (3) Family history of significantly poor medication tolerability.

Conclusions

Pharmacogenomic testing is one of several pieces of clinical information that should be considered when initiating or altering psychotropic medications. More evidence is needed to support pharmacogenomic-guided dosing in child and adolescent psychiatry. Caution against making treatment decisions simply based on pharmacogenomic testing results is advised given the potential for such decisions to be misleading, non-evidence based, and not well-informed.[60] Successful implementation will require more robust education for psychiatrists, trainees, and pharmacists to ensure a higher level of understanding across the country.

Tables

Table 1: Standardized Terms for Metabolic Phenotypes. Developed from CPIC Guideline (Caudle 2017). Description of specific enzyme phenotypes available at CPIC.

Standardized Terms for Metabolic Phenotypes		
Term	**Phenotype Definition**	**Genetic Definition**
Ultrarapid metabolizer	Increased enzyme activity, compared to rapid metabolizers	Two increased function alleles, or more than 2 normal function alleles (eg, CYP2C19*17/*17)
Rapid metabolizer	Increased enzyme activity compared to normal metabolizers, but less than ultrarapid metabolizers	Combinations of normal function and increased function alleles (eg, CYP2C19*1/*17)
Extensive (normal) metabolizer	Fully functional enzyme activity	Combinations of normal function and decreased function alleles (eg, CYP2C19*1/*1)
Intermediate metabolizer	Decreased enzyme activity	Combinations of normal function, decreased function, and/or no function alleles (eg, CYP2C19*1/*2)
Poor metabolizer	Little to no enzyme activity	Combination of no function alleles and/or decreased function alleles (eg, CYP2C19*2/*2)

Table 2: Psychotropic Medication Pharmacokinetic and Pharmacogenomic Considerations.

Psychotropic Medication Pharmacokinetic & Pharmacogenomic Considerations						
Medication Class	**Medication**	**FDA Approved Indication(s) in Youth[a]**	**Primary Metabolism[b]** **Secondary Metabolism[b]**	**Other Pharmacokinetic Considerations[a]**	**CPIC Guideline[c]**	**FDA PGx Label Data (Prescribing information Section)[d]**
Antidepressant	Amitriptyline	MDD (≥12 years)	CYP2C19 CYP2D6, CYP2C9, CYP3A4, CYP2C8	---	TCA 2016	Actionable CYP2D6, Precautions
	Bupropion	---	CYP2B6	Potent CYP2D6 inhibitor	---	---
	Citalopram	---	CYP2C19 CYP3A4, CYP2D6	Weak CYP2D6 inhibitor	SSRI 2015	Actionable CYP2C19 clinical pharmacology; Dosage and Administration, Warnings CYP2D6, Clinical Pharmacology
	Clomipramine	OCD (≥10 years)	CYP2C19 CYP1A2, CYP3A4, CYP2D6	---	TCA 2016	Actionable CYP2D6, Precautions
	Desvenlafaxine	---	Conjugation CYP3A4	Weak CYP2D6 inhibitor	---	-- CYP2D6 Clinical Pharmacology
	Doxepin	---	CYP2C19, CYP2D6	---	TCA 2016	Actionable CYP2D6, 2C19 Clinical Pharmacology

Medication Class	Medication	FDA Approved Indication(s) in Youth[a]	Primary Metabolism[b] / Secondary Metabolism[b]	Other Pharmacokinetic Considerations[a]	CPIC Guideline[c]	FDA PGx Label Data (Prescribing information Section)[d]
Antidepressant	Duloxetine	GAD (≥7 years)	CYP1A2, CYP2D6 /	Moderate CYP2D6 inhibitor	---	Actionable CYP2D6 Drug Interactions
	Escitalopram	MDD (≥12 years)	CYP2C19 / CYP3A4, CYP2D6	---	SSRI 2015	Actionable CYP2D6 Drug Interactions; CYP2C19 Adverse Reactions
	Fluoxetine	MDD (≥8 years); OCD (≥7 years)	CYP2D6, CYP2C9 /	Potent CYP2D6 inhibitor; potent CYP2C19 inhibitor; 2C9, 3A4 inhibitor	---	Informative CYP2D6 Clinical Pharmacology, Precautions
	Fluvoxamine	OCD (≥8 years)	CYP2D6 / CYP3A, CYP2C19, CYP1A2	Strong 1A2, 2C19 inhibitor; moderate 3A4, 2D6 inhibitor, weak 2C9 inhibitor, PGP inhibitor	SSRI 2015	Actionable CYP2D6, Drug Interactions
	Imipramine	MDD (≥12 years); Enuresis (≥6 years)	CYP2C19 / CYP2D6, CYP3A4, CYP1A2	---	TCA 2016	Actionable CYP2D6, Precautions
	Mirtazapine	---	CYP3A4 / CYP2D6, CYP1A2	---	---	---
	Nortriptyline	---	CYP2D6 /	---	TCA 2016	Actionable CYP2D6, Precautions
	Paroxetine	---	CYP2D6 / ---	Potent CYP2D6 inhibitor	SSRI 2015	Informative CYP2D6, Drug Interactions

Medication Class	Medication	FDA Approved Indication(s) in Youth[a]	Primary Metabolism[b] / Secondary Metabolism[b]	Other Pharmacokinetic Considerations[a]	CPIC Guideline[c]	FDA PGx Label Data (Prescribing information Section)[d]
Antidepressant	Sertraline	OCD (≥6 years)	N-demethylation, conjugation, CYP2C19 / CYP2D6, CYP2B6, CYP2C9, CYP3A4	Weak CYP2D6, CYP2C19, CYP3A4 inhibitor	SSRI 2015	
	Trazodone	---	CYP3A4 / CYP2D6	---	---	---
	Venlafaxine	---	CYP2D6 / CYP2C19, CYP3A4	---	---	Informative CYP2D6, Precautions
	Vortioxetine	---	CYP2D6 / CYP3A4/5, CYP2C19, CYP2C9, CYP2B6, CYP2A6, CYP2C8, glucuronic acid conjugation	---	---	Actionable CYP2D6, Dosage and Administration, Clinical Pharmacology

Medication Class	Medication	FDA Approved Indication(s) in Youth[a]	Primary Metabolism[b] Secondary Metabolism[b]	Other Pharmacokinetic Considerations[a]	CPIC Guideline[c]	FDA PGx Label Data (Prescribing information Section)[d]
Antipsychotic	Aripiprazole	Schizophrenia (≥13 years) Irritability associated with ASD (≥6 years) Tourette's disorder (≥6 years) Bipolar mania (≥10 years)	CYP3A4 CYP2D6	---	---	Actionable CYP2D6 dosage and administration, use in specific populations, clinical pharmacology
	Brexpiprazole	---	CYP3A4, CYP2D6	---	---	Actionable CYP2D6 Dosage and Administration, Use in Specific Populations, Clinical Pharmacology
	Cariprazine	---	CYP3A4 CYP2D6	---	---	Informative CYP2D6 Clinical Pharmacology
	Chlorpromazine	Severe behavioral problems (6 months-12 years) Psychotic disorders (>12 years)	CYP2D6 CYP1A2, CYP3A4	---	---	---

Medication Class	Medication	FDA Approved Indication(s) in Youth[a]	Primary Metabolism[b] Secondary Metabolism[b]	Other Pharmacokinetic Considerations[a]	CPIC Guideline[c]	FDA PGx Label Data (Prescribing information Section)[d]
Antipsychotic	Clozapine	---	CYP1A2 CYP2C19, CYP2D6, CYP2E1, CYP3A4, CYP3A5	---	---	Actionable CYP2D6 Dosage and Administration, Use in Specific Populations, Clinical Pharmacology
	Haloperidol	Psychotic disorders, Tourette's disorder, Severe behavioral problems, (≥3 years)	CYP2D6, glucuronidation (main) CYP3A4/5, CYP2C8, CYP2C9, CYP1A1, CYP2C19	Very weak CYP2D6 inhibitor	---	---
	Lurasidone	Schizophrenia (≥13 years) Bipolar depression (≥10 years)	CYP3A4 ---	---	---	---
	Molindone	Psychotic disorders (≥12 years)	Hepatic ---	---	---	---
	Olanzapine	Schizophrenia (≥13 years) Bipolar mania (≥10 years)	CYP1A2 CYP2D6, CYP2C8	---	---	---
	Perphenazine	Psychotic disorders (≥12 years)	CYP2D6 ---	---	---	Actionable CYP2D6 Precautions, Clinical Pharmacology
	Pimozide	Tourette's disorder (≥12 years)	CYP3A4, CYP2D6 CYP1A2	---	---	Testing Required CYP2D6 Dosage and Administration, Precautions

Medication Class	Medication	FDA Approved Indication(s) in Youth[a]	Primary Metabolism[b] Secondary Metabolism[b]	Other Pharmacokinetic Considerations[a]	CPIC Guideline[c]	FDA PGx Label Data (Prescribing information Section)[d]
Antipsychotic	Quetiapine	Schizophrenia (≥13 years) Bipolar mania (≥10 years)	CYP3A4	---	---	---
	Risperidone	Schizophrenia (≥13 years) Irritability associated with ASD (≥5) Bipolar mania (≥10 years)	CYP2D6 N-dealkylation	---	---	Informative CYP2D6 Drug Interactions, Clinical Pharmacology
	Ziprasidone	---	CYP3A4 CYP1A2	---	---	---
Mood Stabilizer	Lamotrigine	Seizure disorders (>2 years)	Glucuronidation	---	---	---
	Divalproex derivatives	Seizure disorders (≥10 years)	Glucuronidation CYP2A6, CYP2C9, CYP2B6	Inhibits metabolism of lamotrigine	---	Testing Required POLG Boxed Warning, Contraindications, Warnings and Precautions
	Carbamazepine	Seizure disorders	CYP3A4 Secondary: CYP2C8	Potent CYP3A4, 2B6 inducer; moderate CYP2C9 inducer; autoinduction during initial weeks of treatment	HLA 2017	Testing Required HLA-B Boxed Warning, Warnings, Precautions Actionable HLA-A Warnings
	Oxcarbazepine	Seizure disorders (≥4 years)	Cytosol arylketone reductase to MHD that is then glucuronidated	Potent CYP3A4 inducer, inhibit CYP2C19	HLA 2017	Testing Required HLA-B Warnings and Precautions
	Lithium	Bipolar mania (≥ 12 years)	Not metabolized, renally excreted unchanged	---	---	---

Medication Class	Medication	FDA Approved Indication(s) in Youth[a]	Primary Metabolism[b] Secondary Metabolism[b]	Other Pharmacokinetic Considerations[a]	CPIC Guideline[c]	FDA PGx Label Data (Prescribing information Section)[d]
Stimulant	Amphetamine-based	ADHD	CYP2D6	---	---	---
	Methylphenidate-based	ADHD	CES1	---	---	---
Non-Stimulant	Atomoxetine	ADHD (≥6 years)	CYP2D6, CYP2B6, CYP2C19	---	CYP2D6	Actionable CYP2D6 Dosage and Administration, Warnings and Precautions, Adverse Reactions, Drug Interactions, Clinical Pharmacology
	Clonidine	ADHD (≥6 years; ER formulation)	Metabolic pathway poorly understood	---	---	---
	Guanfacine	ADHD (≥6 years; ER formulation)	CYP3A4/5 ---	---	---	---

ADHD Attention-Deficit/Hyperactivity Disorder; ASD Autism Spectrum Disorder; CES1 Carboxylesterase 1; CYP Cytochrome-P450; FDA Food and Drug Administration; GAD Generalized Anxiety Disorder; HLA Human Leukocyte Antigen; MDD Major Depressive Disorder; OCD Obsessive Compulsive Disorder; PGx Pharmacogenomic; POLG Polymerase γ.

[a] Prescribing information (Available at: https://www.fda.gov/Drugs/default.htm); Accessed 1/13/2019.

[b] Formatted from: Psychiatric Pharmacogenomics, David Mrazek. Oxford Publishing 2010.

[c] CPIC Guidelines (Available at: https://cpicpgx.org/guidelines/); Accessed 1/13/2019).

[d] Table of Pharmacogenomic Biomarkers in Drug Labeling (Available at: https://www.fda.gov/Drugs/ScienceResearch/ucm572698.htm); Accessed 1/13/2019.

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Table 3. Helpful Pharmacogenomic-Related Resources for Clinicians.

Helpful Pharmacogenomic-Related Resources for Clinicians		
Organization	**Summary of Resource(s) Available**	**Website**
Clinical Pharmacogenetics Implementation Consortium (CPIC)	Guidelines: *CYP2C19/CYP2D6* SSRIs, *CYP2C19/CYP2D6* TCAs, *HLAB*1502/HLAB*3101* carbamazepine/oxcarbazepine Genes-Drugs/Allele Interactive Tables: provides a summary of medications with available CPIC guideline, "actionable pharmacogenomic variant," and available publications to support recommendation.	https://cpicpgx.org/
United States Food and Drug Administration (FDA)	Table of Pharmacogenomic Biomarkers in Drug Labeling: provides a summary of biomarkers that are included in drug prescription labels, with specific labeling section and genetic biomarker identified. Direct link to package inserts available.	https://www.fda.gov/Drugs/ScienceResearch/ucm572698.htm
Pharmacogenomics Knowledge Implementation (PharmGKB)	Dosing Recommendations: summarizes CPIC, Royal Dutch Association for the Advancement of Pharmacy – Pharmacogenetics Working Group (DPWG), and Canadian Pharmacogenomics Network for Drug Safety (CPNDS) recommendations into one interactive table.	https://www.pharmgkb.org/guidelines
Indiana University School of Medicine	P450 Drug Interactiion Table: provides concise tables of CYP450 substrates, inhibitors, and inducers. Allows for personalized drug interaction queries, with detailed description and management strategies of interactions.	http://medicine.iupui.edu/clinpharm/ddis/clinical-table/

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Preliminary Outcomes from an Outpatient Dialectical Behavior Therapy (DBT) Skills Training Group for Adolescents

*Kim Sheffield, PhD; Robert Evans, BS; Jenna Glover, PhD**

Abstract

Introduction. This pilot study examines the outcomes of a 16-week transdiagnostic Dialectical Behavior Therapy for adolescents (DBT-A) multifamily group.

Methods. Sixty-seven adolescents ages 13-17 presenting with internalizing and externalizing disorders enrolled in DBT-A group during this pilot period. Data was collected on participants' attendance rates, participant satisfaction with the program at the conclusion of group, and pre- and post-measures of symptom severity on 3 symptom domains (depression, anger, and anxiety) utilizing the *Patient-Reported Outcomes Measurement Information System (PROMIS)*. A total of 67 families enrolled in group, with 39 families completing the 16-week group, 27 of whom completed study measures of acceptability and symptomatology.

Results. On the satisfaction questionnaire, patients reported an average satisfaction score of 3.22 on a scale of 1 (low satisfaction) to 4 (high satisfaction). Caregivers reported an average satisfaction score of 3.52 on this same scale. On patient-reported PROMIS measures, symptom scales did not meet significance criteria from pre- to post-treatment. However, caregiver reports of their child's symptoms decreased significantly over the course of the program.

Conclusions. In this pilot study, a multifamily DBT-A skills group demonstrated promise as a treatment for symptoms of depression, anger, and anxiety in adolescents. Patient and caregiver satisfaction scores indicated that the intervention was experienced as acceptable. As this was a pilot study with a limited sample, further research is needed on patient adherence and satisfaction across participants that completed group compared to those who dropped out prior to completion.

Sheffield K, Evans R, Glover J. Preliminary Outcomes from an Outpatient Dialectical Behavior Therapy (DBT) Skills Training Group for Adolescents. Colo J Psychiatry Psychology. 2019;3(1):31-39.

Within outpatient child and adolescent mental health settings, there is a common issue facing providers of how to provide evidence-based treatment for specific psychological disorders and meet the needs of a patient population that often presents with varied symptoms and comorbidities. Further, long waitlists due to high demand for mental health services tax our system and require treatment approaches that can meet the needs of patients while making the most efficient use of therapist time. One method to address long waitlists and diagnostically-varied patient populations is to enroll patients in outpatient group psychotherapy. In developing curriculums for these group therapies, the most cost-effective groups will address the needs of patients with varied and multiple diagnostic presentations. Transdiagnostic interventions aim to identify and treat common underlying mechanisms across different mental health diagnoses.[1] Emotion regulation is commonly identified as a primary mechanism underlying a wide range of psychological disorders.[2] Thus, a psychological intervention that specifically addresses impairment in emotion regulation would be a suitable treatment for individuals presenting with disorders ranging from Major Depressive Disorder to Bulimia Nervosa to Posttraumatic Stress Disorder.[3] One such treatment with evidence for transdiagnostic effectiveness is Dialectical Behavior

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Therapy (DBT), which is effective in reducing psychological difficulties in individuals with pervasive emotion dysregulation.[4]

DBT was initially developed by Linehan for adult females with Borderline Personality Disorder (BPD) who were regularly engaging in non-suicidal self-injury (NSSI) and/or had a history of suicide attempts.[5,6] DBT creates change by targeting 5 primary areas: emotional dysregulation, interpersonal dysregulation, self-dysregulation, cognitive dysregulation, and behavioral dysregulation.[6] As originally developed, DBT requires a yearlong commitment to treatment involving weekly individual psychotherapy, weekly skills training in a group setting, and access to telephonic support in between sessions. This intensive treatment helps individuals develop adaptive alternatives to maladaptive behaviors (eg, self-harm, substance use, disordered eating) for managing emotional distress. Koons and colleagues[7] found traditional DBT to be more effective than treatment as usual (TAU) at reducing suicidal ideation, depression, anger, and hopelessness in a sample of adult female veterans.

BPD is not commonly diagnosed in individuals under 18 years of age and should only be diagnosed with considerable caution due to some of the diagnostic features being normative in this population (eg, unstable sense of self and affective instability). However, borderline personality features are known to develop during adolescence and persist into adulthood.[8] Primary features of BPD including interpersonal difficulties, impulsivity, recurrent suicidal behavior or NSSI, emotion dysregulation, and anger are frequently part of the diagnostic presentation in adolescents with psychological disorders. Additionally, in the adolescent population, interpersonal difficulties (eg, difficulty making friends, frequent arguments with adults, bullying, and social isolation) predict suicide attempts even in the absence of diagnosed psychiatric disorders.[9] These common features between adults with BPD and adolescents with both internalizing and externalizing disorders have led to the adaptation of DBT to the adolescent population.[10]

Dialectical Behavior Therapy for Adolescents (DBT-A) was developed as a manualized treatment for adolescents with borderline features.[10-12] A core difference between traditional DBT and DBT-A is the length of treatment. Instead of patients committing to an entire year of treatment, DBT-A typically ranges from 16-24 weeks. Another key component to DBT-A is the involvement of parents/caregivers in treatment. As originally developed, DBT-A involves individual psychotherapy, multifamily group skills training, and telephonic support. The multifamily group skills training focuses on behavioral skill acquisition through instruction and modeling.[13] The group setting provides opportunities for capability enhancement through behavioral rehearsal and reinforcement of new skills. DBT-A is broken down into 5 modules: Mindfulness, Distress Tolerance, Walking the Middle Path, Emotion Regulation, and Interpersonal Effectiveness.

A recent randomized-controlled trial (RCT) of DBT-A in Norway evaluated the effectiveness of a 19-week program involving weekly individual psychotherapy, weekly multifamily skills training, and family therapy/telephonic coaching as needed.[14] Of note, the providers in this RCT received extensive training including an 80-hour seminar and 12 months of supervised practice. Mehlum and colleagues[14] found a significant reduction in depressive symptoms, hopelessness, suicidal behaviors, and NSSI following treatment. There were significantly larger effect sizes for DBT-A versus enhanced treatment as usual (TAU). They hypothesized that teaching specific behavioral skills for managing self-harm urges, increasing emotion regulation, and involving family members enhanced treatment outcomes.[14] Although underlying mechanisms were not specifically studied in this RCT, emotion regulation was a primary treatment target and proposed mechanism of change in symptom severity.

Researchers have also found DBT to be effective at reducing externalizing and internalizing symptoms in adolescents without a history of suicide attempts or NSSI.[15-17] Nelson-Gray and colleagues[16] evaluated the effectiveness of a stand-alone 16-week DBT skills training program in reducing symptoms in adolescents meeting criteria for Oppositional Defiant Disorder (ODD) or Conduct Disorder. They noted that key targets of DBT, including emotion dysregulation, interpersonal difficulties, and low distress tolerance, were common to these adolescents. They found that adolescents who completed the treatment exhibited a reduction in negative behaviors (eg, often loses temper, often argues with adults, often blames others for his or her mistakes or misbehavior) and negative emotionality (eg, anger and depression), and an increase in positive behaviors (interpersonal strength).

This study is also notable because the adolescents evidenced reduction in maladaptive behaviors after participating in the DBT skills training group without co-occurring individual therapy or telephonic coaching. Nelson-Gray and colleagues[16] speculated that the reduction in ODD symptoms could be attributed to the focus on emotional regulation and distress tolerance skills. This study contributes to the emerging evidence base for a deconstructed version of DBT-A focusing on skills training in a group setting.

Goldstein and colleagues[15] likewise evaluated the effectiveness of DBT-A for adolescents diagnosed with Bipolar Disorder. Adolescents in their study were randomly assigned to receive DBT or TAU. The DBT intervention involved group skills training, individual DBT therapy, and telephonic skills coaching. Participants received 36 sessions over the course of 12 months. Researchers found significant improvements in suicidal ideation, depressive symptoms, and emotion dysregulation at immediate follow-up.[15] Additionally, participants reported high levels of acceptability and satisfaction with the treatment. Further, Salbach and colleagues[17] examined the effectiveness of DBT-A for adolescents receiving inpatient treatment for eating disorders. They noted significant reductions in depressive symptoms and eating disordered behaviors (eg, restricting intake, excessive exercise, laxative use). These studies provide compelling evidence that DBT-A can be implemented as a transdiagnostic intervention for adolescents across externalizing and internalizing disorders with common features of difficulty with emotion regulation, interpersonal skills, impulsivity, and behavioral inhibition.

While there is promising support for DBT-A as a transdiagnostic intervention, there is limited research to date on the implementation of DBT in a heterogeneous group. Previous studies have focused on specific populations (eg, ODD, Bipolar Disorder, eating disorders) with clear exclusion criteria based on diagnosis. Further, the majority of previous studies on DBT-A have included a comprehensive DBT program (eg, skills training group, individual psychotherapy, and telephonic coaching). One exception was the study completed by Nelson-Gray and colleagues[16] that demonstrated effectiveness for a stand-alone, multi-family skills training group. Additional research is needed on multi-family DBT skills training groups as a standalone intervention when implemented with heterogeneous patient populations. Finally, a significant barrier to implementing intensive DBT-A in a community setting is treatment adherence.[18] As with any clinical intervention, it is important to develop programs that are acceptable to adolescents and their caregivers. Thus, an evaluation of a modified treatment approach benefits from inclusion of satisfaction and patient adherence data.

Purpose of Current Study

The current study is a pilot conducted as a quality improvement project to evaluate a 16-week DBT-A multifamily group provided in an outpatient setting to adolescents ages 13-17 with a range of primary mental health diagnoses (eg, mood disorders, anxiety disorders, eating disorders, externalizing disorders). The aims of the pilot study were to: (1) identify adherence rates for participation (ie, patient and caregiver attendance rates) of a 16-week multifamily DBT-A skills training program that does not require participation in concurrent individual therapy, (2) determine treatment acceptability (ie, patient/caregiver satisfaction, patient adherence rate), and (3) conduct a preliminary assessment of changes in symptom severity among adolescent participants over the course of group participation.

The pilot was run in 2 outpatient clinics affiliated with a children's hospital. Clinicians facilitating this group therapy intervention included psychologists, social workers, licensed professional counselors, and trainees within those disciplines. The skills training intervention was modified from the DBT-A curriculum developed by Rathus and Miller consisting of 4-week modules covering each of the following skills: emotion regulation, distress tolerance, interpersonal effectiveness, and walking the middle path (eg, dialectics and behavior change principles).[13] Adolescents and their caregiver(s) participated in 16 weekly skills training sessions lasting 90 minutes. The group was conducted on a rolling basis with new participants joining at the start of 4-week modules to increase access to care.

Methods

Participants

During this treatment pilot, 67 adolescents presenting with internalizing and externalizing disorders enrolled

in DBT-A group therapy and all participants were included in the analysis for adherence. However, only 27 participants (22.2% Male, 77.8% Female), ages 13 to 17 (Mean=14.78, SD=1.19), were included in the current analyses for acceptability (ie, satisfaction ratings) and change in symptom severity due to missing data for the remaining participants at pre- and/or post-treatment data collection points. Participants self-identified race as 74.1% Caucasian, 11.1% more than one race, 7.4% Hispanic or Latino, 3.7% Black, and 3.7% Asian or Pacific Islander. Adolescents were considered to be appropriate for the group if they were experiencing significant emotion dysregulation, limited coping skills, interpersonal difficulties, NSSI, and/or had a history of suicidal ideation. Referrals to the program came from inpatient units, partial-hospitalization programs, outpatient intake assessments, individual therapists, and psychiatric medication providers. At intake, 17 of the 27 patients who completed all measures met DSM-5 criteria for depressive disorders, 4 for anxiety disorders, 3 for bipolar disorders, 1 for obsessive compulsive disorder (OCD), and 2 for an unspecified eating disorder. The *Colorado Multiple Institution Review Board (COMIRB)* approved this study.

Measures

Attendance

Attendance data was recorded by group leaders for each family unit for each group session. Both caregiver(s) and patient had to be present in the group in order to be recorded as attending group.

Satisfaction

At the final group session (week 16), caregivers and teenagers each completed a questionnaire on their satisfaction with the group. This form consists of 9 items based on the *Client Satisfaction Questionnaire* (*CSQ-8*).[19,20] Ratings of satisfaction with the program were on a scale of 1 (low) to 4 (high). These items directly addressed the caregiver and adolescent's satisfaction with the help they received, the skills they learned, and their likelihood to recommend services to family and friends. All items were averaged to calculate the caregiver's (Cronbach Alpha=.86) and the teenager's (Cronbach Alpha=.91) overall satisfaction with the program.

PROMIS Short Forms

The *Patient-Reported Outcomes Measurement Information System* (*PROMIS*) Short Forms (SFs) were used to determine the frequency of depressive, angry, and anxious symptoms over the past 7 days.[21] Data was collected at the first and last session of the 16-week group.

Data was collected from teens and caregivers using the PROMIS Pediatric SF-Anger 5a and the PROMIS Parent Proxy SF-Anger 5a. These forms each consist of 5 items to evaluate symptoms of anger, including hostility and irritability (eg, "I was so angry I felt like throwing something" or "my child felt mad").

Depressive symptoms were assessed using reports from the caregivers on the PROMIS Parent Proxy SF v1.1-Depressive Symptoms 6b, and teens completed the PROMIS Pediatric SF-Depressive Symptoms 8b. The Parent Proxy SF consists of 6 items to evaluate depressive features such as guilt, sadness, and loss of interest (eg, "My child felt like everything in his/her life went wrong"). The Pediatric SF for depressive symptoms consists of 8 items, such as "I felt unhappy" and "I could not stop feeling sad."

Anxiety symptoms were assessed using reports from caregivers on the PROMIS Parent Proxy SF v1.1-Anxiety 8b and reports from the teens on the PROMIS Pediatric SF-Anxiety 8b. These forms consist of 8 items to evaluate anxious symptoms, including misery, fear, and arousal (eg, "I worried when I was at home" or "I felt like something awful might happen").

For each PROMIS SF, the frequency of all items was rated on a scale from 0 (Never) to 4 (Almost Always). Raw sums of these scores at pre- and post-treatment for each participant were then analyzed to capture change in symptoms across treatment.

Procedure

This study employed an uncontrolled pre-post treatment design. Satisfaction surveys (ie, CSQ-8) and patient adherence rate were utilized to evaluate treatment acceptability. Data was also collected on changes in severity of symptoms of depression, anger, and anxiety (ie, PROMIS SFs) from pre- to post-treatment. These symptoms were chosen as they are commonly experienced in adolescents with both internalizing and externalizing disorders. Pre-treatment symptom measures were obtained from adolescents and care-

givers at their first group session and post-treatment symptom measures were obtained from adolescents and caregivers at the completion of their 16th group session. Finally, symptom and satisfaction post-treatment measures were obtained following completion of the 16th group session.

Results

Adherence

The first aim of the pilot was to determine current adherence rates for participation in a 16-week multifamily DBT-A skills training program that does not require participation in concurrent individual therapy. Adherence was evaluated through caregiver(s) and patient attendance records. Of the 67 families that enrolled in group during the pilot period, 39 families (58%) completed the entire 16-week treatment. Families completed an average of 13.81 group sessions (Mode=14 sessions) during the 16-week treatment. Per verbal report from the group facilitators, families dropped out of group early for multiple reasons including scheduling issues, a desire to focus on a different treatment modality (eg, individual or family therapy), admission to a higher level of care, and treatment refusal (ie, adolescent refused to attend group).

Acceptability

The second aim of the pilot was to determine treatment acceptability of the multifamily DBT-A skills training program. Analysis for treatment acceptability was determined using caregiver(s) and patient satisfaction scores completed during the 16th group session. Satisfaction questionnaires were only available for 27 participants that completed the group and all measures. This current study was unable to capture satisfaction data from patients that dropped out before the final group session. Patients reported an average satisfaction score of 3.22 on a scale of 1 (low satisfaction) to 4 (high satisfaction). Caregivers reported an average satisfaction score of 3.52 on this same scale. Statistics for each item are provided in Table 1.

Symptom Severity

The final aim of the study was to evaluate symptom severity over the course of treatment. To evaluate symptom change, raw scores were compared for each patient-reported and caregiver-reported PROMIS measure for anger, depression, and anxiety during the first group session (pre) and at the 16-week session (post). This data was analyzed using paired-samples t-tests to measure changes from pre- to post-treatment.

The results for the 27 caregiver/child dyads are summarized in Table 2. Patient-reported symptom scores from pre- to post-treatment did not meet statistical significance. However, caregiver-reported PROMIS measures across all 3 symptoms were significantly lower at post-treatment. Caregiver's scores of patient's depressive symptom decreased from pre- to post-treatment ($t(26)=2.38$, $p=.025$). Anger symptoms also significantly decreased across treatment ($t(26)=2.76$, $p=.01$). Further, anxiety symptoms significantly decreased ($t(26)=3.51$, $p=.002$).

Of note, the percentage of clinically significant (ie, T-score greater than 60) ratings decreased or remained stable in all domains from pre to post. Ratings of significant depression decreased from 55.6% to 33.3% of participants for adolescent self-report and 77.8% to 66.7% of participants for parent report. Ratings of significant anger remained at 29.6% of participants for adolescent self-report and decreased from 51.9% to 26.0% of participants for parent report. Finally, ratings of significant anxiety decreased from 37.0% to 22.2% of participants for adolescent self-report and 37.0% to 33.3% of participants for parent report.

Discussion

The current pilot study was a quality improvement project designed to determine if a DBT-A multifamily group therapy intervention was an acceptable transdiagnostic intervention for adolescents presenting with a range of psychiatric diagnoses. Previous studies of DBT-A have focused on specific populations (eg, ODD, Bipolar Disorder, eating disorders) and/or have included a comprehensive DBT program (eg, skills training group, individual psychotherapy, and telephonic coaching). In this current study, DBT-A was administered as a standalone multifamily group for adolescents with a wide range of primary diagnoses. The pilot provided information on acceptability of the intervention and symptom change over the course of treatment.

Adherence

Patient adherence rates were 58% for the current treatment. This appears to be consistent with dropout rates seen across therapy modalities within adolescent mental health.[22-24] Of those families completing the group, average number of sessions attended was 13.81 (Mode=14) out of 16 sessions. This commitment to treatment is encouraging and supports the acceptability of this treatment model to adolescents and caregivers. However, more information is needed to identify the most frequent barriers to treatment in order to appropriately address these and improve patient adherence.

Acceptability

Satisfaction scores indicated that participants were satisfied with their group experience and provide support that DBT-A multi-family group therapy was experienced as an acceptable intervention for both adolescents and caregivers. On average, the highest rated satisfaction item for caregivers was "If a friend were in need of similar help, would you recommend our DBT program to him/her?" suggesting that caregivers have confidence in DBT-A multifamily group as a helpful intervention. Additionally, on average the highest-rated satisfaction items for adolescents were "How would you rate the quality of care you have received?" and "If you were to seek help again, would you come back to our clinic?" indicating that adolescents were highly satisfied with the care they received and willing to return to the clinic for further treatment providing further support for treatment acceptability.

Symptom Severity

Overall, there were mixed results between adolescents and caregivers regarding the impact of DBT-A in reducing symptoms of depression, anxiety, and anger. Adolescents were more likely to endorse higher severity of symptoms at the start of group compared to their caregivers and reported no significant changes in these symptoms over the course of group. In comparison, caregiver's reports were significantly reduced from pre-to post-treatment on symptoms of depression, anger, and anxiety for the adolescent. The inclusion of caregiver data is noteworthy, as caregivers may be more likely to observe incremental change in symptom presentation than the adolescents may self-report. Alternatively, DBT-A may have affected parents' perceptions of their child's symptoms as opposed to leading to a genuine change in symptom presentation.

The general trends described above are consistent with past research on DBT-A, which has found the treatment to be impactful for patients with both internalizing and externalizing disorders.[15-17] Mood instability (depression ratings) and frustration tolerance (anger ratings) are mechanisms that cut across several disorders of the participants in this group (depressive disorders, bipolar disorders, anxiety disorders, ADHD, and eating disorders) providing initial evidence that DBT-A multi-family group could be an effective transdiagnostic intervention for adolescents with poor emotion regulation. Although these initial results are promising, additional research is needed to determine if DBT-A multifamily group can be an effective intervention for adolescents presenting with a broad range of psychiatric concerns.

Limitations

Several limitations of the current project should be considered in the interpretation of the results. First, the primary limitation of the current study is that participants were only included in the symptom change and satisfaction analyses if they completed the entire 16-week group program and pre/post-treatment measures. Additional research is needed examining participants who did not complete the 16-week program to further explore adherence as a component of treatment acceptability. Also, participants who completed the 16-week group are not a representative sample and may be more likely to endorse higher rates of satisfaction with group than participants who dropped out of group prematurely. Further, this study did not control for participation in additional treatment modalities (eg, psychiatric medication, individual therapy, other group therapy). Pre-treatment refers to pre-DBT skills training, so it is difficult to determine if trends in decreasing symptom severity were a result of participation in group as a standalone treatment or as a combined treatment approach. Finally, the measures used to assess treatment effectiveness captured time-limited ratings (ie, measure of symptoms during the last week) which minimize the external validity of the results as state-dependent variables could easily impact these ratings (eg, failing a test the day before group).

Conclusions

Despite these limitations, the results of the current pilot study offer support that DBT-A multifamily group could be an acceptable treatment with promise as an effective intervention for adolescents presenting with symptoms of depression, anger, or anxiety regardless of primary mental health diagnosis. Additional research is needed to evaluate patient adherence rates and examine both quantitative ratings and qualitative feedback of satisfaction across participants that complete group compared to those who drop out prior to completion. Additionally, future research would be benefited by expanding assessment of different transdiagnostic constructs (eg, mood stability, frustration tolerance, and experiential avoidance) that measure change across longer periods of time (eg, assessing constructs over the past 3 months). Comparisons between those in DBT-A group as a standalone treatment compared to those who are concurrently participating in multiple treatment modalities are also needed. Finally, inclusion of a control group (eg, participants on the waitlist waiting to enter group) is necessary to empirically evaluate the effectiveness of DBT-A multifamily group. The initial findings of this pilot provide a roadmap for ways to continue to develop and evaluate programs that can be used to deliver treatment to several patients simultaneously across a variety of presenting concerns, which will help improve access to care and availability of effective treatments for more adolescents.

Tables

Table 1: Means and standard deviations for patient and caregiver satisfaction survey results.

Item	Patient Score	Caregiver Score
1. How would you rate the quality of care you have received? (1=Poor; 2=Fair; 3=Good; 4=Excellent)	3.44±.70	3.63±.49
2. Did you get the kind of help you wanted? (1=No, definitely not; 2=No, not really; 3=Yes, generally; 4=Yes, definitely)	3.07±.87	3.37±.57
3. To what extent has the DBT program met your needs? (1=None of my needs have been met; 2=Only a few of my needs have been met; 3=Most of my needs have been met; 4=Almost all of my needs have been met)	2.96±.76	3.15±.77
4. If a friend were in need of similar help, would you recommend our DBT program to him/her? (1=No, definitely not; 2=No, I don't think so; 3=Yes, I think so; 4=Yes, definitely)	3.15±.82	3.67±.48
5. How satisfied are you with the amount of help you have received? (1=Quite dissatisfied; 2=Indifferent or mildly dissatisfied; 3=Mostly satisfied; 4=Very satisfied)	3.30±.61	3.30±.82
6. Have the services you received helped you to better understand your/your child's difficulties? (1=No, they seemed to make things worse; 2=No, they really didn't help; 3=Yes, they helped somewhat; 4=Yes, they helped a great deal)	3.41±.64	3.74±.45
7. How hopeful are you that the skills you and your child learned will help you effectively address you/your child's difficulties? (1=Very hopeless; 2=Somewhat hopeless; 3=Somewhat hopeful; 4=Very hopeful)	3.19±.68	3.44±.51

8. In an overall, general sense, how satisfied are you with the help you have received? (1=Quite dissatisfied; 2=Indifferent or mildly dissatisfied; 3=Mostly satisfied; 4=Very satisfied)	3.11±.64	3.59±.50
9. If you were to seek help again, would you come back to our clinic? (1=No, definitely not; 2=No, I don't think so; 3=Yes, I think so; 4=Yes, definitely)	3.37±.74	3.78±.42

Table 2. Raw scores and standard deviations across treatment for PROMIS measures.

	Pre	Post
Caregiver-Reported Depression	13.26±4.86	10.56±4.82
Caregiver-Reported Anger	9.78±3.75	7.44±4.02
Caregiver-Reported Anxiety	13.41±6.54	9.81±7.07
Patient-Reported Depression	16.52±11.07	13.89±8.08
Patient-Reported Anger	9.67±5.23	7.30±4.50
Patient-Reported Anxiety	13.07±9.91	11.30±10.11

Table 3. Percentage of participants with significant T-scores (T>60) across treatment for PROMIS measures.

	Pre	Post
Caregiver-Reported Depression	77.8%	66.6%
Caregiver-Reported Anger	51.9%	26.0%
Caregiver-Reported Anxiety	37.0%	33.3%
Patient-Reported Depression	55.5%	33.3%
Patient-Reported Anger	29.6%	29.6%
Patient-Reported Anxiety	37.9%	22.2%

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Impact of Integrating Complementary and Alternative Therapies into a Multi-Family Group Setting for Children and Adolescents with Eating Disorders: A Pilot Study

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Abstract

Background. Family-based treatment (FBT) is an empirically-supported, first-line approach to treating teens and children with eating disorders. Positive outcomes are associated with families who embrace a parenting approach that includes positive parental authority; demonstrating warmth, connection, and empathy; and being able to isolate the behavior of the child with the eating disorder from the characteristics of their child. Art, yoga, dance/movement, and music therapies (which are collectively considered "complementary and alternative modalities" or CAM) may provide useful augmentation to supporting FBT.

Methods. This pilot study explored the utility and tolerability of 90-minute complementary and alternative therapy multi-family groups as part of a milieu-based day treatment program for eating disorders. In 2014, 812 surveys were collected from 94 patients and family members.

Results. Overall, patients and families found the CAM therapies helpful in providing opportunities for safe exploration of experiences and feelings, promoting feelings of connection and empathy, and feeling supported by others. These findings provide initial support for the integration of complementary and alternative arts-based approaches into FBT for eating disorders.

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Introduction

Eating disorders are both psychiatric and physical illnesses and can include a range of symptoms involving a preoccupation with food, weight, and appearance. Lifetime prevalence for adolescents with anorexia nervosa, bulimia nervosa, and binge-eating disorder were 0.3%, 0.9%, and 1.6%, respectively.[1] Eating disorders can become persistent and severely impact emotional, psychological, and physical health and interrupt development and life functioning. Mortality associated with eating disorders is higher than any other psychiatric illness. Some estimates suggest the mortality rate for anorexia nervosa is 12 times higher than the death rate associated with other causes of death for females 15-24 years old.[2,3]

Family-based treatment (FBT) is an outpatient treatment approach with empirical support for treating adolescents with eating disorders.[4-7] Research has indicated this approach can be effective in eliminating symptoms completely in some cases, particularly when eating related psychopathology is high.[4,5,8,9]

Within more intensive levels of care (inpatient, residential, and day treatment programs) there are limited outcome studies due to the many variables that likely contribute to outcomes overall. As such, it is essential to describe and study individual program approaches in order to replicate results and provide more consistent and effective treatments to adolescents with eating disorders.

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Multi-family groups (MFGs), where patients are present with family members, have been shown to be effective in treatments for a variety of mental health disorders [10] and are thought to augment family treatment for eating disorders.[11] At least 4 studies since 2000 have contributed evidence that multi-family group therapy provides significant end-of-treatment improvement in symptoms for adolescents with eating disorders.[12-14] Le Grange et al[15] indicated that parental isolation, high-expressed emotion and distress during treatment, as well as low parental self-efficacy can be barriers to effective treatment. Additional therapies can be combined within MFGs to help families feel more connected, supported, and empowered. It is hypothesized that these interventions reduce the felt sense of isolation by inviting participants to witness each other's shared emotional experience of having an eating disorder in the family and engaging in group learning and reflection.[16]

Complementary and Alternative Therapies

Art, music, dance/movement, and yoga therapy may be particularly effective interventions in addressing emotional intensity in families in crisis. There is some evidence that suggests that 90-minute facilitated groups in the modalities of art, yoga, music, and dance/movement therapy may improve mood states for adolescents with a wide range of psychiatric diagnoses including mood disorders, eating disorders, and anxiety.[17-19] Yet, little quantitative data exists on the integration of art, music, dance/movement, and yoga therapies, specifically in the context of eating disorder treatment,[20,21] and there have been no published studies of the integration of these 4 CAM modalities into any form of FBT.

The Present Study

This pilot study was designed to explore the utility and tolerability of integrating 4 specific CAM modalities (art, music, dance/movement, and yoga therapy) into treatment through a 90-minute MFG therapy format as part of an existing intensive (inpatient and day treatment) eating disorder treatment program within a large pediatric hospital. Program-specific goals target the 3 essential aims of FBT–parent empowerment, adopting a non-judgmental stance, and externalizing the illness–as avenues to help families re-establish the warmth and connection necessary for successful treatment outcome.

The multi-family groups are designed to support these concepts by providing unique experiences in the context of intensive eating disorder treatment. Utility and tolerability were assessed according to patient, parent, and other family members' quantitative ratings on a survey as well as through an analysis of comments in an open-ended survey question.

Methods

Setting

The project took place in a hospital-based intensive eating disorder program located at a large children's hospital in the intermountain west. The MFGs from which the data for this pilot study was collected occurred weekly on the day in which families also received intensive nutrition coaching and therapy as part of standard care. Patients averaged 24 days in the program over 5 weeks.

Participants

Data for this study were collected from approximately 94 patients (and their family members) who were admitted to either the inpatient or day treatment level of care in the eating disorder program between January 2014 and December 2014. Participants completed a survey after each weekly multi-family group. The survey had been used since 2010 as a quality improvement effort. The responsible Institutional Review Board associated with this institution approved the retrospective analyses of survey data. Specific demographic information of those who completed the questionnaire was not collected during this pilot study. All data were de-identified, excluding the subject name, age, diagnosis, and relationship to the patient.

The typical patient population is approximately 75% female and 25% male, with the majority identifying as Caucasian. During 2014, the average age of patients in the program was 14.51 years old (SD=2.4), and the age range in the MFG was 9 to 19. During this year, 47% of patients had a diagnosis of anorexia nervosa (AN), 27.5% were diagnosed with eating disorder not otherwise specified (EDNOS), 10% of patients were diagnosed bulimia nervosa (BN), and the remaining

patients had a secondary diagnosis of eating disorder not otherwise specified.

Patients and their mothers were the primary participants in these groups (44.9% and 36.3% respectively). Table 1 includes numbers and percentages of respondents by relationship to patient.

Measure

Participation in the survey was voluntary. Each respondent marked their relationship to the patient (patient, mother, father, sibling, or other) and the number of family members present. This survey consisted of 9 items; each item was rated on the level of agreement on a 5-item Likert scale from "Strongly Agree" to "Strongly Disagree." One item assessed overall satisfaction and the remaining 8 items measured the extent to which the interventions reached the stated goals. There was also a section for comments. (See *Appendix 2: Multi-Family Group Survey*.) A total of 812 surveys were completed from January 2014 to December 2014. Since surveys were distributed to all participants after each weekly group they attended, many respondents completed the survey more than once.

Procedure

The MFGs were 90 minutes long and occurred once a week. Licensed therapists, who were each board certified in their specific sub-specialty areas, led the groups. The modality (art, music, dance/movement, yoga) rotated throughout the month. Each group was comprised of patients, one or both parents, siblings, and sometimes other family members.

The creative arts therapists were consistent throughout the study. While several studies have indicated that MFG (or multi-family therapy) can facilitate meeting the core tenets of FBT,[12-14] there are no published studies of using CAM specifically to support and/or augment meeting these FBT goals. Therefore, the authors in this study needed to create an original rubric for aligning the stated CAM goals with the known FBT goals based on clinical knowledge. In order to create this rubric, the authors identified the elements of FBT goals and matched them to the identified elements of the CAM goals. The CAM and associated FBT goals are listed in Table 2.

Intervention Structure

Given the lack of literature on CAM as an MFG intervention, below is a description of how each of the 4 CAM modalities are integrated into an MFG format.

Yoga Therapy

Yoga therapy generally consists of several components: introduction to the session and check-in, a centering exercise to orient participants to the present moment, a group intervention incorporating yoga and mindfulness techniques, and a check-out. The yoga therapist starts by introducing the topic for the session and then group members check in as a large group. The group interventions consist of paired exercises done in family groups, or teen/parent group activities. Yoga therapy interventions include partner poses, the creation of an obstacle course by patients that represents the eating disorder, body scans, mirroring, role plays, and other mindfulness activities. The check-out at the end of the yoga therapy session allows the group to process the experience as a whole. Participants are encouraged to talk to one another to facilitate opportunities for validation and shared experiences. One of the goals of MFG yoga therapy is to explore and model effective parent-child communication, including empathy, limit setting, and validation.

Art Therapy

The art therapy MFG includes an introduction by the art therapist, group member introductions, and a common question to create a sense of community and emotional safety. Materials and a metaphor directive are then introduced. Families work either together as a large group, in family groups, or as individuals, according to intervention goals. The art therapist fosters discussion and supports families during the art-making process. The group closes with an invitation for families to share their artwork with the larger group. In art therapy, patients and family members elucidate and challenge family dynamics by externalizing emotions into the artwork.

Music Therapy

Music therapy starts with individual group members introducing themselves by name, their therapeutic intention for group, and a brief musical note. The purpose is at least 3-fold: to introduce group mem-

bers to the sounds of the instruments, to normalize the making of non-verbal sounds within the group, and for group members to experience the expressive nature of even the simplest musical gestures. Music-making within the therapeutic context is seen as both self-expressive and relational, offering group members a present-moment expression of self-states and/or relational dynamics. The absence of words in this context allows for an explicit focus on nonverbal aspects of communication, and for more metaphorical understandings of patients and their families.

Dance/Movement Therapy

The initial check-in of a dance/movement therapy group is intended to increase group cohesion, familiarity, and comfort with the therapist and modality. During the initial check-in, the therapist asks questions to establish the current state of the group's energy. Lower energy groups are invited to bring focused energy that enlivens through directed movement. Active, emotive groups may require more structured interventions designed to foster emotional regulation. Resistance to communicating through body movements can become an important component of the therapy, as it informs the therapeutic process when managed skillfully. Through simple grounding exercises, closing back up the vulnerability that may have been exposed is essential to completing the therapy experience.

More detailed examples of specific interventions associated with each of these CAM modalities is included in *Appendix 1: Complementary Alternative Medicine Creative Arts Therapeutic Interventions*.

Data Analysis

Given that the aim of this study was to examine the utility and tolerability of CAM as an MFG intervention, we transformed the original 5-point Likert scale into a 3-point scale. The new transformed scale included ratings for "agree," "neutral," and "disagree." Descriptive statistics were explored to investigate participants' level of satisfaction with the multi-family groups and to determine the extent to which the goals were met. Descriptive statistics were obtained using SPSS version 17. A total of 812 surveys were used for this analysis. Due to the retrospective methods used to collect the pilot survey data and the initial goal of program improvement, it was not possible to run inferential statistics on the 8 Likert scale items. Our data violated the assumption of independence, since patients or family members could have completed the measure multiple times during their hospitalization. The data were also hierarchical since multiple family members in the unit were invited to complete the survey. We were not able to cluster by family or track patients across sessions due to the anonymity of the survey.

A content analysis using a priori coding technique[22] was used to analyze the open-ended survey item. Comments were provided on 249 of the 812 surveys (30.7%). First, 2 authors (MS and HK), who were not therapists providing the CAM MFG intervention, coded the comments from the surveys assigning pre-established a priori codes (each using keywords from goals) to passages. A final consensus set of codes (9 total) was used in the final coding. Finally, another author (CH), who had not been a part of the intervention, coded the comments using the 9 consensus category codes. Code counts and selected comments are presented below.

Results

Results are presented along with quotes associated with each goal area. Patients and family members overall were positive about the CAM MFG experience as reflected in their high "agree" rating. Results are also presented by modality and respondent type.

1. To provide a structured creative arts therapy group allowing for the safe expression of authentic emotion.

"This was really helpful for me to express my feelings to my parents without feeling judged or getting defensive. Also, insights from other families help me."
-Patient

Participants were asked if they experienced the multi-family groups as a safe environment in which they could express their feelings. Participants reported the strongest agreement with this question in the art therapy groups, followed by music, yoga, and dance/movement therapy respectively, with 85.4% overall agreement. The deductively derived codes for this goal area were "safety and/or vulnerability" and "expressing emotion." Safety and/or vulnerability was the least coded item while expressing emotion was more frequent.

2. To provide opportunity for families to receive support from staff and each other, which can decrease

sense of isolation related to mental illness.

"This made me feel validated and not so alone." -Mother

Participants were asked if they perceived the multi-family group therapist as supportive. Participants reported the strongest agreement with this question for dance/movement therapy, followed by yoga, art, and music, respectively, with 77.6 % overall agreement. Parents and other participants had similarly high ratings of agreement with this statement, whereas patients had noticeably lower, but still relatively high ratings of agreement. Participants were asked if they perceived other families to be supportive in the multi-family groups. Participants reported the strongest agreement with this question for dance/movement therapy, followed by music, yoga, and art, respectively with 77.5% overall agreement. Parents agreed with this statement at higher rates than other participants and patients.

Two codes were derived from the goal area "supportive environment" and "connection to others." Comments expressing an element related to a supportive environment represented 2.8% of the total codes. Comments related to connection to others constituted 5% of the total coded comments.

3. To explore family dynamics in order to develop insight and work toward problem solving.

"This was a fun but safe way to learn more about my family in a way I couldn't have done before." -Mother

Participants were asked if they learned from other families in the multi-family groups. Participants reported the strongest agreement with this question for dance/movement therapy, followed by art, music, and yoga, respectively, with the vast majority (84.7%) in overall agreement. Participants were asked if the multi-family groups led to a greater understanding of themselves. Participants reported the strongest agreement with this question for dance/movement therapy, followed by art, music, and yoga, respectively and 70.6% overall agreement. Although the majority of participants agreed with this question, overall there was less agreement with this question compared to those previously reported. Parents agreed with this item most, followed by other participants, and then patients. Participants were asked if the multi-family groups led to increased insight into family dynamics. Participants reported the strongest agreement with this question for dance/movement therapy, followed by yoga, art, and then music, respectively, and 73.3% overall agreement. Parents agreed with this item more than other participants and patients. Only one code, "increased insight," was part of the final consensus code for this goal. This represented 11.6% of the total coded comments.

4. To explore and model effective parent-child communication, including empathy, limit setting, and validation.

"Today's exercise reinforced what I need to do to listen calmly and understand better. It was also clear that our communication is not always as clear as I thought." -Patient

Participants were asked if the multi-family groups led to new ideas for how to communicate more effectively as a family. Participants reported the strongest agreement with this question for dance/movement therapy, followed by yoga, music, and art, respectively. While the majority of participants agreed (67.4%) with this statement, they expressed the lowest amount of agreement with this question compared to all others asked. Only 1 code, "communication," was part of the final consensus code for this goal. This represented 6.2% of the total coded comments.

There was 1 survey item that corresponded to utility: "This group was helpful." Dance/movement therapy received the highest percentage of agree ratings at 86.2%, followed by art (79.5%), yoga (78.3%), and music (75.6%) with an overall 79.9% of participants in agreement.

Discussion

The primary aim of this pilot study was to explore the acceptability and perceived utility of including art, yoga, music, and dance/movement therapy MFGs in an eating disorder treatment program for adolescents. A secondary aim of this study was to evaluate the feasibility of integrating the different CAM interventions with adolescents and their families as part of treatment for eating disorders in an attempt to improve overall quality of care patients and family receive while participating in the program.

Analyses of both the qualitative and quantitative data suggest overall that the interventions met the specific goals identified by therapists. This pilot study provides some evidence to suggest the CAM MFG

may contribute to the essential goals of FBT. A foundational principle for the family-based approach is empowering parents to resume their parental roles and establish security and safety around meals and nutrition in order to allow the child/adolescent the opportunity to reinstate trust in their parents and move away from the eating disorder messages. Based on clinical experiences, parents who can effectively identify their areas of strength and apply skills to support those strengths tend to experience the benefit of confidence and hope, which translates to feeling empowered to manage the symptoms of the illness and relates to the best outcomes.

Our results demonstrate that families felt supported by staff and each other in the art, yoga, music, and dance/movement therapy MFGs, with a reduced sense of isolation that is typically related to mental illness. Lastly, the goal of enhancing communication was also supported with the current pilot study data. The art, yoga, music, and dance/movement therapy MFG experiences included opportunities for families to externalize the illness; create judgment-free expression of emotion; and increase warmth, empathy, and perspective-taking. While qualitative comments supported the results in the 4 goal areas, many respondents wrote in comments related to the helpfulness of particular modalities or therapists. Given that therapists did not change within a specified modality over the course of the study, future research could vary therapists within a modality to better disentangle the impact of a modality from the unique talents of a therapist.

In our study, dance/movement therapy was rated consistently higher than other modalities on most items (the item pertaining to a safe environment was the sole exception). This was slightly unexpected, as dance/movement therapy requires more vulnerability from participants and relies solely on the physical body as its tool of expression. Though this can create a higher potential for discomfort, it can also lead to deeper insights and awareness of the connection between body, thoughts, and emotions. This hypothesis could be further explored through more specific questions related to different aspects of the experience, and through more specific study of dance/movement therapy as a treatment approach with families struggling with eating disorders. Another possible explanation for these results could be related to clinician-specific variables.

It is noteworthy that across all of the surveys, a large proportion of "neutral" responses were recorded by patients as well as parents. Parents consistently reported higher scores than patients and other participants. One explanation may be that adolescent patients in intensive treatments could be less invested in change than their parents. Readiness to change/motivation could have impacted the respondent's experience of the interventions.

Interestingly, "understand myself" received the lowest average rating among all participants. One potential explanation could be that the interventions were delivered within a family group context, which inherently emphasizes the family dynamics more than insights into the individual processes. The family group interventions are specifically designed to explore the dynamics of family systems when a family member has an eating disorder, as well as the supportive structure necessary to foster healthy recovery.

This study has several important limitations that impact the generalizability of the results. Given that this study started as a quality improvement project, we did not collect specific demographic information on participants, nor were the questionnaires associated with particular patients or family members; results could not be associated with other treatment outcome measures. It also means that we cannot determine whether a smaller group of individuals or families had an outsized influence on the study findings. This also reduced our ability to perform appropriate inferential statistical analyses. It also limited our ability to track participation over time or to compare a family's experiences across modalities. This survey was designed specifically to measure the art, yoga, music, and dance/movement therapy MFG goals, and as such it was not a validated instrument. This survey had face validity, but other tests of validity or reliability were not performed. Future prospective studies should address these limitations.

Families report that art, yoga, music, and dance/movement therapy experiences provide unique opportunities for insight and growth. These modalities are challenging to study, especially in the context of a milieu therapy program where many different groups are offered in addition to individual and family therapy. It is critical to explore approaches to research on art, yoga, music, and dance/movement therapy

to advance the field and provide optimal therapeutic interventions for specific patient populations.

Children and teens going through any challenge in life will likely fare better when they feel supported by and connected to their families. Optimal family involvement and support is a significant component of treatment and is a predictor of lasting recovery. Family-based eating disorder treatment has the opportunity to provide families an opportunity for growth in communication, empathy, tolerance, and support which can potentially have a permanent, positive impact. This pilot study demonstrates that art, yoga, music, and dance/movement therapies can be integrated into treatment in an MFG format and may provide a unique experience, which contributes to improved communication and the ability to work together in treatment.

Tables

Table 1: Demographics of survey participants.

Participant Type	N (%)
Patient	362 (46.5)
Mother	295 (36.2)
Father	109 (13.4)
Sibling	27 (3.3)
>Other	20 (2.5)

Table 2: CAM and FBT goals.

CAM Goal	Associated FBT Goal
1. To provide a structured creative arts therapy group allowing for the safe expression of authentic emotion.	Agnostic approach by reducing isolation and ability to increase empathy by shared emotional experience.
2. To provide opportunity for families to receive support from staff and each other, which can decrease sense of isolation related to mental illness.	Parent empowerment comes from skills and hope–establish hope by joining with others and skills by learning from others.
3. To explore family dynamics in order to develop insight and work toward problem-solving.	Supporting the agnostic approach and focus on problem solving.
4. To explore and model effective parent-child communication, including empathy, limit-setting, and validation.	All therapeutic aims: agnostic approach, non-judgmental stance, parent empowerment.

Table 3: Percentage of responses to survey items by goal and CAM modality.

Goal: Item	Art n=162			Music n=201			Dance/Movement n=219			Yoga n=231		
	Agree	Neutral	Disagree	Agree	Neutral	Disagree	Agree	Neutral	Disagree	Agree	Neutral	Disagree
Goal 1: Safe environment	86.5	9.9	3.7	84.1	11.9	4.0	79	9.6	1.4	82.3	15.5	2.2
Goal 2: Support from therapist	71.0	25.3	3.7	73.5	20.5	6.0	84.4	12.4	1.8	79.4	16.4	4.3
Goal 2: Support from families	69.6	28.0	2.5	78.0	17.5	4.5	84.7	10.6	2.8	75.8	19.4	4.7
Goal 3: Learned from families	87.6	9.4	3.1	81.7	14.7	3.5	91.2	6.0	1.8	79.3	17.7	3.0
Goal 3: Understand myself	70.3	20.5	11.1	66.2	24.4	9.5	76.1	18.4	4.6	70.7	22.4	6.9
Goal 3: Insight into family	73.2	19.3	7.4	66.7	24.4	9.0	78.9	16.1	5.0	73.7	18.5	7.8
Goal 4: New communication ideas	62.1	25.5	12.5	66.5	23	10.0	70.5	22.1	7.4	68.7	22.9	8.4

Table 4: Percentage of responses to survey items by goal and patient versus other.

Goal: Item	Patients n=362			Parents n=404			Other n=46		
	Agree	Neutral	Disagree	Agree	Neutral	Disagree	Agree	Neutral	Disagree
Goal 1: Safe environment	71.8	21.5	4.9	93.7	5.6	.7	84.9	8.6	6.5
Goal 2: Support from therapist	63.8	27.6	7.7	85.0	12.6	2.4	84.8	13.0	2.2
Goal 2: Support from families	69.6	24.3	5.5	88.0	10.8	1.2	80.5	15.2	4.3
Goal 3: Learned from families	74.3	18.5	4.9	92.6	6.7	.7	82.8	8.6	8.6
Goal 3: Understand myself	58.5	27.9	13.2	80	17.1	2.9	71.8	21.7	6.5
Goal 3: Insight into family	60.5	26.5	13.0	84.2	13.6	2.2	76.2	15.2	8.6
Goal 4: New communication ideas	52.1	31.2	15.7	78.5	15.8	5.7	69.7	21.7	8.6

Appendix 1: Complementary Alternative Medicine Creative Arts Therapeutic Interventions

Yoga Therapy: Partner Poses

In the introduction, the yoga therapist asks participants to name the 4 styles of communication (passive, aggressive, passive aggressive, and assertive), and gives an overview of the session. During check-in, each participant reports what style of communication s/he uses most frequently. Participants are then led through a body scan, noticing present moment body sensations and feelings. Afterwards, participants debrief what the experience of the body scan was like. Next, each family group (usually 2-3 members) practices various partner poses from yoga flash cards placed at intervals along the hallway. Family groups are instructed to pair a communication style with one of the yoga poses. For instance, a family might decide that a partner pose that requires a lot of twisting and pulling seems to show aggressive behavior. Once family groups have experimented with a few different poses and have decided on a pairing of communication style/pose, the large group reconvenes. Participants check out by saying how they feel, what they learned in the session, and how that new knowledge can be incorporated into treatment.

Art Therapy: Family Portrait as a Landscape

The family is asked to consider the general current mood of the family and associate that mood with a specific color. Family members are then invited to create a landscape to represent the mood, with each family member depicted metaphorically within the landscape. For instance, if the family feels dry and parched like a desert, each family member is depicted as an object or creature in the desert. Art materials are chosen specifically to elicit emotion. For example, pastels, as they become messy, often mirror the unpredictable nature of emotions better than a highly controlled pencil, which allows families to experience the frustrations and victories that can reflect reality. The art therapist asks specific follow-up questions related to their landscape. During the check-out process, families are encouraged to ask questions of each other to identify and explore different group members' perspectives. By staying within the metaphor, families are also given tools to depersonalize the eating disorder and become aware of family dynamics in a less threatening way than direct family descriptions. These narratives offer family members new perspectives as well as the opportunity to choose new roles within the identified family dynamic. Facilitation of this final discussion purposefully encourages authenticity and courage.

Music Therapy: Musical Emotion Sculpts

To address the goal of safe expression of authentic emotion, this intervention allows all patients to portray the complexity of felt emotion, where several emotions are often distinguishable within one's subjective awareness. In addition to emotion identification, the directive supports the practice of making validating statements. The intervention starts with a "name that mood" game, in which group members are asked to think of any emotion word secretly and chooses an instrument on which they think they can best portray that emotion. Group members are asked to guess which emotion is being portrayed. If members guess correctly, the music therapist guides the group to name the nonverbal cue(s) that led to the correct guess. In cases where no one guesses the correct emotion, the player is coached through noticing the ways in which he or she is being misunderstood and asked to consider other ways to express him/herself in order to clarify the misperception. After a few rounds, patients are asked to name the 3 to 5 most predominant emotions they have been experiencing. Patients are then asked to name the top emotions aloud and assign a different instrument to each of them. Each instrument is then given to different group members who are instructed to play in a manner of their assigned emotion. Group discussion is typically led with the question, "Based on what you heard, how do you think it feels to be that person?" Group members can comment on the overall sounds, the quality of any emotions, or relationships between the emotions themselves. The felt awareness elicited by the musical exercises is reviewed at the close of group, providing families the opportunity to gain increased perspective of family dynamics.

Dance/Movement Therapy: Family Dances

In this intervention, a family works together to create a movement phrase exploring the before, during, and after treatment family dynamics. These dynamics are expressed through each family member and they are invited to share this movement phrase, or dance, with the rest of the group. Without words, each family selects a specific song or silence to accompany their movement phrase. The traditional therapy group shifts to an artistic performance space, where there are those sharing as well as those witnessing, holding, and at times reflecting these dynamics back to the family. After a family shares their dance, the group is invited to comment on what they saw or felt. This evocative intervention tends to increase the level of emotionality and expressivity. Given the level of intensity during treatment, Family Dances may provide a space in which emotional intensity can be acknowledged and expressed.

Appendix 2: Multi-Family Group Survey

Thank you for attending today's group. Your feedback and input are essential to the continued improvement of our services. Please take a few moments to complete this questionnaire.

Are you:

Current Patient Mother Father Sibling Other

How many members of your family attended today's group?_____

Prior to today's group, how many Multi-Family Groups have you attended during this hospital stay? (Circle one)

0 1 2 3 4 5 6+

Please circle the response that best matches your level of agreement with the following statements (strongly agree to strongly disagree).

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Today's group was helpful.	5	4	3	2	1
Today's group provided a safe environment to express my feelings.	5	4	3	2	1
I received support from the group therapist and staff.	5	4	3	2	1
I received support from other families in group.	5	4	3	2	1
I learned from other families that were here today.	5	4	3	2	1
Today's group helped me understand more about myself.	5	4	3	2	1
I've gained insight into my relationship with my family.	5	4	3	2	1
I have new ideas for how to communicate with my family.	5	4	3	2	1

Please provide comments or thoughts about today's Multi-Family Group:

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Factors of Parental Stress Among Parents of Children with Autism Spectrum Disorder in Psychiatric Hospital Settings

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Abstract

Introduction. Children with autism spectrum disorder (ASD) and co-existing psychiatric diagnoses pose significant parental stress burdens, particularly when these children require support in acute psychiatric hospital care settings. Stressors can include added financial burdens, missed work to accommodate treatment, and the grief of altered life expectations. This study explores the relationship between parental stress and socio-demographic factors surrounding the psychiatric hospitalization of children with ASD.

Methods. Pediatric patients with ASD and psychiatric diagnoses were recruited for this study from a multi-site study involving 6 inpatient units of the Autism Inpatient Collaborative (AIC). A total of 593 caregivers participated in this project. Several standardized tools were used as part of the AIC to document the participant's experiences.

Results. Of 593 caregivers who participated in the study, a median total stress score of 116 was identified, compared to 73 in a normative sample. In the final multiple logistic regression model, factors that were found to positively correlate with increased parental stress include the child's sleep difficulties (p=0.02), irritability (p=0.003), hyperactivity (p=0.01), and social withdrawal (0.002). A diagnosis of comorbid depression was related to decreased parental stress (p=0.046).

Conclusions. Parents who access inpatient psychiatric services for their children with ASD face higher than average stress levels compared to the general population. Parental stress levels can be impacted by a child's sleep disruptions along with child behaviors of irritability, hyperactivity, and social withdrawal that can present safety concerns.

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Introduction

Individuals with autism spectrum disorder (ASD) struggle with social and communication impairments, in addition to restricted repetitive behaviors and interests.[1] ASD prevalence rates are increasing, with recent data suggesting a 150% increase in the last 18 years.[2] As of 2014, identification rates show that 1 in 59 children in the United States (US) are diagnosed before the age of 8 years.[2] Growing attention to the ASD population relates to the impact this diagnosis has, not only on the individual with ASD, but also on communities[3, 4] and family systems.[5] This is particularly the case for individuals with ASD and co-occurring mental health diagnoses.[6, 7]

While parents in general may experience stress of some kind, families raising children with ASD and other developmental disabilities face unique challenges.[8] From the moment of diagnosis, parents may experience grief related to changing expectations of their child's future,[5] challenges of navigating a complex service delivery system to search for high-quality interventions, and chronic pressures to meet the daily dependency needs of children with ASD. For example, while parents may expect to lose sleep during the first few years of an infant's life, sleep disruption is common in 50-80% of individuals

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with ASD beyond infancy.[8] These issues can take a toll on parents' emotional state and the family unit as a whole.[5, 9] Financially, the cost of raising any child with ASD is significant,[3, 4] with economic impacts over 1 million dollars per child in the US across their lifetime.[3]

It is relatively common for children with ASD to have co-occurring psychiatric diagnoses, with some studies reporting rates of over 70%.[10] An estimated 11% of all those diagnosed with ASD require psychiatric hospitalization before reaching adulthood[11]; however, few ASD specialized hospital psychiatric units exist in the US and general psychiatric hospitalization in non-specialized units offer minimal long-term benefits.[11] With increasing rates of ASD, those who require psychiatric hospitalization[11] call for additional attention to address health disparities for this specific cohort. Additional unexpected expenses for psychiatrically-complex children with ASD include hospitalizations and time off work for parents.[3, 4] Trends in Medicaid spending on behavioral health for children with ASD have not increased at the same rate as diagnosis,[4] suggesting that increases in spending may be greater than reported, with families paying out of pocket for certain programs or treatments for their children.

Collecting data on hospitalized children with ASD has been historically difficult, with limited information available in literature review.[11] The present study aims to add to the literature by identifying specific familial factors that impact parental stress in a larger population of psychiatrically-hospitalized youth with ASD. The authors of this study hypothesized that several socio-demographic factors would increase parental stress. Understanding the specific factors that may increase or decrease parental stress in this high-need population can help inform the public and service providers in an effort to support the development of interventions and preventative programs that include attention to caregiver stress and burden.

Methods

Participants

Participants' data reviewed for this institutional review board approved study was collected as part of the Autism Inpatient Collection (AIC)[12] that included youth with ASD admitted to one of 6 participating inpatient specialty psychiatric units across the US. As part of this study, caregivers and participants engaged in an informed consent/assent process with study personnel. A subset of data from 736 participants, ages 4 to 20 years, was included in these analyses. Eligible participants were youth admitted to these units with a community-based diagnosis of ASD and meeting the screening cut-off score (≥12) for ASD on the Social Communication Questionnaire (SCQ).[13] Excluding incomplete data records and participants who did not meet ASD criteria, 593 participants' data were included. As part of this study, participants' ASD diagnosis was confirmed by meeting the clinical cut-offs for ASD on the Autism Diagnostic Observation Schedule, Second Edition (ADOS-2)[12] administered by research-reliable study personnel in compliance with standards set by the test authors.[14]

Measures

Dependent Variable

The dependent variable for this study was parental stress. The Parental Stress Index-Short Form (PSI-SF)[15] is a 36-item questionnaire and was completed by parents upon their child's admission and again at discharge. The 3 subscales for the PSI-SF include parental distress, parent-child dysfunctional interaction, and difficult child. Responses are assigned a numeric value that is used to score the subscales. Parent and child subscales are combined to create a Total Stress Scale with a .96 reliability coefficient.[15] A total stress score of 110 or above is considered "high" on this standardized measure while a score of 114 or more is considered "clinically significant."[15] This study utilized the parental responses recorded upon the child's admission to the psychiatric hospital. The Total Stress Scale on the PSI-SF was the primary outcome of this analysis. Of the 593 subjects, 535 (90%) responded to all 36 items on the questionnaire; the remaining 58 were missing no more than 2 items. As per the PSI-SF manual, the average value of a respondent's answers were imputed for missing values. Subjects' PSI-SF forms missing 3 or more items were omitted from this analysis in order to maintain the reliability coefficient.

Child Symptoms

The Emotional Dysregulation Inventory (EDI) is an ASD-specific measure developed to quantify rates of emotional dysregulation.[17] This parent questionnaire is scored in 2 subdomains, dysphoria and reactivity. For this study, results from both subdomains were

examined. In preliminary studies, the EDI has been effective in comparing and evaluating emotional dysregulation regardless of a child's intellectual functioning and communication ability.[17] Despite these initial findings the EDI does not have a reliability coefficient documented at this time. Thus this study will also utilize the Aberrant Behavioral Checklist-Community (ABC-C) to evaluate effects of child symptoms on parental stress. The ABC-C utilizes a Likert scale for parents to rate their child's behaviors between 0 and 3,[18] where 0 indicates that the described behavior is not a problem and 3 indicates a severe problem. These 58 questions are then converted to scores for 5 domains—irritability, social withdrawal, stereotypy, hyperactivity, and inappropriate speech—to describe the significance of problem behaviors in children with developmental disabilities.[18] Parents completed the ABC-C upon their child's admission to the hospital unit. The ABC-C has been widely used as a reliable research outcome measure for the ASD population.

Demographic Variables

As previously mentioned, the ADOS-2 was used to confirm participants' ASD study diagnosis. The module sets were used to define "verbal" participants as those evaluated using ADOS-2 modules 3 and 4, while the "non-verbal" participants as those evaluated using modules 1 and 2.

Additional demographic information was collected upon admission and utilized as independent variables to evaluate their effect on parental stress. Variables include marital status, gender of respondent, gender of child participant, household income, child sleeping patterns, parental education level, and type of co-existing psychiatric diagnoses reported for the child with ASD. Psychiatric diagnoses were confirmed by the child participant's treatment team using the Diagnostic and Statistical Manual of Mental Disorders 5th Edition (DSM-5).[1] For analysis purposes, this study examined psychiatric categories within the DSM-5 and not individual diagnoses.[1]

Analysis

A multiple linear regression model was used to explore the associations between behavioral measures and parental stress to estimate the adjusted effect of each covariate on PSI-SF score, as well as the effects of all socio-demographic information collected. Variables were selected a priori and a single model was fit with all variables included. All analysis was performed in SAS 9.2 (SAS Institute, Cary, NC) with graphics created in S-Plus 8.2.

Results

The PSI-SF total stress score followed a normal distribution, with a median score of 116 (Figure 1) compared to the mean score of a normative sample at 73.[15] A score of 114 or more indicates clinical significance on the PSI-SF (90th percentile or above).[15] Families participating in this study were, on average, already scoring in the clinically significant range for parental stress, with 63% meeting criteria for high stress on the PSI-SF (Figure 1).

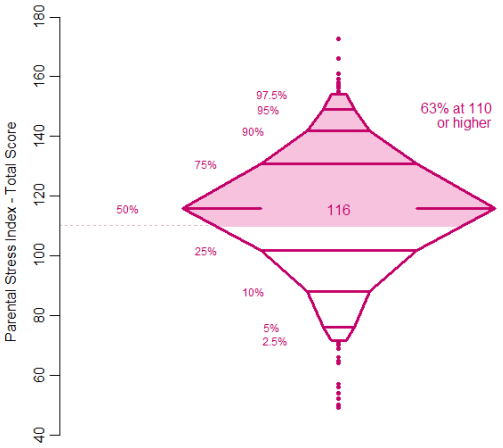

Figure 1. PSI-SF score distribution.

Child participants were predominantly male (80%), while the majority of parental respondents were female (83%; Table 1). Demographic information, including race, child's age, and parental education is displayed in Table 1. Contrary to our hypothesis, several variables did not correlate with parental stress. For example, marital status (p=0.54, Table 2), income level (p=0.25, Table 2), and child's verbal ability (p=0.14, Table 2) showed limited to no impact on parental stress scores. Table 2 also shows comparisons between male and female caregivers. Only 68 parents (11% of 593 respondents) identified as a father or step-father. This small sample is not large enough make generalizations; however, there are no statistical differences between male and female caregiver reported stress on the PSI-SF (p=0.77).

Several DSM-5 categories for psychiatric co-existing diagnoses were included in the analysis. The only category that showed correlation with parental stress

was Depressive Disorders, which includes Disruptive Mood Dysregulation Disorder, Major Depressive Disorder, Unspecified Depressive Disorder, and Persistent Depressive Disorder.[1] This co-existing diagnostic category was reported in 23% of the sample and was found to negatively correlate with parental stress (p=0.046).

Sixty-three percent of parents reported that their child experienced significant sleep problems, including trouble falling asleep and frequent nighttime waking (Table 1). This result is consistent with rates of sleep disorders in ASD reported in the current literature.[8] Significant sleep problems positively correlated with parental stress (p=0.02, Table 2).

Table 2 displays the results of a multiple linear regression model for estimating associations with PSI-SF. On the ABC-C the irritability (p=0.003), hyperactivity (p=0.01), and social withdrawal (p=0.002) subscales correlated most strongly with parental stress, regardless of socio-demographic variability. Neither of the EDI subdomains showed statistical significance in this analysis.

Conclusions

This study explored contributing factors for parental stress among a cohort of families raising a child with ASD and co-existing psychiatric diagnoses who required acute hospitalization. Sleep disruptions were found to highly correlate with increased parental stress. While the EDI found no correlations with child behaviors, the ABC-C found 3 subscales to be positively correlated to parental stress scores: irritability, hyperactivity, and social withdrawal. A DSM-5 diagnosis[1] of depression upon admission correlated with lower parental stress in this population.

Externalizing behaviors present unique challenges to the family system. For example, aggression towards self or others often requires immediate intervention and attention from the caregiver. This can demand that caregivers maintain hypervigilance and sometimes cause them to constantly worry about the safety of family members and the home environment. Such situations may lead parents to avoid placing demands on their child, which can be considered a trauma-related symptom in families experiencing high levels of externalizing behaviors. Further research into the use of evidenced based practices for trauma, such as Trauma Focused-Cognitive Behavioral Therapy (TF-CBT), should be explored for parents of children with high scores on the ABC-C.

In contrast, a child who is depressed may require less parental attention and present fewer risks to harm family members. Depression primarily manifests with internalizing symptoms (withdrawal, sadness, loss of appetite, and increased sleep).[1] While still requiring attention for clinically significant stress levels, the total stress score for parents of child with ASD and a diagnosis of depression is less than that of children without depression in this cohort. The average parental stress score of all participants in this study is 116 compared to the lower score of 111 for children with a dual diagnosis of depression. One explanation of the negative correlation between PSI-SF scores and having a child with ASD and depression is the reduced prevalence of physical aggression towards property, family, and self in this subgroup.

Parental stress can affect a caregiver's ability to engage with their child when necessary. A parent may be unable or unwilling to intervene to assist with daily life demands, such as homework or therapy, in lieu of safety concerns or fatigue. This may explain why children in this cohort who are identified on the social withdrawal subscale of the ABC-C were positively correlated with increased parental stress. The increased need for a parent to fill this social role and structure a child's free time could increase the stress of an already overwhelmed family unit. This study suggests that intervention be targeted towards relieving the burden of stress, particularly for parents with children who struggle with sleep, externalizing behaviors, and social isolation.

Limitations of this study should be noted. First, only 1 aspect of parental stress and burden was measured, which limits the scope of understanding of the full impact a child's externalizing behaviors may have on the family system. Additionally, the classification verbal versus nonverbal was based on ADOS-2 module and is only a gross measure of communication ability. It is possible that some children assessed using the ADOS-2 module 2 had some speech, which is appropriate for this module. Since children are not allowed to use augmentative communication during the ADOS-2, it is not known whether the identified nonverbal children in this study had mastered the use of augmentative communication or other strategies (eg, pictures or

sign language) to communicate at home. The impact of a child's communicative ability on parental stress should be considered for future research. Finally, the data from this study cannot be generalized to patients with ASD with psychiatric diagnoses in general. This study focuses on children with ASD who required psychiatric hospitalization to address mental health crises. Impacts of parental stress on this population could differ from those of parents raising a child with ASD who never require this level of care or who do not have a co-occurring disorder.

Looking towards the future, consideration for the impact or role of caregiver stress when treating youth with ASD and co-existing psychiatric diagnoses should not be overlooked. Advocating to include respite care as part of the recommended and covered medical treatments for these families may be beneficial. With respite, parents who are kept awake by their child's sleep disruptions can focus on self-care, sleep, and other personal health needs. Respite may also be utilized as a recreational outlet for children who are at risk for dependence on their caregiver due to social withdrawal. Additional research is needed in the area of mental health treatment to create evidence-based practices that are trauma-informed for this population, including increased access to specialized inpatient care and outpatient care. Creating a culture within our community that is able to meet the needs of this complex population can have financial impacts on our public health system that cannot be ignored.

Acknowledgements

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Tables

Table 1. Demographics reported by parent upon admission to hospital.

Characteristic	Mean±SD or N (%)
Child age, years	13.1±3.4
Female sex, child	120 (20%)
Race	
White	465 (78%)
African-American	47 (8%)
Asian	11 (2%)
Mixed/Other/Unspecified	70 (12%)
Resides at home	529 (90%)
Primary parent education	
Less than high school	27 (5%)
High school	109 (20%)
Some college	203 (37%)
College	116 (21%)
Post-graduate	99 (18%)
Married	320 (61%)
Income	
<$20k	98 (18%)
$21k to $35k	99 (18%)
$36k to $50k	74 (14%)
$51k to $65k	65 (12%)
$66k to $80k	40 (7%)
$81k to $100k	54 (10%)
$101k to $130k	49 (9%)
$130k to $160k	24 (4%)
>$160k	36 (7%)
Respondent	
Mother/stepmother	494 (83%)
Father/stepfather	68 (11%)
Other	30 (5%)
Non-verbal	305 (52%)
Significant sleeping problems	349 (63%)
Siblings with disorders	261 (80%)
EDI responses (severe/very severe)	
Destroys property	309 (54%)
Physically attacks people	342 (60%)
No response to praise/good things	49 (9%)
Comorbidities	
Intellectual disability	275 (46%)
Bipolar and related disorders	63 (10%)
Depressive disorders	140 (23%)

Anxiety disorders	147 (24%)
Trauma-related disorders	19 (3%)
Disruptive/impulse control/conduct disorders	168 (28%)

Table 2. Multivariate linear regression scores for hypothesized indicators of parental stress.

Characteristic	Estimate	(95% CI)	p-value
Age, years	0.09	(-0.52, 0.71)	0.76
Female sex	1.60	(-3.18, 6.38)	0.51
White race	-3.34	(-8.47, 1.78)	0.20
Resides at home	-4.73	(-12.94, 3.48)	0.26
Primary parent ed: some college	3.53	(-1.41, 8.47)	0.16
Primary parent ed: college or more	4.28	(-1.14, 9.69)	0.12
Respondent: father	0.91	(-5.12, 6.93)	0.77
Parents married	1.45	(-3.25, 6.15)	0.54
Income category	0.60	(-0.43, 1.62)	0.25
Verbal (vs non-verbal)	3.28	(-1.04, 7.60)	0.14
Significant sleeping problems	4.51	(0.65, 8.37)	0.02
EDI: reactivity index theta score	2.59	(-0.39, 5.58)	0.09
EDI: dysphoria index theta score	2.33	(-0.47, 5.13)	0.10
Comorbidity: intellectual disability	1.01	(-3.12, 5.15)	0.63
Comorbidity: bipolar	-1.02	(-7.23, 5.19)	0.75
Comorbidity: depression	-4.69	(-9.29, -0.08)	0.046
Comorbidity: anxiety	-2.35	(-6.68, 1.97)	0.29
Comorbidity: disruptive/conduct	0.79	(-3.53, 5.12)	0.72
ABC-C: Irritability	4.70	(1.61, 7.80)	0.003
ABC-C: Social Withdrawal	4.30	(1.60, 7.01)	0.002
ABC-C: Stereotypy	-0.38	(-4.94, 4.18)	0.87
ABC-C: Hyperactivity	3.39	(0.82, 5.95)	0.01
ABC-C: Speech	-4.25	(-10.17, 1.66)	0.16

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Body Image Stages of Change: A Body Image Specific Application of Readiness to Change

*Mindy C. Solomon, PhD; Alexandra K. Romero, PsyD; Jennifer Hagman, MD; Guido Frank, MD**

Abstract

This article describes the relevant background literature and limitations in previously-published body image focus work and proposes a new model and suggestions for matching interventions to appropriate body image stage of change.

We developed a model for working with patients with body image concerns. The *Body Image Stages of Change model (BI-SOC)* was designed to improve motivation to change by identifying the underlying cognitive, emotional, and perceptual processes implicated in body dissatisfaction. It is fundamental to understand the unique processes salient in each stage of change and specifically tailor interventions to the underlying cognitive process and stage a patient is in. We adapted the readiness to change assessment to focus on body image. This approach allows the therapist to tailor cognitive and experiential interventions and improves the chance that interventions are offered at appropriate times in treatment based on patient readiness for change related to improving body dissatisfaction.

Solomon M, Romero A, Hagman J, Frank G. Body Image Stages of Change: A Body Image Specific Application of Readiness to Change. Colo J Psychiatry Psychology. 2019;3(1):60-66.

Introduction

"In a way I want to have all this be over with, but I hate the idea of being at a healthy weight. I just hate being in my fat body. I really do feel fat. . . and I am pretty positive I am."

"I know I am the fattest one here."

"I hate my body."

These are quotes from a 15-year-old female with anorexia nervosa (AN), written in a journal she kept when she was hospitalized for severe malnutrition and bradycardia, weighing approximately 80% of her ideal body weight. These are common thoughts expressed by others with eating disorders and highlight the mismatch of body perception and reality with respect to weight and shape.

In the treatment of eating disorders, it is sometimes stated that body image dissatisfaction is the first symptom to appear and the last to disappear. Body image distortion (BID) is an extreme form of body dissatisfaction and can become so severe that it may take on a psychotic quality.[1] Although body dissatisfaction is a key symptom of AN,[2] we know very little about its pathophysiology. Sociocultural influences are involved in striving for a thin-ideal, but what happens in the brain to distort the experience of body shape and weight is just beginning to be understood.[3,4] Brain imaging suggests that body perception in AN may have a neurobiological underpinning,[5] but we are still far from a true model of brain network function that drives those perceptions and behaviors.[3,4] Nevertheless, distorted perceptions of body image can be a central aspect of AN, influencing behavior and the development and maintenance of AN.[2] Improvement in body image and attitudes towards one's body are considered important for sustaining recovery from AN and other eating disorders.[6] There is some evidence to suggest that cognitive behavioral approaches[7] and Acceptance and Commitment Therapy show promise for addressing

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body image dissatisfaction.[8] It is unclear, however, what underlying construct(s) allow these interventions to be effective, and whether their efficacy could be impacted by the *timing* of when the interventions are administered in clinical treatment.

Delinksy et al[9] cite motivation as a useful construct for evaluating response to treatment and/or predictor of treatment outcome in eating disorders. Some studies suggest that there is clinical relevance associated with high motivation at the onset of treatment including lower pathological behavior, staying in treatment, and weight gain.[10] Motivation is commonly measured in treatment by using a "readiness to change" assessment that evaluates one's cognitive acceptance and commitment to making changes.[11] The *Anorexia Nervosa Stages of Change Questionnaire (ANSOCQ)* scale is a validated instrument most commonly used to assess readiness to change/motivation in eating disorder treatment.[10] This measure focuses on a general sense of motivation or commitment to making the behavioral changes necessary in eating disorder treatment (such as eating regular meals, gaining weight, stopping bingeing and purging, etc). One recent study looked at ANSOCQ results as a predictor of outcome with adolescents and found that high readiness for change (RFC) was associated with high self-esteem and active coping style as moderators for positive treatment outcome.[10] There have not, however, been studies that investigate readiness to change specifically about one's beliefs about his/her body and whether or not the timing of when to introduce body image interventions is clinically relevant.

The transtheoretical model of change (TTM) leverages timing of interventions based on the assessment of one's cognitive readiness to change. It "integrates processes and principles of change across major theories of intervention…The TTM emerged from a comparative analysis of leading theories of psychotherapy and behavior change."[12] The general model helped weave these principles and theories into a series of steps and tasks important to understanding the broader concept of change.[13,14] Within the model, there are 5 core constructs relating to the process or "stages of change" (SOC): pre-contemplation, contemplation, preparation, action, and maintenance. *Pre-contemplation* is the stage where individuals have no intention of taking action within the next 6 months. Individuals may remain in this stage because they are either uninformed or under-informed about the impact of their behavior or they may have experienced failure in previous attempts at making change, resulting in feelings of demoralization.[12] Individuals in this stage of change avoid increased exploration of high-risk behaviors and tend to present as resistant or unmotivated when faced with action-oriented treatment.[12,15] In *Contemplation*, individuals are aware their behavior is likely problematic and are more aware of the pros and cons associated. "This balance between the costs and benefits of changing can produce profound ambivalence and keeps people stuck in contemplation for long periods of time."[12] The *Preparation* stage of change is characterized by an acceptance that current beliefs and behaviors are implicated in problems; a commitment to change is beginning to form and there is an identification of potential steps one needs to take to make change. *Action* is the stage of change where one has begun taking steps toward behavior change and is willing to act "as if" they have a healthier belief system. People in the action stage have made specific, intentional modifications.[12-15] Finally, in the *Maintenance* stage, behavior changes occur in a more automatic, less effortful way. In this stage a person is more likely to act in accordance with his/her beliefs and values and a focus on working to prevent relapse is a critical component to this stage. People in the *Maintenance* stage are less vulnerable to repeating prior high-risk behaviors and are increasingly confident in their ability to maintain changes made.[12] Prochaska, DiClemente, and Noar estimated that individuals can remain in the *Maintenance* stage for 6 months to 5 years.[12,13] This wide range of potential time spent within maintenance demonstrates the principle that the stages of change are a non-linear process where individuals can vary significantly in how they progress through and within each phase. The process of change "…is filled with starts and stops, progression and regression, slips, lapses, relapse and, more importantly, recycling."[13] Change and motivation are seen as multidimensional and more complicated than simply being present or absent within treatment.[13-15]

Motivation enhancement techniques based on the SOC model rely on dissonance to inspire the change process (ie, eliciting internal discomfort with the tension between staying the same and moving toward behavioral change).[12,13] Cognitive body image treatments are also designed to elicit dissonance as

a mechanism to promote change,[7] however, standard treatments do not necessarily or specifically leverage readiness for change principles to "stage" the timing of various interventions and techniques for improving body image. It is a noteworthy caveat that people with different health conditions have been shown to respond differently within the stages of change specifically related to behavioral vs cognitive changes.[16] One study looked at SOC as related to dieting/exercise behavior and found that cognitive and behavioral processes increased simultaneously, while with smoking cessation, cognitive changes were a precursor to behavioral changes. Furthermore, as it related to other health-related conditions, there was more variability.[16] This variability of timing of cognitive vs behavioral intervention has not been closely evaluated in the eating disorder literature and would be an important consideration when applying the model to improving body image.

Patients struggling with eating disorders often report body dissatisfaction as the main contributor to their overall distress and seek to change their appearance with disordered eating behavior or exercise. They tend to believe that changing their appearance is the key to improving low self-esteem and alleviating symptoms of depression.[17] Often patients at this level of suffering are less tolerant of suggestions that might challenge this belief. Cognitive interventions require some hope that shifting beliefs can reduce the experience of distress. In early stages of change where body dissatisfaction contributes to the highest level of distress in patients, the intensity of that distress can make people fearful that making cognitive change cannot provide significant relief. Additionally, cognitive change relies on a willingness to tolerate prolonged exposure to distress and commitment to resist engaging in appearance-changing behaviors. For patients with eating disorders and related body image dissatisfaction, this treatment request can feel like flooding in traditional exposure therapy and seem too threatening. To move forward with this type of exposure, people need to be reassured to feel hopeful that their efforts will have a significant beneficial impact on their emotional state or wellbeing. Despite the evidence base for cognitive interventions for body image, providers need to be sensitive to the feasibility of treatments based on the lived experience of the individuals. It might be hypothesized that motivation, or lack of motivation, is associated with fears of the suggested intervention and/or low self-efficacy.[18] For these treatments to be most effective, it is useful to consider how clinicians can employ efforts to reduce the perceived threat of the intervention.

To address this, we have developed a new, clinically-relevant theoretical application of the Stages of Change model, unique to the concept of improving body image. The Body Image Stages of Change (BI-SOC) model encourages small steps that promote feelings of success and identifies goals associated with each stage, providing a clear outline of how to improve body image for individuals who struggle with flexibility in thinking and may be fearful of adopting a new set of cognitive beliefs. This model is not linear; it allows people to move back and forth through the stages as they experience challenges and set backs, which can help promote a feeling of self-efficacy and contribute to more lasting and meaningful changes.

The BI-SOC model is designed to address motivation to change the underlying cognitive, emotional, and perceptual processes implicated in body dissatisfaction. It is fundamental to understand the unique processes salient in each SOC and specifically tailor interventions to the underlying cognitive process and stage a patient is in. We adapted the readiness to change assessment to focus on body image with suggested standard interventions placed at various points within the stages of change (Figure 1). This approach allows the therapist to individualize interventions and improves the chance that interventions are offered at appropriate times in treatment based on patient motivation related to improving body dissatisfaction.

The BI-SOC model was developed as part of an exploration of how to discuss body image with teens and their parents participating in an intensive outpatient program specifically designed for families who had completed a 5-week intensive (inpatient and partial hospitalization), family-based treatment for eating disorder. Patients and families often provided feedback that the intensive program emphasized weight gain, but did not adequately address body image dissatisfaction and patients often expressed they felt "worse" about themselves than before they started treatment. In response, we provided evidence-based cognitive interventions for improving body image including workbooks with homework and opportunity for group discussion and practices. However, despite the fact patients and parents had requested this,

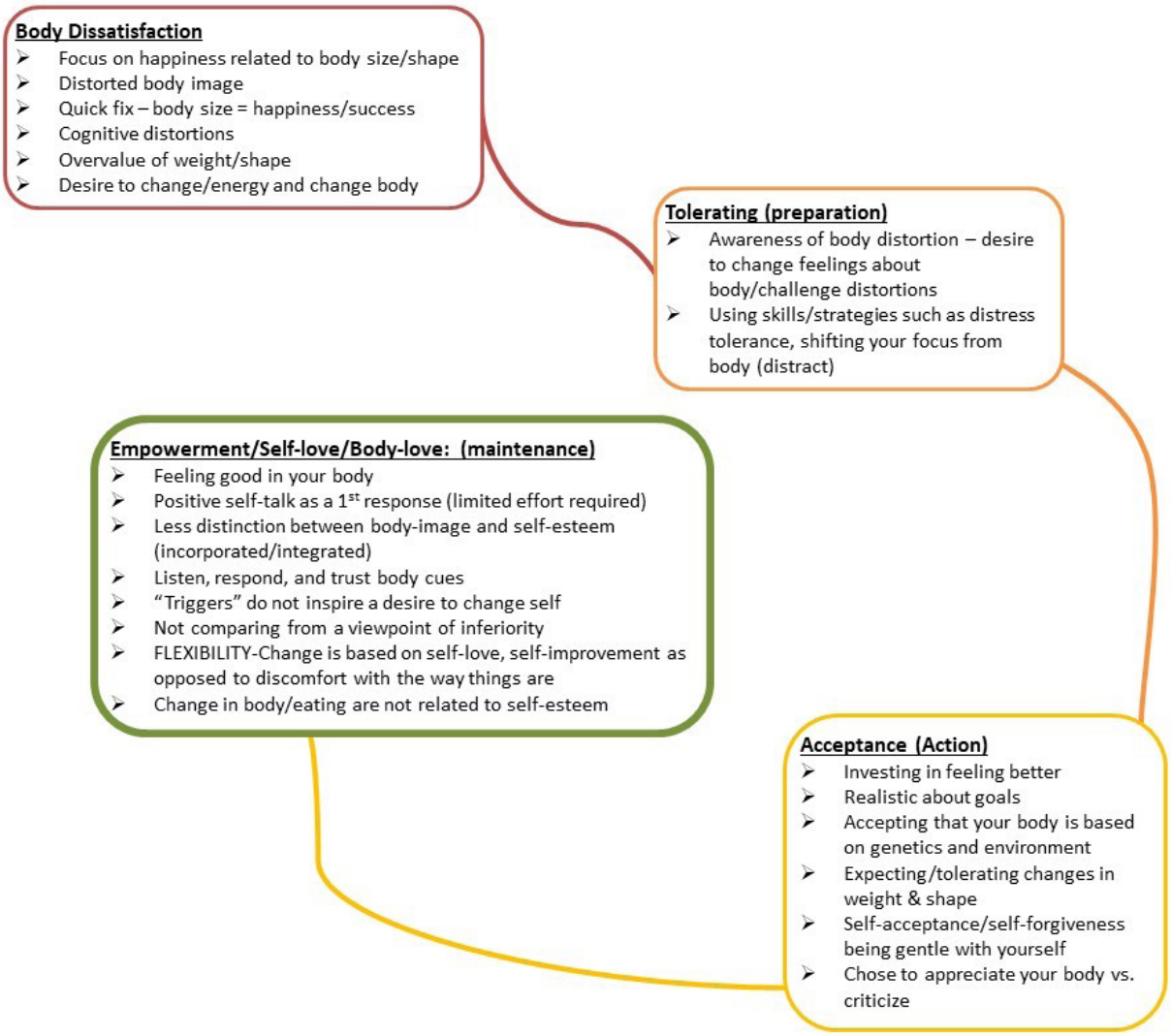

Figure 1. The cognitive processes at each body image stage of change, including the original stage of change label (in parentheses).

they frequently did not complete homework assignments and were disengaged in the group discussions. It was clinically evident that the adolescents wanted to feel better about themselves; however, they appeared to be in various stages of readiness to accept the responsibility for making the cognitive changes necessary to allow for an improvement in body image. It became clear to the clinicians that in order for the evidenced-based interventions to have benefit, we needed to address the space between *wanting* to feel better and being *ready* to engage in the process to make necessary changes in order to get better. We hypothesized that the fears associated with changing beliefs was overwhelming to patients and reduced feelings of self-efficacy resulting in what appeared to be low motivation for participating in the body image work. Motivation for change and assessment of readiness to change seemed like a natural fit for exploring this discrepancy. We discovered that helping teens specifically apply the readiness to change concept to their beliefs about body image began to allow a safe way to explore their beliefs and attitudes about their bodies and their associated fears with letting go of the dominant cultural pursuit of the thin-ideal. Additionally, teaching parents and caregivers about these stages gave them a way to understand the ways they could be patient and supportive and have compassion for where their child was struggling most. The following is a description of the adapted transtheoretical model and suggested timing for specific interventions where we believe they might have the most impact for change.

Design

Body Dissatisfied (Precontemplative/Contemplative)

The stage in our model that relates to the *Precontemplative* stage is "body dissatisfied." In this stage, cognitive distortions may become fixed beliefs about perceived body shape and size and their importance. Individuals might have a strong focus on weight loss and achieving an idealized body. Perception of size and shape is frequently distorted, and the individual believes that efforts to change the body are the only solution to improve how he/she might feel about his/her body. It can be challenging for clinicians to find useful interventions for working with individuals who present with this mindset as the discrepancy between goals and willingness is most pronounced. An individual might report wanting to "feel better" about his/her body, and then advocate for doing that by engaging in disordered behaviors (such as excessive exercise or extreme dieting) in order to achieve their perception of an ideal physical appearance. Motivation enhancement teaches us that efforts to confront distortions when people are rigidly fixed in their beliefs only serves to strengthen maladaptive beliefs and does not inspire change.[11] Thus, most traditional cognitive interventions (such as finding evidence to dispute the beliefs) for body image could be contraindicated at this point in treatment. Interventions focused on providing compassion and empathy are offered, which may be more useful for someone experiencing this cognitive conflict. Clinical interventions with body image, interventions designed to improve insight around how current body image views developed, increased awareness around how current mindset or behaviors are or are not working and define and imagine what positive body image might look like might be more likely to initiate the initial cognitive process of change. Emphasis is focused on acknowledging the inherent pain and/or suffering associated with the origin of body dissatisfaction and allowing the individual the opportunity to explore their beliefs without feeling the need to defend them. Mindfulness practices, which focus on simply noticing feelings in your body and/or feelings of distress, might be particularly useful at this stage. While in the "body dissatisfied" stage, individuals come to recognize the distress caused by body dissatisfaction. As individuals become more aware and feel the tension associated with this distress, they might start to move toward *Contemplation*, which allows for beginning to question their current beliefs and whether their thoughts and behaviors are helpful. In body image treatment, an individual might start to acknowledge that he/she may not fully believe the body messages he/she is acting on and outside influences could be contributing to the distress caused by body dissatisfaction. The individual begins to experience some awareness and hope that they might not have to feel as badly as they currently do. Activities designed to help a person recognize there *could* be another way of experiencing his/her current body include listing pros and cons of maintaining current thoughts or beliefs. These are recommended to help motivate someone to embark on a change process. Discomfort with the status quo is at the helm of motivation to change and these types of interventions at this stage help individuals start to feel dissonance or discomfort and can start to inspire hope that change is possible. Compassion-focused approaches suggest self-compassion, including meditation and practicing loving-kindness towards oneself, as a useful component to treating body image.[16,17] Beginning to plant seeds for the cultivation of self-compassion can be particularly useful in the contemplation stage as self-compassion inherently contradicts the self-loathing and shame associated with negative body image.

Tolerating (Preparation)

The *Preparation* stage is characterized by a commitment to the change process in the foreseeable future. The work of this stage is to assess what is needed in order to make those changes. In order to be motivated to do the hard work of making change, one must cultivate a sense of self-efficacy and reduce fears associated with failure to make the changes.[19] Individuals need to have enough hope that making the changes will improve the situation as well as the feeling of competency (skills) of how to go about making desired change efforts. In our BI-SOC model, this stage translates to tolerating the body the way it is. Specifically, one might start to accept that feeling better does not have to translate to looking different. Someone in this stage will embrace a desire to change or challenge feelings about one's body and will work to increase the ability to use skills to tolerate distress

associated with moving toward acceptance of one's body verses the more superficial fix associated with weight loss/appearance change. This is the stage where the more commonly-used cognitive interventions are likely to be most effective including challenging cognitive distortions, identifying values and broadening self-image, engaging in gratitude practices, increasing the use of neutral self-talk, affirmations, positive self-talk, and continued practice of self-compassion.

Acceptance (Action)

The *Action* stage in the BI-SOC model is focused on acceptance and appreciation of one's body. The cognitive process is characterized by an investment in feeling better, being realistic about goals, accepting that your body is based on genetics and environment, tolerating changes in weight and shape, and regularly practicing self-compassion by choosing to appreciate your body and beginning to challenge negative body thoughts. It is at these later stages where cognitive interventions to challenge underlying or core beliefs that contribute to triggering situations and negative self-appraisal might be most effective. Helpful interventions focus on managing comparisons, reducing the impact of triggers, increasing comfort with self-affirmations, engaging in gratitude work, and questioning motivation of actions (eg, why am I exercising?). A study published in 2017 showed a significant benefit of introducing compassion-focused therapy (CFT) as an adjunctive treatment for standard cognitive strategies suggesting the importance of including compassionate self-acceptance as part of treatment.[20]

Empowerment/Self-Love (Maintenance)

Finally, the *Maintenance* stage, as it relates to body image work, spotlights empowerment and advocacy. A person in this stage would begin to experience feeling good about his/her body; respond with loving-kindness toward his/her body; be able to listen, respond, and trust body cues; and could make physical changes based on a desire for self-improvement instead of from the vantage point of self-loathing or an effort to avoid appearance-related anxiety.

This model is also based on the premise of exploring and reducing fears associated with changing behaviors the individual feels are necessary to manage body dissatisfaction prior to introducing change-based interventions.

Summary and Recommendations

Our clinical experience in using this model with families in the intensive outpatient program provides initial promise that this could be a useful framework for clinicians to use with patients struggling with body image dissatisfaction. We believe that the use of this framework helped patients feel less threatened and improved their sense of efficacy in making changes toward a more positive body image. Future directions for evaluating the validity and efficacy of using a stages of change/readiness for change model for improving the symptoms of body dissatisfaction in individuals with eating disorders include exploring integrating the BI-SOC model into therapy in both outpatient and higher levels of care and/or studying its utility as a clinical guide in determining the timing of treatment interventions to enhance outcome. Our application of the model allows for helping individuals begin work on body dissatisfaction without feeling forced to commit to change before they are ready.

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Mental Health Providers' and Trainees' Experience Treating Pediatric Patients with Psychogenic Non-Epileptic Seizures (PNES): A Clinical Survey

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Abstract

Introduction. Psychogenic non-epileptic seizures (PNES), which can be present in youth and adults, are seizure-like events that are not caused by abnormal brain activity. While the majority of studies examine adult patients, the goal of this study was to determine the perceived level of confidence among pediatric providers and trainees in delivering clinical services to patients with PNES, and to identify areas for future training.

Methods. A 13-item survey was administered electronically to mental health providers and trainees (32% response rate; n=112). Questions were related to experience in treatment and management of cases, training, and desired PNES-related resources. Quantitative results were summarized descriptively, while qualitative responses were summarized as major themes or pertinent quotes.

Results. Of those who responded, 32% had not treated pediatric PNES. Among those who had managed cases (n=76), 54% indicated that they received direct referral and 62% reported it was helpful to consult with the referring provider. However, time constraints, charting gaps, and inability to contact referring providers hampered this process. Only 17% of respondents indicated high level of comfort in treating pediatric PNES. Lack of previous training and availability of education opportunities were cited as reasons for such perceived low confidence in providing effective care. Respondents listed peer consultation/supervision (64%), provision of education materials (59%), and interactive workshop (57%) as the top preferred training platforms.

Conclusions. Results suggest that patient care could be optimized through improving the communication between referring and accepting providers. Provision of educational opportunities to providers and trainees should also be made available.

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Introduction

Psychogenic non-epileptic seizures (PNES) are characterized by physical movements that resemble seizures but are not consistent with electrophysiologic findings on electroencephalogram (EEG). These paroxysmal events are frequently found to be functional in nature (ie, inconsistent with an organic etiology) and comorbid with other mental health conditions (eg, anxiety, depression, posttraumatic stress).[1] This condition can occur in children, adolescents, and adults, although most of the literature on PNES has focused on adult population. Studies have determined that approximately 20% to 30% of adults and 10% to 20% of children that had been evaluated at epilepsy clinic met the criteria for PNES. [2] However, it can be challenging to estimate the prevalence of PNES given limited epidemiologic studies in this field. [3]

Results from a recent randomized controlled trial indicated that adult PNES study participants who received cognitive behavioral therapy (CBT), whether performed alone (manual-based) or combined

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with an anti-depressant (sertraline in this case), had significantly decreased seizures and improved psychosocial functioning as compared to those who were administered treatment-as-usual or sertraline alone.[4] In this case, treatment-as-usual consisted of a neurologist sharing the diagnosis with the patient and their family, conducting follow-up consultation with the patient, tapering dosage of anti-epileptic drug as appropriate, and making a referral to a psychiatrist or psychologist.[4] Similar studies, however, have not been replicated in youth. In addition, national treatment guidelines for PNES for adults (or youth) are not available at this time.[3] In their 2017 report, the PNES workgroup within the International League Against Epilepsy (ILAE) indicated that many psychiatrists and psychologists in the United States do not commonly treat patients with PNES. They surmise that such lack of familiarity with treatment and management of patients with PNES could even be more pronounced within a pediatric setting, particularly given the dearth of clinical practice guidelines for pediatric patients with PNES.

While formal clinical guidelines are lacking, several recommendations for guiding treatment of PNES in youth are suggested in the literature. First, treatment should target the PNES symptoms as well as the underlying psychopathology that contributes to the symptoms, which is often depression and/or anxiety.[5] This is achieved by using a combination of treatment modalities (such as individual therapy, family therapy, parent training) using evidence-based interventions. It may also include pharmacological treatment to address more significant psychiatric concerns, and/or rehabilitative therapies (eg, physical therapy) if physical functioning is impacted.[6] It is recommended that a multidisciplinary treatment approach be used when working with the child and family, which includes a neurologist or other physician as well as a mental health provider. It is imperative for this team to clearly explain the diagnosis of PNES to the child and for the family to be certain that they understand the diagnosis and how PNES symptoms differ from epileptic seizures.[5,6]

While pediatric PNES treatment has been discussed in the literature, little is known about provider attitudes and comfort in diagnosing and treating this condition. In a study of Danish pediatricians (n=61), Nielsen and colleagues (2018) found that the majority of providers (55%) stated that they completely or partly agree that they are concerned about "overlooking organic disease."[7] Similarly, over two-thirds of respondents (69%) partly or completely agreed that pediatric "functional seizures" (the authors use this term rather than PNES, however their definition is the same) are often misdiagnosed. The authors also point out that respondents' overall level of experience did not impact their confidence in diagnosing PNES. Thus, there is a clear need for ongoing education for providers to improve their confidence and experience in diagnosing pediatric PNES. While there are no current studies reflecting the attitude and comfort of mental health providers in treating PNES, a recent survey of psychiatrists attending a child and adolescent psychiatry conference in the United Kingdom (n=61) noted that 51% of respondents had a neutral perception about the effectiveness of local services in treating PNES, but 31% indicated that service efficacy was poor.[8] Thus, within this surveyed group of psychiatrists, there were concerns about the overall level of treatment that could be provided to pediatric patients with PNES. Additional information about the overall attitude and comfort of pediatric mental health clinicians in treating pediatric PNES is needed.

This study was developed to systematically evaluate the levels of mental health providers' and trainees' training, experience, and comfort in treating pediatric patients with PNES and their families. Other goals included identifying barriers for providing optimum patient care, and gathering information about providers' preferences with regards to training and education models related to PNES.

Methods

Members of the Psychiatry Consultation and Liaison (C/L) Team and select outpatient mental health providers practicing at a large, tertiary pediatric hospital developed a 13-question survey about pediatric PNES. This survey consisted of 4 sections: (1) respondents' role, (2) patient referral process and barriers associated with this practice, (3) treatment and management of pediatric patients with PNES including perceived challenges, and (4) PNES-related education including ideas for training and resources that might be needed. Overall, these questions were designed to provide insight into the current environment, which could subsequently inform the development of other

related quality improvement initiatives. This study received the approval of the Organizational Research Risk and Quality Improvement Review Panel (ORRQ-IRP), which provides regulatory oversight for quality improvement projects at the study site. Clinical providers (ie, psychologists, psychiatrists, behavioral health counselors or master's-level providers, mental health counselors, nurses, and therapists), and trainees (ie, psychology interns, psychology externs, and psychiatry fellows) at the study site were eligible to participate in the survey. Survey was administered online using SurveyMonkey™ platform. An electronic link to the survey was distributed by email initially to providers and trainees at the outpatient unit, and then later to the entire institute. These participants were identified via the outpatient and staff distribution list (ie, reaching approximately 350 staff). The survey was made available for approximately 2 weeks for each group.

Results

Demographics

A total of 112 respondents participated in the survey contributing to a response rate of approximately 32%. Demographic information of the respondents is summarized in Table 1, with the top 3 being trainees (20%; including psychology interns, psychology externs, and psychiatry fellows), psychologists (19%), and behavioral health counselors (19%; master's-level providers).

Referral Process and Associated Barriers

Survey results indicated that 32% of respondents (n=36) had not treated pediatric patients with PNES, and thus were unable to provide patient-care related information. Among those with experience (68%; n=76), 54% mentioned that patients were referred directly to them. In particular, 36% received a referral from a medical provider at the study site, 21% from primary care providers, 16% from providers in the community, 14% from mental health providers outside of the study site, and 5% from the Psychiatry C/L Team at the study site. Forty percent identified other referral sources including the inpatient psychiatric unit, emergency department, and other hospital and facilities (eg, schools). Additionally, 60% of respondents mentioned that they spoke directly to the referring providers, and 62% reported that such contact was helpful in developing a treatment plan for their respective patients. One respondent (psychologist) shared that "not having information from the referring MD is a huge impediment to appropriate care. I always try to contact the referring MD, sometimes without a return phone call." Other respondents (psychologists, psychology interns, psychiatry fellows, nurses, and therapists) mentioned time constraint at the clinic, and not having the contact information of referring MD listed in patient's chart as main barriers that impede formulation of the treatment plan.

Treatment and Management of Cases and Perceived Challenges

Among respondents who had experience in managing PNES patients (n=76), less than one-fifth (17%) noted that they were "very" comfortable in treating pediatric patients with PNES. A majority of respondents noted that they were "somewhat comfortable" or "somewhat uncomfortable" (37% and 38%, respectively). In addition, 8% of respondents reported that they were "very uncomfortable" treating PNES. These results may indicate that the majority of providers have a low confidence level in treating and managing these patients. While 10% of survey respondents were mental health counselors (MHC; n=11) who typically are not in charge of creating the treatment plan, their sentiments mirror the responses of those in other roles. The main challenges associated with providing PNES-related treatment were identified as a lack of referral information (39%), conflict related to families having difficulty in accepting medical diagnosis (36%), and having to practice outside of their comfort zone (28%). The top 3 treatment choices indicated by respondents across the various roles were psychoeducation (71%), indirectly treating PNES by addressing other comorbid psychological symptoms (eg, anxiety, depression; 66%), and providing supportive therapy (61%), among other approaches. These choices are consistent with recommendations suggested for treating pediatric PNES, which include providing clear information and education about PNES, treating underlying psychopathology using evidenced-based interventions, and other supportive approaches.[5,6] These treatment approaches are further stratified by roles in Figure 1.

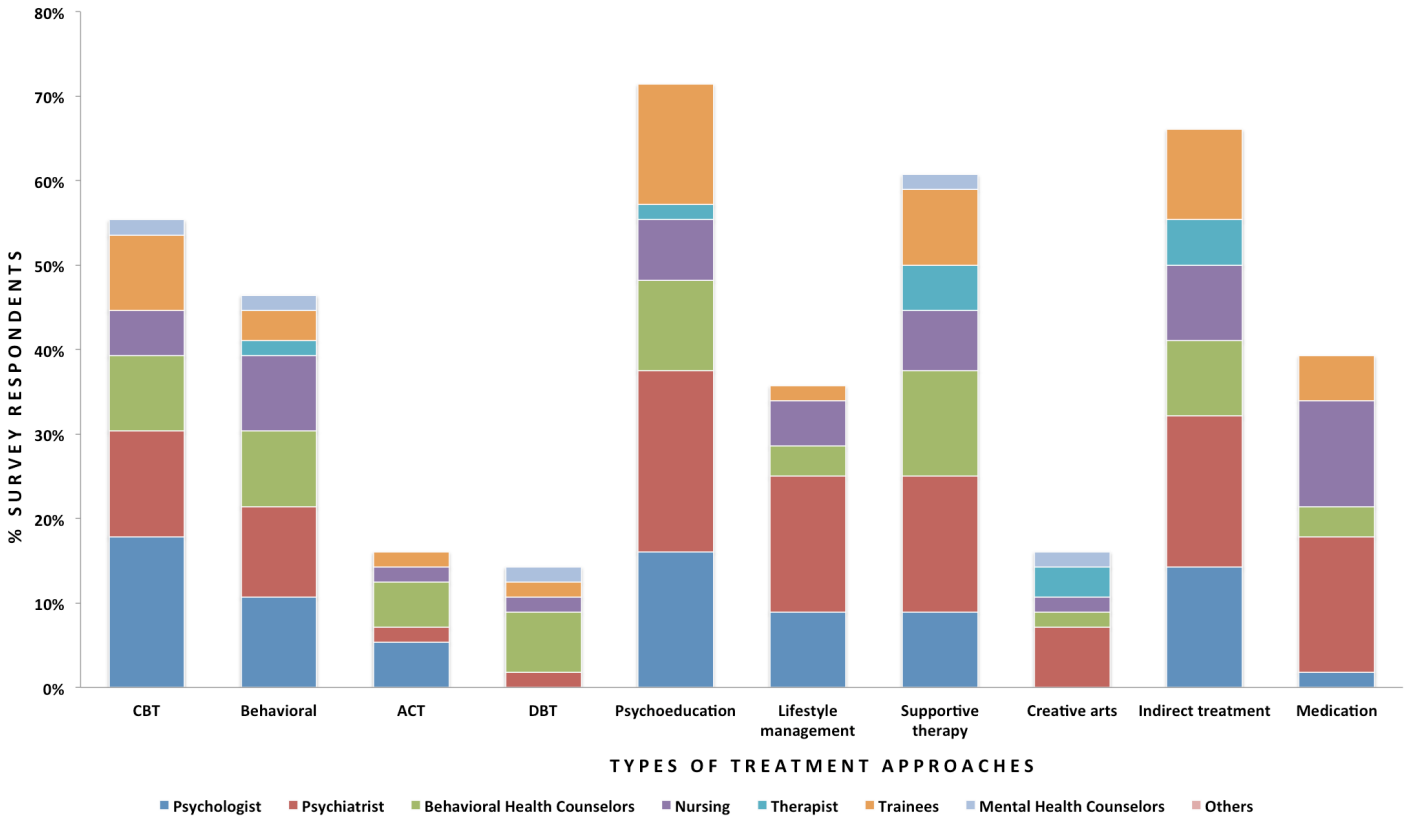

Figure 1. Preference for treatment interventions for pediatric patients with PNES as stratified by roles of survey respondents who had the experience in managing these cases (n=75; 67% of total survey respondents).

*DBT: Dialectical Behavioral Therapy; ACT: Acceptance and Commitment Therapy; CBT: Cognitive-Behavioral Therapy; Indirect treatment: treatment of comorbid symptoms (eg, anxiety, depression).

Education and Training

Respondents (n=112) identified several types of training that they had previously received pertaining to the care and management of pediatric patients with PNES (Figure 2), with the majority identifying independent studying (42%) and direct consultation (39%). Approximately 10% of respondents did not receive any education or training. Most respondents agreed that making the following resources available would enable them to treat pediatric patients with PNES more effectively: peer consultation or supervision (64%), educational materials given out as handouts or books (specific versions for providers, patients, and patients' families; 59%), interactive workshop (57%), didactics (45%), and medication consultation (23%).

Figure 2. PNES-related training modalities that respondents had received during their career as a mental health provider or trainee (n=84).

Discussion

Previous discussions among members of the Psychiatric C/L Team at the study site highlighted a concern regarding the knowledge and comfort of providers and trainees in treating pediatric patients with PNES. Preliminary feedback suggested that providers and trainees were not confident in managing their PNES patients because they felt they had inadequate train-

ing in this area, and that there were gaps in communication between referring and accepting providers. Given that previous feedback was anecdotal in nature, results from this study provided the first systematic examination of mental health providers' and trainees' training and comfort in treating PNES.

Overall, survey results confirmed that providers and trainees across levels of practice at the study site had varying levels of confidence in treating and managing patients with PNES. The majority of respondents rated themselves between "somewhat uncomfortable" to "somewhat comfortable," with few actually rating themselves as "very comfortable." Survey results implied that such perceived low level of self-confidence was attributed to 3 main reasons: (1) ineffective relay of information (either as verbal communication or through medical charts), (2) inconsistent management plan (or the lack thereof), and (3) inconsistent level and quality of training on PNES (again, if any).

The opportunity to directly discuss cases with referring providers was found to be valuable and helpful for the accepting providers in developing a specific treatment plan for the patient. However, this occurred in approximately only half of the cases. Failure to maintain communication between accepting and referring providers was attributed to not having time to connect, not knowing whom to contact (frequently because information about referring provider was not included in patient's chart), and scheduling conflicts resulting in referring providers not returning the call of accepting providers. Respondents also mentioned that accepting providers mostly relied on information in the patients' electronic medical record (eg, crisis statement) to formulate treatment plans. However, the level of details included in a patient's chart varied depending on how much the referring providers incorporated. Such lack of standardization in the type of information that is included in the charts of pediatric patients with PNES may have hampered the process for formulating the treatment plan. In general, respondents observed high variability in treatment plans of PNES patients with similar diagnoses, which may have been attributed to these challenges in communication and timely relay of information. Consequently, since providers and trainees did not necessarily know how best to manage their PNES patients, they developed a perceived sense of practicing outside their scope.

Issues related to previous training and levels of knowledge on PNES were also identified as another barrier in providing optimum patient care. The majority of respondents relied on independent studying (42%), consultation (39%), and supervised guidance during clinical training (38%) as the main platforms for learning (Figure 2). Only 18% of respondents mentioned that PNES was part of their graduate coursework. Since most of these options are self-selected modules, the extent of knowledge accumulation is largely dependent on personal interest of the learners. Quality of information and depth of learning of these self-directed modules can lead to providers and trainees having inconsistent levels of knowledge, which can be concerning. Further, reliance on learning through consultation and supervision is not ideal to achieve a high level of competency. This mode of learning is limited on the interest of the mentors, their capacity to educate on the subject matter, and availability of time for mentorship. Collectively, a combination of these factors contributed to perceived low level of confidence and competency among providers and trainees at the study site in treating and managing pediatric patients with PNES.

Several strategies can be implemented to address the deficiencies outlined above. First and foremost is to increase the depth of knowledge of providers and trainees by providing a comprehensive educational option that delivers uniform, high-quality, and evidence-based modules related to treatment and management of pediatric patients with PNES. Interactive workshops and didactics were identified in the survey as the preferred educational format. Concurrently, care must be taken to avoid using training that relies on a self-select module and/or relaying information through individual supervision as the primary mode of training. These means can be applied as complementary exercises for knowledge and skill building but are not sufficiently effective if used as the only way to learn the materials because such an individualized training approach may create inconsistency in quality and amount of information being disseminated. Consultation and supervision can be added on to reinforce knowledge and skills once foundational competency has been established among the providers and trainees. Regularly scheduled, interactive educational sessions that incorporate discussions on pertinent clinical cases can also be used to deliver new information from the field and refresh knowledge. Addition-

ally, several respondents mentioned that informative booklets that incorporate visual aids could be developed and then disseminated to patients and their caregivers. These materials may facilitate discussion between patients (and their caregivers) and providers about a patient's conditions and treatment plans. Regardless, a training platform and educational materials should be specifically tailored according to the audience (ie, for dissemination to providers vs those for patients and caregivers). One main challenge with developing these training platforms is identifying an expert in the field who has the bandwidth to create relevant modules and teach these training sessions. This is a daunting task given most providers in any institution, including the study site, have limited bandwidth beyond the time for providing clinical care.

Ideally, once providers and trainees have been given adequate knowledge related to the treatment and management of pediatric patients with PNES, efforts should then be made to translate this knowledge to clinical encounters. Strategies that facilitate better communication across providers and trainees need to be developed. Respondents mentioned that revamping the electronic medical record to include specific fields about presence (or absence) of PNES diagnosis and adding detailed contact information of relevant personnel (eg, the referring provider) would be sufficient to remedy the situation. Knowing in advance that the patient has been diagnosed with PNES and whom to call to discuss the case could significantly improve coordination of care, as well as to expedite the formulation of an effective treatment plan. Subsequently, this could translate to an improvement in timeliness of patient care and their overall health outcomes.

In summary, survey results indicated that there are 3 areas that should be improved by mental health providers who are treating pediatric patients with PNES at the study site in order to elevate quality of care for this patient population. Relevant and up to date PNES-related information (eg, diagnosis, treatment plan) should be delivered consistently across all levels of providers and trainees in various units. Such information can also be tailored for dissemination to patients and their caregivers. Further, this information should be incorporated into an overall management plan (eg, dropdown option in EPIC, standard procedural flowcharts when consulting about PNES patients, command fields in charts) to facilitate optimum coordination of care between providers. It is also crucial that providers and trainees strive to maintain a clearer line of communication, specifically with regards to charting, sharing contact information, and returning colleagues' calls soliciting advice about a particular patient. The outpatient clinic and Psychiatry C/L Team value this feedback and are planning other relevant quality improvement initiatives in the near future.

Limitations

The main limitation with any online survey that did not provide reimbursement to participants is low response rate. Additionally, approximately 32% of our survey respondents (36 out of 112 respondents) had not treated PNES patients in their clinical career. Consequently, they could not provide comment on their patient care experience. While the survey drew responses from respondents of a variety of backgrounds (Table 1), some roles were better represented than others due to sample size. Additionally, some respondents also opted not to provide answers to several questions throughout the survey. Collectively, this further limits both our interpretation of survey results, and ability to generalize the data to the entire clinic at the study site. Further, an in-depth exploration of pertinent issues that were identified in the survey were not possible since focus groups were not conducted post-survey. Despite these limitations, results gathered in this survey served to generate further discussions on this issue, and to formulate future quality improvement initiatives.

Conclusions

This effort highlights the need for improving the process of communication and collection of medical information, as well as providing education and training opportunities to mental health providers and trainees related to the treatment and management of pediatric patients with PNES.

Table

Table 1. Role of survey respondents at the study site (n=112).

Role	Number of respondents (%, n)
*Trainees	20 (22)
Psychologists	19 (21)
Behavioral Health Counselors	19 (20)
Nursing	15 (17)
Psychiatrists	13 (14)
Mental Health Counselors	10 (11)
*Others	4 (4)
*Therapists	3 (3)

**Trainees* category includes psychology interns, psychology externs, and psychiatry fellows; *Others* category includes manager, MD in Adolescent Medicine, Professional Research Assistant, and Education Programs Specialist; *Therapists* category includes creative art therapists and an occupational therapist.

Appendix: Non-epileptic Seizures Provider Survey

1. What is your current role within PMHI?
    a. Psychologist
    b. Psychiatrist
    c. Behavioral Health Counselor/Master's Level Provider
    d. Nurse Practitioner
    e. Nurse
    f. Creative Arts Therapist
    g. Psychology Intern
    h. Psychology Extern
    i. Psychiatry Fellow
    j. SUPPORT Trainee
    k. Other (please specify)
2. Have you treated a patient with non-epileptic seizures (NES)?
    a. Yes
    b. No
3. If so, did you receive the referral from a provider at CHCO?
    a. Yes
    b. No

4. From whom did you receive the referral (select all that apply)?
    a. CHCO medical provider
    b. CHCO Psychiatry Consult/Liaison (C/L) team
    c. Other CHCO mental health provider
    d. PCP/Pediatrician
    e. Community provider
    f. Other (please specify)
5. Did you speak to the referring provider?
    a. Yes
    b. No
6. If so, was it helpful in developing a treatment plan for the patient?
    a. Yes
    b. No
    c. Not applicable
7. If not, what were the barriers (eg, limited time, unclear of who to contact)?
8. How would you rate your comfort in treating a patient with NES?
    a. Very comfortable
    b. Somewhat comfortable
    c. Somewhat uncomfortable
    d. Very uncomfortable
9. What kind of training have you received on NES (select all that apply)?
    a. Professional workshop/presentations
    b. Graduate coursework
    c. Other didactics
    d. Independent studying
    e. Supervised or other clinical training
    f. Consultation
    g. Other (please specify)
10. What kind of interventions have you implemented in treating a patient with NES (select all that apply)?
    a. Cognitive-behavioral therapy (CBT)
    b. Behavioral approaches
    c. Acceptance and commitment therapy (ACT)
    d. Dialectical behavioral therapy (DBT)
    e. Psychoeducation
    f. Lifestyle management
    g. Supportive therapy
    h. Creative arts

i. Indirect treatment by treating comorbid psychological symptoms (eg, anxiety, depression)
j. Medication management
k. Not applicable—have not treated NES
l. Other (please specify)

11. What challenges have you found in treating patients with NES (select all that apply)?
    a. Managing episodes in session
    b. Families accepting medical diagnosis
    c. Practicing outside of comfort zone
    d. Inconsistency in management across providers
    e. Not applicable—have not treated NES
    f. Other (please specify)
12. What resources would be helpful to you ineffectively treating patients with NES (select all that apply)?
    a. Interactive workshop
    b. Didactics
    c. Educational materials (eg, handouts, or books)
    d. Peer consultation or supervision
    e. Medication consultation
    f. Other (please specify)
13. Please include other comments below.

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Coffin-Siris Syndrome and Comorbid Psychiatric Illness: A Case Report

Elise M. Sannar, MD; Julia Barnes, PhD; Lauren Mowrey, LCSW;

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Abstract

Coffin-Siris syndrome (CSS) is a rare genetic syndrome associated with developmental delay, coarse facial features, and abnormalities of the distal phalanges. The main gene implicated in CSS (ARID1B) is one of the most frequently mutated genes associated with intellectual disability. Little is published about the syndrome, particularly its neuropsychiatric manifestations. We describe the case of a 15-year-old female with significant psychiatric and behavioral challenges in the context of CSS. Treatment interventions included psychotropic medication, individual psychotherapy, and caregiver training.

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Introduction

Coffin-Siris syndrome (CSS) was first described in 3 unrelated female patients by Grange Coffin, MD, and Evelyn Siris, MD, in 1970.[1] All 3 individuals had coarse facial features (eg, wide nose, wide mouth, and thick eyebrows and lashes). They also had sparse scalp hair, but hypertrichosis on other parts of the body, hypotonia, microcephaly, and hypoplasia of the fifth digit phalanges/nails. Because of the fingernail abnormalities, CSS is sometimes referred to as the "fifth digit syndrome." Other clinical features include failure to thrive, growth retardation, and malformations of the cardiac, gastrointestinal, genitourinary, and/or central nervous systems.[2,3] Initially, CSS was thought to be very rare, with less than 200 cases reported in the world. However, as more is understood about its genetic basis, this syndrome, and the similar Nicolaides-Baraitser syndrome, are thought to represent about 1% of all cases of intellectual disability.[4]

Since 2012, most cases of CSS have been shown to be associated with germ line abnormalities in 5 genes: *ARID1B*, *ARID1A, SMARCA4, SMARCB1,* and *SMARCE1.* Heterozygous mutations of these genes are present in at least 50% of patients with CSS and are inherited in an autosomal dominant pattern.[5] These genes encode subunits of the switch/sucrose non-fermenting (SWI/SNF) ATP-dependent chromatin-remodeling complex and play a crucial role in brain development via modulation of cell differentiation, DNA repair, and tumor suppression.[5-7]

The majority of articles published about CSS describe the physical features of the syndrome.[3,8,9] There is little said about neurodevelopmental manifestations, other than to describe individuals with the syndrome as having delay. There are a few case reports that mention symptoms of autism spectrum disorder, including an insistence on sameness, rigid thought patterns, and social impairments.[10-12] However, there are no specific case reports describing associations with psychiatric illness or recommendations for the management of behavioral challenges.

Case Presentation

The patient was a 15-year-old female who presented for intensive neuropsychiatric treatment when her functioning in home, school, and community environments became significantly impaired, leading to safety concerns. Her symptoms included mood lability (anxiety, anger, and sadness), high levels of rigid-

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ity and anxious preoccupation (excessive application of idiosyncratic "rules"), and disruptive externalizing problem behavior (aggression and other intrusive physical contact). She had a difficult time managing her emotions and impulses throughout the day. Her mood rapidly shifted from being happy or excited to tearfully anxious over a matter of minutes. Her symptoms presented significant limitations not only to her daily functioning, but also to her family's daily activities. Her parents often restricted her involvement in community activities due to her compulsive and problematic behaviors. The patient's school had implemented a "no touch policy" because of her physically intrusive behavior. The patient was also assigned a one-on-one paraprofessional to support her in safely managing her emotional and behavioral responses to a variety of unpredictable triggers throughout the school day.

The patient suffered from high levels of anxiety that primarily manifested as obsessive thought patterns and compulsive behavior. Obsessions typically related to situations that did not align with her rigid expectations for how others should behave or appear. Examples included hair not being styled "a certain way" or clothes not being worn the "correct way." Additionally, the patient was bothered if others did not follow-through as expected with desired plans, like allowing her a privilege or giving her something she perceived to have been promised. Other obsessional thought patterns included vivid and engrossing fantasies about roles or personas that she attempted to adopt, such as being a professional photographer or fitness coach.

In an attempt to manage distress related to situations that were "not quite right," the patient engaged in a variety of excessive and problematic behaviors to neutralize or fix the perceived concern. Examples ranged from physically touching others to change their appearance and/or demanding they change their appearance, to making perseverative requests to access restricted materials or activities. When her compulsive attempts to change her situation were blocked or interrupted in some way, the patient displayed signs of acute distress including crying, shaking, rapid breathing, difficulty transitioning, and perseverative statements. When she was calm, the patient could identify some of her triggers and signs of anxiety. However, she struggled to access her coping skills in novel uncomfortable situations.

Past History

The patient was the product of a full term, uncomplicated birth. She was hypotonic at birth and major motor milestones were delayed. Initial genetic screening was within normal limits. She was diagnosed with autism spectrum disorder (ASD) as a toddler and participated in speech and occupational therapies. Work-up for her delay included an MRI scan, which revealed partial agenesis of the corpus callosum. Abnormalities in the corpus callosum are often associated with developmental delay and social and behavioral problems.[13] The patient had a prominent mouth, excessive arm hair, and clinodactyly of the fifth fingers. By age 6-years-old, her behaviors were increasingly problematic. She was impulsive, rigid, and had inappropriate social boundaries with strangers. The patient had a very good vocabulary, but poor abstraction. Neurologic symptoms included challenges with motor planning and coordination. The patient was evaluated by a neuropsychologist when she was 9-years-old to help with educational planning. Her intelligence quotient on the Weschler Intelligence Scale for Children, 4th edition fell in borderline low range (Standard Score SS=76) with noted deficits in processing speed (SS=68) and perceptual reasoning (SS=71), compared to verbal comprehension (SS=100) and her adaptive skills were rated as very low (Vineland Adaptive Behavior Scale, 2nd edition, SS=62). A chromosomal microarray showed no abnormalities. The patient was diagnosed with obsessive-compulsive disorder (OCD), attention-deficit/hyperactivity disorder (ADHD), and pervasive developmental disorder (PDD) and mental health treatment was recommended.

The patient started psychiatric treatment at age 9, shortly after her neuropsychological evaluation. She was treated with fluvoxamine targeting symptoms of OCD and risperidone targeting symptoms of aggression and irritability. The AIMS assessment and laboratory monitoring were part of her routine psychiatric medication management appointments. She tolerated her medications well. Over the years, the patient's symptoms continued to be difficult to control. Despite adjustments in her medications, she continued to display intrusive and inappropriate behaviors. The patient participated in supportive therapies (speech-language therapy to address pragmatic speech; physical therapy to increase strength, posture, and coordination; and occupational therapy to address feeding,

and sensory processing and regulation). Other than care with a psychiatrist who specialized in working with patients with developmental disabilities, she did not receive mental health-specific interventions until her intensive treatment at age 15. Based on the family's location, they did not have immediate access to therapy providers with the level of expertise needed to manage her care. They also believed that they were "getting by" and did not need additional services.

From a medical perspective, the patient was generally healthy, although she required frequent courses of antibiotics for treatment of chronic sinusitis. She was tall and thin and her BMI averaged between 16 and 17 through the first half of her adolescence.

At age 13-years-old, the patient was seen by a new neurologist with complaints of worsening headaches and a single seizure. Her seizure was a one-time occurrence and did not require intervention. The neurologist suggested that she be re-evaluated by genetics. Testing included a 62-gene panel to look for causes of syndromic autism. She was found to have an *ARID1B* pathogenic alteration. Specifically, the heterozygous C>T change of nucleotide 2692 of the *ARID1B* gene (c.2692C.T) resulted in the substitution of an arginine by a stop codon at amino acid position 898 (p.R898X). Based on her gene mutation, she was given a diagnosis of CSS. While the diagnosis did not change management of her symptoms, she was referred to nephrology and cardiology clinics for routine screening, but no abnormalities were found.

Treatment Course

Psychosocial Interventions

At age 15, the patient participated in an intensive partial-hospitalization program for 3 weeks to address her OCD and related behavioral challenges. Although the patient's symptoms had been present and problematic for many years, as she got older, her parents felt an increased sense of urgency that something needed to change. They worried that if she did not get more intensive help, she would never live up to her cognitive potential.

Treatment interventions were multi-modal. During individual sessions, the patient participated in graduated exposures to anxiety-provoking situations, using both imaginal and in vivo scenarios, while also learning about the cognitive behavioral therapy (CBT) model of anxiety. Traditional CBT interventions for OCD, including exposure and response prevention, were augmented with supports to accommodate for the patient's learning, self-awareness, and self-regulation delays.[14,15] Augmentations included enhanced use of visual supports, reduced emphasis on cognitive therapy components, and focus on repetition of consistent verbal rules (including rules about not being in control of others' bodies, as well as coping statements to support her appraisal of the situation). She worked with an occupational therapist to develop a list of coping strategies, which she later made into a small book of "cope cakes" that served as a portable visual cuing system.[16] Additionally, prescriptive scripts for prosocial management of her anxiety symptoms were presented to her via an individualized visual story. The story reviewed her goals for treatment, ideas about how her brain worked, and rules she could follow to stay safe.

The patient's cognitive deficits, including increased distractibility and her concrete, perseverative thought processes, presented barriers to her maintenance and generalization of learning between treatment sessions. Her difficulty accurately assessing and rating her levels of distress also impeded her understanding of the rationale for repeated exposure therapy. Applied behavior analytic (ABA) interventions were incorporated to address concerns about the role of environmental contingencies, such as contingent attention, in maintaining repetitive problem behaviors.[17] This involved training her caregivers (parent and teachers) to state clear verbal rules, and to ignore or neutrally re-direct problem behavior and to deliver differential attention when the patient utilized self-regulation strategies to maintain safe/prosocial interactions with others. The patient's mother participated in several sessions during patient's treatment to observe and facilitate exposure therapy.

Prior to the patient's discharge from the intensive neuropsychiatric program, treatment team members worked closely with the patient's school team (teacher and paraprofessional) to offer additional recommendations. These included: visual stories to describe appropriate versus inappropriate behaviors, common language to acknowledge the patient's distress when she could not engage in neutralizing or controlling another one's body or actions, visual tools such as a "thermometer" to help the patient identify her level

of distress in a particular situation, and visual tools of coping skill techniques to practice after identifying her level of distress.[18]

Medical Interventions

Despite medication adjustments in the outpatient clinic, the patient continued to struggle with significant symptoms of OCD, irritability, and behavioral dysregulation. Psychiatric medication changes included a change in selective serotonin reuptake inhibitor (SSRI) from fluvoxamine to escitalopram targeting anxiety and OCD, and starting a cross taper from risperidone to aripiprazole targeting mood lability. Given the lack of apparent benefit with fluvoxamine, and in an effort to minimize the risk for drug interactions (eg, the patient was frequently prescribed antibiotics for upper respiratory infections/pharyngitis), she was transitioned to escitalopram with modest improvement. The subsequent transition from risperidone to aripiprazole provided an alternative support for ongoing mood reactivity and a more metabolically-friendly alternative. Cardiac and metabolic parameters continued to be closely monitored. There is limited evidence in the literature regarding the effective use of psychiatric medication in patients with both OCD and ASD.[19] The patient's case was further complicated by her genetic syndrome and partial agenesis of the corpus callosum. Medication decisions were informed by treatment recommendations for patients with ASD.[20,21]

Ongoing Interventions and Outcomes

The patient was referred for outpatient CBT and in-home ABA therapy to address her on-going needs of promoting appropriate boundaries with family members and appropriate social media use. She started individual weekly outpatient therapy and continues to receive special education supports at school. These supports have been effective in maintaining this patient's level of functioning in an outpatient setting. A readmission to the neuropsychiatric program has not been needed.

March & Mulle's CBT manual[14] was utilized to introduce the patient to externalizing her OCD skills, to change cognitions, and to provide caregivers with information on course of treatment and ways to support the patient. The patient responded well to externalizing her OCD by calling it a name and identifying that she wanted to be stronger than OCD. When asked to recall strategies to change cognitions, the patient independently recited all of the skills learned. Her mother reported that the patient responded to prompting from adults to acknowledge when her OCD was stronger and would change her behavior most of the time. The patient willingly participated in in-session exposures. Continued difficulties in outpatient CBT included the patient's limited insight into obsessive thoughts, transferring exposures from session to home, persistence of caregivers in providing supportive prompting, and impulsivity. The patient's response to CBT as outlined by March & Mulle[14] was not as expected due to continued difficulties in inhibiting compulsions. This required numerous modifications as described in Kose, Fox, & Storch.[15] In-home ABA was continually recommended to address behavioral concerns; however, the family had not pursued this service.

Medication changes made during her intensive treatment were also of limited benefit. Her mother said that the patient continued to be "consistently inconsistent." When the remainder of her risperidone was tapered, her mood lability and externalizing behaviors increased, necessitating consideration of alternative options.

Discussion

Supportive therapies (eg, occupational, physical, nutritional, and speech and language) are typically recommended in the management of CSS, but there is little information about the role of psychiatric and psychological interventions.[3,22] To date, no controlled trials exist to guide prescribing psychiatric medications. The prescriber must consider the neurologic, cardiac, and metabolic risks of psychotropic medications as they relate to the underlying sequelae of CSS. In addition to previously described clinical features associated with *ARID1B* mutations (eg, cardiac, gastrointestinal, genitourinary, CNS malformations, and hypotonia), case reports have described obesity, macrocephaly, hepatomegaly and/or polycystic ovarian syndrome (PCOS) as features to consider.[23,24] This further highlights the importance of careful consideration with the use of psychotropic medications.

The neurocognitive and behavioral phenotype of CSS most often mentioned in the literature is similar to ASD. Our patient was diagnosed with ASD as a young child and her early intervention services paralleled

those for a child with non-syndromic autism. However, her behavioral challenges became more pronounced as she got older which necessitated treatment (both psychological and psychiatric) for OCD, in addition to ASD. Despite adherence to a manualized CBT treatment for OCD[14] and modifications made to this treatment,[15] she continued to display difficulties with inhibiting compulsions and awareness and expression of possible obsessions. Persistent concerns remain about the patient's capacity for learning self-regulation and self-monitoring skills that are important to anticipating and avoiding major behavioral escalations, particularly when her mood and anxiety are less-than optimally stabilized using psychotropic interventions. Although the patient's generalization and maintenance of treatment gains continues to vary over time, the training provided to her parents and teachers appears to be a critical component to her being maintained within an outpatient level of care.

Because of the rarity of CSS, most practitioners will not encounter such an individual. However, any patient with developmental delay and dysmorphic features should be referred to genetics if they have never been evaluated or seen within the past 5 years.

Conclusion

We describe a patient with CSS and comorbid psychiatric illness. Management of her case was multi-modal and incorporated an understanding of her genetic illness and cognitive differences. Despite intensive treatment, her behavioral symptoms continue to be problematic, exemplifying the challenges of managing patients with genetic, developmental, and psychiatric comorbidities.

Informed Consent

The patient and her mother provided informed consent to have de-identified medical information shared in a case report format.

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Tiffany Banks received her bachelor's degree in social work from Niagara University and a master's degree in social work with a specialization in maternal and child health from The University of Maryland at Baltimore. She completed her Leadership Education in Neurodevelopment (LEND) fellowship at the Kennedy Krieger Institute in Baltimore, MD.

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Dr Barnes received her bachelor's degree in psychology from the University of Rochester and her doctoral degree in clinical psychology from Binghamton University (SUNY Binghamton). She completed a predoctoral internship in intellectual and developmental disabilities at Nationwide Children's Hospital and a postdoctoral fellowship on the Neuropsychiatric Special Care Unit at Children's Hospital Colorado.

Austin Butterfield, MD; Peer Reviewer

Austin Butterfield, MD is an assistant professor of psychiatry at the University of Colorado School of Medicine. Dr Butterfield serves as a child and adolescent psychiatrist for the Psychiatric Emergency Service for the Pediatric Mental Health Institute at Children's Hospital Colorado. Dr Butterfield has many educational roles including serving as the Associate Director of Medical Student Education for the Department of Psychiatry at the University of Colorado School of Medicine. He designed and implemented the Essentials of Psychiatry Curriculum for the University of Colorado third year psychiatry clerkship. Dr Butterfield also designed and leads the Psychiatric Resident as Educator longitudinal curriculum, Child & Adolescent Fellow as Educator longitudinal curriculum and the Psychiatric Resident as Educator intensive elective for senior residents. His academic activities focus on curriculum design, medical education reform, suicide prevention, and telepsychiatric care in emergency settings.

Dr Butterfield received his bachelor's degrees in molecular biology and Spanish literature from the University of Colorado Boulder, and his medical degree at the University of Colorado School of Medicine. He completed both his general residency in psychiatry and his fellowship in child and adolescent psychiatry at the University of Colorado School of Medicine.

Beau Carubia, MD; Author

Beau Carubia, MD is an assistant professor of psychiatry at the University of Colorado School of Medicine and serves as a child and adolescent psychiatrist and the Medical Director for the Consultation Division within the Pediatric Mental Health Institute at Children's Hospital Colorado. Dr Carubia is responsible for psychiatric consultations occurring within the emergency room as well as on all inpatient medical, surgical, and subspecialty team services at Children's Hospital Colorado. Dr Carubia leads classes on child mental health law; suicide risk and prevention; management of psychiatric emergencies; and management of delirium, depression, and anxiety within the medical setting for a variety of learners including child and adolescent psychiatry and pediatric neurology fellows, pediatric residents, psychology and social work interns, and medical students. Dr Carubia also provides lectures to hospitalists within Children's Hospital Colorado and primary care providers across the state of Colorado covering the same topics. Dr Carubia's research focuses on numerous quality improvement projects and on the management of psychiatric emergencies.

Dr Carubia received his bachelor's degree from the University of Iowa and his medical degree from the University of Colorado School of Medicine. He completed both his General Psychiatry Residency and Child and Adolescent Psychiatry Fellowship at the University of Colorado School of Medicine.

Tony Edelblute, LPC; Author

Tony Edelblute, LPC has worked as a music therapist at Children's Hospital Colorado (CHCO) since 2003. As a member of the Ponzio Creative Arts Therapies Program, he has worked with children with psychiatric and medical diagnoses in units throughout the hospital. From 2013-2019, he also co-led the CHCO Mental Health Youth Action Board, guiding Denver-area teens through the creation of advocacy projects related to de-stigmatizing mental health issues. He was the lead author of CHCO's Expressive Approaches to Social-Emotional Wellness: A Toolkit for Youth-Serving Professionals.

Robert Evans; Author

Robert Evans, BS was previously a professional research assistant in the Department of Psychiatry Child and Adolescent Division. He worked in both the department's Innovations Center and Dr Joel Stoddard's Emotion and Development Lab. Mr Evans provided assistance to department faculty by configuring a state-of-the-art eye-tracking device, offering technical support, developing stimuli, and running experiments with pediatric participants and their families. He was a member of the Developmental Psychobiology Research Group and a supporting member of the Innovation Center's undergraduate training program, Pediatric Psychiatry Undergraduate Research Program and Learning Experience (PURPLE). He left the department in late 2018 to pursue opportunities in his home state of Alabama. Mr Evans is passionate about early intervention techniques for children with neurodevelopmental disorders, especially those on the autism spectrum entering the school system.

Mr Evans received his bachelor's degree in psychology from Birmingham-Southern College in 2014.

Guido K. W. Frank, MD; Author

Guido K. W. Frank, MD is a professor in psychiatry at the University of California San Diego. He is a clinician-researcher who uses functional and structural brain imaging to better integrate research and clinical work. His goal is to develop better treatments for eating disorders. Dr Frank is also a psychiatry consultant at the Rady Children's Hospital San Diego Medical Behavioral Unit and conducts research studies at the UCSD Eating Disorders Program for Treatment and Research in San Diego, CA.

Dr Frank presents regularly at national and international conferences and has written over 100 peer-reviewed articles in scientific journals. His combination of clinical and research training gives him a unique perspective on psychiatric disorders and treatment, fostering a neuroscience-based approach to care.

Dr Frank received his medical degree from the Ludwig-Maximilians-University Munich, Germany. He trained in psychosomatics at the Roseneck Hospital for Behavioral Medicine and completed adult and child psychiatry training and the University of Pittsburgh and University of California San Diego. Dr Frank is board certified in both adult and child and adolescent psychiatry. In addition, he received extensive formal training in psychotherapy and training in biological brain research. He has been National Institute of Mental Health funded since 2008.

Michelle Fury, LPC, C-IAYT; Author

Michelle Fury, LPC, C-IAYT, worked at Children's Hospital Colorado for over 13 years as a yoga therapist and more recently as faculty through the University of Colorado School of Medicine. She currently provides therapy in the group private practice setting for children, teens, and adults. Michelle specializes in yoga therapy for mental health, trauma therapy, and CBT. She is the author of Using Yoga Therapy to Promote Mental Health in Children and Adolescents (Handspring, 2015) and co-authored a chapter in Yoga Therapy for Mental Health (Handspring, 2018). Michelle regularly speaks at professional conferences. Her work with children, teens, and families in the field of yoga therapy for mental health has been featured in publications such as U.S. News & World Report, the Wall Street Journal, Yoga Journal, and Yoga Therapy Today.

Ms Fury received her master's degree in contemplative psychotherapy from Naropa University and is a certified yoga therapist (C-IAYT) through the International Association of Yoga Therapists.

Robin Gabriels, PsyD; Author

Dr Robin Gabriels, PsyD is a licensed clinical psychologist and professor in the Division of Child and Adolescent Psychiatry, Departments of Psychiatry and Pediatrics at the University of Colorado School of Medicine. Dr Gabriels has over 30 years' experience developing intervention programs along with assessing and treating a variety of pediatric and adult populations. Dr Gabriels established the Neuropsychiatric Special Care program at Children's Hospital Colorado, one of the few nationally-recognized specialized psychiatric inpatient and day treatment units for children with Autism Spectrum Disorder (ASD) and/or intellectual disabilities (ages 4-17 years) and she served as the Clinical Program Director for 13 years. Dr Gabriels' research efforts have focused on the ASD population for the past 21 years and for the past 11 years, her research has focused on evaluating the effects of human-animal interactions (HAI) on youth with ASD. Dr Gabriels was the Principal Investigator on a 5-year NIH/NINR-funded randomized controlled trial studying the Effects of Therapeutic Horseback Riding on Children and Adolescents with Autism (Project Number: 1R01NR012736-01). She was also the Colorado site principal investigator for a 5-year multi-site project funded by the Simons Foundation and Lurie Foundation with the aim to phenotype children with ASD admitted to autism specialty psychiatric hospital inpatient units. Dr Gabriels is one of only 100 trainers world-wide for the "gold standard" ASD diagnostic tool, the Autism Diagnostic Observation Schedule trainer (ADOS-2), providing research reliability and clinical training to diagnose individuals with ASD in schools, hospitals, and academic institutions across the United States. She has written articles and book chapters in the fields of autism, asthma, and art therapy, and has lectured and conducted workshops on ASD, both nationally and internationally. She has published 2 edited books, Autism: From Research to Individualized Practice, (2002) Jessica Kingsley Publishers and Growing Up with Autism: Working with School-Age Children and Adolescents (2007) Guilford Press.

Monique Germone, PhD, BCBA; Author

Monique Germone, PhD, BCBA is an assistant professor of psychiatry and pediatrics at the University of Colorado School of Medicine and serves as a clinical psychologist at Children's Hospital Colorado. Her clinical focus entails providing care for children and families living with Autism Spectrum Disorder. She also provides health and behavior interventions to children and families with celiac disease through the Colorado Center for Celiac Disease. She provides direct clinical training in general outpatient psychotherapy and integrated health and behavioral interventions to doctoral candidates in psychology. She is the Course Director of a course for hospital staff and providers to support care for children with Autism Spectrum Disorder, and Co-Director alongside a

psychiatrist of a course for psychology doctoral candidates and psychiatry fellows on pediatric behavioral medicine. Her research focus includes human-animal interaction interventions for individuals with autism, as well as the health-related quality of life in children and adolescents with celiac disease.

Dr Germone received her bachelor's degree in psychology from the University of Hawai'i and her doctoral degree from the California School of Professional Psychology in San Diego, California. She completed her psychology internship training at the Rady Children's Hospital in San Diego.

Jenna Glover, PhD; Author

Jenna Glover, PhD is a licensed psychologist and an assistant professor in the Departments of Psychiatry and Pediatrics at the University of Colorado School of Medicine. Dr Glover serves as the Director of Psychology Training at Children's Hospital Colorado. Dr Glover's clinical work focuses on utilizing motivational interviewing, and acceptance-based therapies with adolescents across a range of disorders. Dr Glover leads courses on professional development and Dialectic Behavior Therapy for psychology doctoral interns and provides community outreach giving talks and lectures on promoting health and wellness. Dr Glover's research interests include improving patient experiences of psychological evaluation through therapeutic assessment and identity and relationship development in LGBTQ youth. Dr Glover has been honored with awards for teaching excellence, exemplary mentorship, and promotion of professional wellness.

Dr Glover received her doctoral degree in combined clinical, counseling, and school psychology from Utah State University. She completed her doctoral internship at University of Tennessee Counseling Center.

Jennifer Hagman, MD; Author

Jennifer Hagman, MD is a professor of psychiatry with the University of Colorado, School of Medicine. She is board certified in both child and adolescent psychiatry and general psychiatry. Dr Hagman has been the Medical Director of the Eating Disorder Program at Children's Hospital Colorado since 1993. She is a distinguished fellow of the American Academy of Child and Adolescent Psychiatry, the American Psychiatric Association, and the Academy of Eating Disorders.

Dr Hagman is an expert in the treatment of children and adolescents with eating disorders and has published widely in the field. She has received the Dane Prugh award for Distinguished Teaching in Child Psychiatry, the Outstanding Achievement Award from the Colorado Psychiatric Society, the Faculty Award for Mentorship for the Child and Adolescent Psychiatry Residency Class of 2013, and the Distinguished Educator Award in 2019. She accepted the AACAP Catcher in the Rye award on behalf of CCAPS in 2000 for work on recovery efforts after the Columbine tragedy. She was recognized as a "Woman of Distinction" by the Mile High Girl Scouts organization in 2003 and was the Keynote speaker for the 2008 North American Leadership Conference (NALC) of Children's Hospitals.

Dr Hagman received her bachelor's degrees in molecular, cellular and developmental biology and psychology from the University of Colorado Boulder and her medical degree from the University of Kansas. She completed her psychiatry residency training and child and adolescent psychiatry fellowship at the University of California Irvine.

Jessica Hawks, PhD; Author

Jessica Hawks, PhD is an assistant professor of psychiatry and Pediatrics at the University of Colorado School of Medicine and serves as the Clinical Director of Ambulatory Services at the Pediatric Mental Health Institute (PMHI) at Children's Hospital Colorado. She is also a psychologist in the outpatient clinic at PMHI and on the headache team in the Neuroscience Institute. Dr Hawks provides outpatient mental health services to children, adolescents, and families presenting with a wide spectrum of mental health concerns. She has particular clinical expertise in working with children with externalizing disorders, irritability, functional disorders, and chronic pain conditions. Dr Hawks supervises undergraduates, psychology externs, interns, and post-doctoral fellows, and psychiatry fellows in clinical and research activities. She leads clinical services and provides training to psychology interns in transdiagnostic therapeutic assessment and to psychology interns and psychiatry fellows on transdiagnostic group-based interventions for children with irritability. She also regularly guest lecturers in trainee

didactics and in community settings. Dr Hawks' research focuses on innovative program development and dissemination efforts aimed at bringing a transdiagnostic approach to pediatric mental health assessment and treatment services.

Dr Hawks received her bachelor's and master's degrees in psychology, educational specialist degree in school psychology, and doctoral degree in clinical psychology from Utah State University. She completed a predoctoral internship in pediatric health and clinical child psychology at Children's Hospital Colorado and a postdoctoral fellowship in pediatric health and clinical child psychology at Cleveland Clinic Children's.

Chelsea Hilsendager, PhD; Author

Chelsea Hilsendager, PhD is a senior instructor of psychiatry at the University of Colorado School of Medicine and serves as a psychologist in the Eating Disorders Program at Children's Hospital Colorado. Dr Hilsendager provides clinical services in the Eating Disorders Program, including individual, family, and group therapy. Dr Hilsendager also provides clinical supervision and gives didactic lectures for psychology trainees. Dr Hilsendager's research focuses on the identification of novel treatments for eating disorders. She is particularly interested in how mindfulness and self-compassion-related interventions can improve treatment outcomes for this population.

Dr Hilsendager earned her bachelor's degree in psychology from the University of Colorado and her doctoral degree in counseling psychology from the University of Denver. She completed a postdoctoral fellowship in eating disorders treatment at Children's Hospital Colorado.

Laura Judd-Glossy, PhD; Author

Laura Judd-Glossy, PhD is an assistant professor within the departments of Psychiatry and Pediatric Surgery at the University of Colorado School of Medicine. She serves as a pediatric psychologist at Children's Hospital Colorado (CHCO) within the Psychiatry Consultation Liaison Service (C/L service) as well as the International Center for Colorectal and Urogenital Care. Through her role on the C/L service, Dr Judd-Glossy provides psychological assessment and treatment to pediatric patients and their families on the medical, surgical, and intensive care floors at CHCO. In addition, she provides inpatient and outpatient psychological services to patients with colorectal conditions across the lifespan. She is actively involved in the training of psychology interns and externs, child and adolescent psychiatry fellows, medical students, and pediatric residents. Dr Judd-Glossy's research broadly focuses on the well-being of children, adolescents, and their families, including coping with chronic illness.

Dr Judd-Glossy received her bachelor's degree in psychology from the College of William and Mary, her master's degree in school counseling from Boston College, and her doctoral degree in school psychology from the University of Texas at Austin. She completed a predoctoral internship in pediatric psychology at Boston Children's Hospital and a postdoctoral fellowship in pediatric psychosocial oncology at Dana Farber Cancer Institute.

Kimberly Kelsay, MD; Reviewer

Kimberly Kelsay, MD is an associate professor of psychiatry at the University of Colorado School of Medicine. She is the Training Director for Child and Adolescent Psychiatry (CAP) and is dedicated to advancing mental health training for CAP fellows, other trainees in various levels of medical education, and training for those in other disciplines. Dr Kelsay serves as a psychiatrist in the multidisciplinary team embedded within pediatric primary care training clinic at Children's Hospital Colorado. She provides specific training for child psychiatry fellows in this setting, as well as advanced training for pediatricians working with children with ADHD. Dr Kelsay also provides integrated mental health services through telehealth in collaboration with a rural Colorado pediatric practice, helping pediatricians assess and manage youth with complex mental health difficulties while also training CAP fellows in this model. Dr Kelsay gives lectures to primary care providers in the community through their regional organizations and within multiple GME settings both to share knowledge regarding common mental health problems in primary care and to improve models of care. Alongside other faculty, Dr Kelsay is leading a project to improve scholarship opportunities and products for CAP fellows working with faculty. She directs courses in development, psychotherapy, and quality improvement and her current

scholarship is focused on integrated care and advancing education scholarship within the department. She has received teaching awards, is past president of Colorado Child and Adolescent Psychiatric society, and is a distinguished fellow of the American Psychiatric Association.

Dr Kelsay received her medical degree at McGill University and triple board residency though Tufts University and Brown University. She completed a fellowship in infant mental health through Harris Training Program at the University of Colorado.

Heather Kennedy, PhD, MPH; Author

Heather Kennedy, PhD, MPH, is currently the Program Manager of a statewide youth empowerment movement at the Colorado School of Public Health. Heather was previously a senior professional research assistant with the Department of Psychiatry at the School of Medicine and conducted research on the integration of complementary and alternative therapies of art, music, dance/movement, and yoga therapy into the psychiatric care of pediatric patients. Dr Kennedy is interested in interventions that provide young people an opportunity to experience agency.

Dr Kennedy received her bachelor's degree in English from the University of Northern Colorado, her master's degree in public health from the Colorado School of Public Health, and her doctoral degree from the University of Denver Graduate School of Social Work.

Jennifer Lindwall, PhD; Author

Jennifer Lindwall, PhD is an assistant professor in the Departments of Psychiatry and Neurology at the University of Colorado School of Medicine and a licensed clinical psychologist at Children's Hospital Colorado (CHCO). Dr Lindwall is the lead psychologist for Medical Day Treatment at CHCO, where she collaborates with a multidisciplinary team to support youth with chronic medical issues in an alternative school setting. Dr Lindwall provides interventions to address issues including adherence, pain, quality of life, anxiety, depression, and learning/cognitive disorders. In addition, she leads program evaluation efforts, psychosocial initiatives, and psychology training within the program. Dr Lindwall is also the psychologist in the multidisciplinary Neuroimmunology Clinic for Children, where she provides assessment and intervention, and contributes to the development of a mentoring program for youth with Multiple Sclerosis. Dr Lindwall also serves as a co-investigator for a research investigation focused on the development and implementation of a tele-coaching intervention for youth with Cystic Fibrosis. Previously, Dr Lindwall worked with children and families primarily in the Cystic Fibrosis Center at CHCO, at the Barbara Davis Center for Childhood Diabetes, and with the Child Psychiatry Consultation-Liaison Service at CHCO. Dr Lindwall's clinical, teaching, and research interests are focused on coping, quality of life, and resiliency of youth with chronic illness and their families.

Dr Lindwall received her bachelor's degree in psychology and social welfare, her master's degree in counseling, and her doctoral degree in counseling psychology from the University of Wisconsin-Madison. She completed her pre-doctoral internship at the Temple University Health Sciences Center/Shriners Hospitals for Children in Philadelphia, PA, with a focus on pediatric and health psychology. Dr Lindwall's post-doctoral fellowship training focused on clinical intervention and research in pediatric oncology/hematology at St. Jude Children's Research Hospital in Memphis, TN.

Matthew Matheson, MS; Author

Matthew Matheson, MS, is a senior biostatistician at the Johns Hopkins Bloomberg School of Public Health. As part of the Department of Epidemiology, Mr Matheson contributes statistical expertise, analysis, and manuscript writing to various cohort and clinical studies. Mr Matheson also conducts research into innovative modeling strategies for longitudinal, non-normal, and competing risks time-to-event data.

Mr Matheson received his bachelor's degree in mathematical sciences from the University of Delaware and his master's degree in biostatistics from the University of North Carolina at Chapel Hill.

Justin Michener, PhD; Reviewer

Justin Michener, PhD is a Colorado licensed psychologist and has been a founding partner at The Arete Center for Behavioral Health since October 2018. Dr Michener specializes in the evaluation and treatment of adolescents and young adults with clinical interest

in adolescent suicide risk reduction, as well as chronic childhood trauma.

Prior to his current position, Dr Michener was an assistant professor of psychiatry at the University of Colorado School of Medicine. He was also a psychologist with the Pediatric Mental Health Institute at Children's Hospital Colorado, serving as the Clinical Director for the psychiatric inpatient and partial hospitalization programs. Dr Michener led numerous quality improvement efforts on these units, including the adaptation of trauma-informed practices.

Dr Michener received his bachelor's degree in psychology from Binghamton University, master's degree in psychology in education from Columbia University, and doctoral degree in clinical psychology from Yeshiva University's Ferkauf Graduate School of Psychology. He completed a postdoctoral fellowship in clinical psychology at the Mount Sinai Adolescent Health Center.

Lauren Mowrey, LCSW; Author

Lauren Mowrey, LCSW is a behavioral health clinician on the Neuropsychiatric Special Care unit at Children's Hospital Colorado. She primarily works as a family therapist and provides behavioral treatment to children and adolescents (ages 4-17 years) with Autism Spectrum Disorder and/or intellectual disability with co-occurring mental health diagnoses. She provides group therapy, parent education around the unique needs of each patient, and family therapy through the scope of trying to identify problem behaviors and develop strategies that create more pro-social behaviors for an individual. She also helps families navigate community mental health resources and collaborates with schools all over the state to address strategies that may be helpful for a child with Autism and/or intellectual disabilities. Currently, she is working on implementing a new group therapy model on the Neuropsychiatric Special Care unit using the PEERS (Program for the Education and Enrichment of Relational Skills) curriculum.

Lauren completed her master's degree through the School of Social Work at Indiana University in Indianapolis, Indiana. She completed internships through her program at the Martin Luther King Center and the Veterans Administration Homeless program.

James Murphy, MD; Reviewer

James Murphy, MD is an assistant professor of psychiatry at the University of Colorado School of Medicine and serves as an attending child and adolescent psychiatrist on the Neuropsychiatric Specialty Care Unit (NSC) at Children's Hospital Colorado. Dr Murphy provides both inpatient and outpatient care to children with neurodevelopmental and comorbid mental health diagnoses. Dr Murphy lectures on psychopharmacology in Autism Spectrum Disorder, sexual development, and cultural considerations in working with children and families with neuropsychiatric diagnoses to both psychology interns and child and adolescent psychiatry fellows.

Dr Murphy received his bachelor's degree in molecular, cellular, and developmental biology from the University of Colorado Boulder, and his medical degree from St. George's University. He completed his residency training in psychiatry at the Medical College of Georgia, and his child and adolescent fellowship training at George Washington University, Children's National Medical Center.

Emily Muther, PhD; Reviewer

Emily Muther, PhD is an associate professor of psychiatry and pediatrics at the University of Colorado School of Medicine and serves as a psychologist in the Breathing Institute as part of the Pediatric Cystic Fibrosis (CF) Center at Children's Hospital Colorado. Dr Muther directs embedded behavioral health services within the CF Center and Breathing Institute. Dr Muther is responsible for providing psychology services to children living with CF and their families in both outpatient and inpatient medical settings. Dr Muther's research focuses on improving quality of life and health outcomes in those impacted by chronic illness, most specifically CF. This includes the development of interventions to improve adherence to medical care. She has authored and co-authored many publications and book chapters related to integrated behavioral health in primary and specialty medical settings promoting resilience among children living with medical issues, and reviews on evidence-based treatments for these populations. She is involved in national efforts to improve mental health care in CF and is a member of the Cystic Fibrosis Foundation Mental Health Advisory Council. Dr Muther also has developed and imple-

mented national training programs and guidelines for integrated behavioral health in CF and currently facilitates the Cystic Fibrosis Foundation's Mentoring Program for mental health clinicians. Dr Muther is active in the teaching and training of psychiatry, psychology, and medical trainees. She supervises numerous trainees, has developed courses and trainings on Motivational Interviewing as a technique to improve behavior change in medical settings, and is a primary supervisor for the psychology pediatric health specialty rotation of the psychology training program at Children's Hospital Colorado. Dr Muther regularly gives lectures in the community as well as to national audiences on the various impacts of emotional health on physical health outcomes.

Dr Muther received her bachelor's degree in psychology from the University of Iowa and her doctoral degree in counseling psychology from the University of Denver. She completed her predoctoral internship training at Boston Children's Hospital/Harvard Medical School and her postdoctoral fellowship in pediatric primary care at Children's Hospital Colorado.

Daniel Nicoli, DO; Author

Daniel Nicoli, DO is a former child and adolescent psychiatry fellow at the University of Colorado School of Medicine and a current forensic psychiatry fellow at Oregon Health & Science University. Dr Nicoli developed in interest in how best to respond to behavioral emergencies in pediatric settings during his fellowship. Dr Nicoli has also given multiple lectures on teen cannabis use and substance abuse in a variety of settings (eg, community health centers, schools, psychiatry resident seminars, etc). Dr Nicoli is also active in the state legislative committee and has testified before the state legislature on a bill concerning inclusion of medicinal cannabis use for certain diagnoses. Dr Nicoli's current research focuses on the identification, management, and provider education regarding pediatric delirium.

Dr Nicoli received his bachelor's degree in general science from Linfield College and his doctoral degree in osteopathic medicine from Des Moines University College of Osteopathic Medicine. He completed his General Psychiatry Residency at Oregon Health & Science University and his Child and Adolescent Psychiatry Fellowship at the University of Colorado Denver.

Douglas K. Novins, MD; Editor-in-Chief, Reviewer

Douglas K. Novins, MD is the Cannon Y. & Lydia Harvey Chair in Child and Adolescent Psychiatry, and Chair of the Department of Psychiatry & Behavioral Sciences at Children's Hospital Colorado. He is also professor of psychiatry and community & behavioral health at the University of Colorado School of Medicine. Dr Novins serves as the leader of child and adolescent behavioral health at Children's Hospital Colorado and the University of Colorado Anschutz Medical Campus, leading the ongoing development of a diverse set of clinical, training, and research programs with over 120 faculty and 300 staff. Dr Novins' expertise is in the areas of adolescent substance-related problems and traumatic experiences, particularly among American Indian and Alaska Native youth. He is also Editor-in-Chief of the Journal of the American Academy of Child & Adolescent Psychiatry (JAACAP), the highest-ranked publication in child and adolescent psychiatry and developmental psychology.

Dr Novins received his bachelor's degree in history and premedical studies from Columbia College and his medical degree from Columbia University's College of Physicians and Surgeons. He trained in general psychiatry at New York University/Bellevue Hospital and in child and adolescent psychiatry at the University of Colorado. The National Institute of Mental Health supported Dr Novins' research training at the University of Colorado through a postdoctoral research fellowship in developmental psychobiology and a career development award in mental health services research.

Lina Patel, PsyD; Associate Editor, Reviewer

Lina Patel, PsyD is an assistant professor of child and adolescent psychiatry at the University of Colorado School of Medicine, practicing at Children's Hospital Colorado. Dr Patel is the Director of Psychology for the Anna and John J. Sie Center for Down Syndrome, a multidisciplinary consultative clinic coordinating care for infants, children, teens, and young adults with Down Syndrome. Dr Patel is responsible for management of all referrals for psychological treatment and evaluation. She provides consultation with schools, parent training regarding the management of challenging or unsafe behaviors, evaluation for

dual diagnoses (Down Syndrome and Autism), toilet training, and desensitization to medical devices (such as hearing aids and CPAP) and procedure-related distress. She has worked with hundreds of individuals with Down Syndrome from 1 to 25 years old. Outside of her clinical work, she has presented to numerous organizations across the country and internationally. She also conducts research on clinical issues impacting those with Down Syndrome.

Dr Patel received her bachelor's degree in psychology from the University of Oklahoma and her master's and doctoral degrees in clinical psychology from the University of Denver's Graduate School of Professional Psychology. She completed her internship training at Boston University Medical Center and her postdoctoral fellowship at Stanford University's Lucile Packard Children's Hospital.

Anne Penner, MD; Associate Editor, Author, Reviewer

Anne Penner, MD is an assistant professor in the Psychiatry Department at the University of Colorado School of Medicine and serves as a child and adolescent psychiatrist in the outpatient clinic and the consultation-liaison service at Children's Hospital Colorado. She is also an associate program director for the Child and Adolescent Psychiatry Fellowship within the Department of Psychiatry and a course director for Pediatric Behavioral Medicine, a course focusing on medical and psychiatric complexities for psychiatry and psychology learners. Dr Penner also regularly lectures on psychosomatics generally, delirium, and psychopharmacology. She is actively involved in 2 NIH-funded research trials at the University of Colorado where she oversees and trains others on clinical assessments and clinical operations. Her current research focus is around developing new longitudinal understandings and treatments for irritable youth, and she is passionate about training others and working with fellows on their scholarship projects.

Dr Penner received her bachelor's degree in molecular biology from Goshen College and her medical degree from Indiana University School of Medicine. She completed her residency and fellowship training in child and adolescent psychiatry at the University of Pittsburgh Medical Center, WPIC.

Katherine Reed, LPC; Author

Katherine Reed, LPC is an art therapist and licensed professional counselor and has been the manager of the Ponzio Creative Arts Therapy Program since its inception in 2005. Katherine earned her master's degree in art therapy at the Art Institute of Chicago after 2 years as a Peace Corps health education volunteer in Burkina Faso, West Africa and 9 years of teaching art in Colorado public schools. Katherine's current role has allowed her to pull together her passions at CHCO, building healing communities using the arts as vehicles for expression, communication, and transformation.

Alexandra Romero, PsyD; Author

Alexandra Romero, PsyD is in private practice in Santa Fe, New Mexico. Dr Romero was previously a senior instructor of psychiatry at the University of Colorado School of Medicine and served as a psychologist on the Eating Disorders Unit at Children's Hospital Colorado. Dr Romero specializes in evidence-based treatment of eating disorders, anxiety, depression, self-esteem, identify development, perfectionism, and parent-child difficulties within a child and adolescent population. She also provides community outreach to medical and education professionals to improve identification of childhood mental health concerns and best practice standards.

Dr Romero received her bachelor's degree in psychology from the University of Denver and her doctoral degree in clinical psychology from the Graduate School of Professional Psychology at the University of Denver. She completed a postdoctoral fellowship in eating disorders at Children's Hospital Colorado.

Elise M. Sannar, MD; Author

Elise M. Sannar, MD is an assistant professor of psychiatry at the University of Colorado School of Medicine and serves as an attending psychiatrist at Children's Hospital Colorado. Her clinical interest is providing high-quality care for patients with comorbid psychiatric disorders and developmental disabilities. She works on the Neuropsychiatric Special Care Unit serving patients in crisis and provides routine outpatient care through PMHI, the Sie Center for Down Syndrome, and the Special Care Clinic (primary care

clinic for medically- and developmentally-complex patients). She also participates in multidisciplinary care for patients with Prader Willi syndrome and 22q11.2 deletion syndrome. She will soon be active in a clinical trial exploring the effects of cannabidiol (CBD) on irritability in autism spectrum disorder.

Dr Sannar received her bachelor's degree in chemistry and women's studies from Pomona College and her medical degree from the University of Chicago Pritzker School of Medicine. She completed her residency and fellowship at the University of Colorado School of Medicine.

Marissa A. Schiel, MD, PhD; Reviewer

Marissa A. Schiel, MD, PhD is an assistant professor of psychiatry at the University of Colorado School of Medicine. Dr Schiel is an attending psychiatrist for the Eating Disorder Program at Children's Hospital Colorado. She also serves as the Medical Director of the Ambulatory Division of the Pediatric Mental Health Institute and works in the Outpatient Psychiatry Clinic. Dr Schiel is actively involved in teaching and committee membership for the child and adolescent psychiatry residency program.

Dr Schiel received her bachelor's degrees in biochemistry and honors biology from the University of Illinois at Urbana-Champaign, her doctoral degree in biochemistry and molecular biology, and her medical degree from Indiana University. Dr Schiel completed her general psychiatry residency and her child and adolescent psychiatry fellowship at the University of Colorado.

Kim Sheffield, PhD; Author

Kim Sheffield, PhD is an assistant professor of psychiatry at the University of Colorado School of Medicine and serves as a psychologist in the Eating Disorders Program and Outpatient Clinic at Children's Hospital Colorado. Dr Sheffield is responsible for providing both individual and family therapy for children and adolescents. Additionally, she facilitates multi-family and parent groups for patients in higher levels of care. Dr Sheffield enjoys training the next generation of psychologists and provides clinical supervision for psychology interns and externs within the Pediatric Mental Health Institute at Children's Hospital Colorado. Her research focuses on improving outcomes for children and adolescents receiving psychological services across different levels of care. She is particularly interested in the adaptation and implementation of cognitive behavioral therapy and dialectical behavior therapy for varied patient populations (eg, mood disorders, eating disorders, anxiety disorders, disruptive disorders). Dr Sheffield also has a strong interest in program development and enhancing services in the Eating Disorders Program.

Dr Sheffield received her bachelor's degree in neuroscience from Union College in Schenectady, New York and her doctoral degree in clinical psychology from Louisiana State University. She completed her predoctoral internship at Denver Health and a postdoctoral fellowship in eating disorders at Children's Hospital Colorado.

Mindy Solomon, PhD; Author

Mindy Solomon, PhD is a clinical associate professor of psychiatry at the University of Colorado School of Medicine. After over a decade as a clinical psychologist and the Clinical Director of the Eating Disorders Program at Children's Hospital Colorado, Dr Solomon is now the founder and owner of Mile High Mental Health, PLLC. Mile High Mental Health is a Denver-based clinical psychology practice offering evidence-based and individualized child, adolescent, and family therapy. Dr Solomon is an Emotion Focused Family Therapy certified Advanced Therapist and is a Certified Eating Disorders Specialist. She provides clinical supervision for students seeking advanced/specialty clinical skills and clinical hours. She also provides training and consultation for community schools and other mental health organizations and holds specialty workshops for parents/caregivers in the Denver and surrounding communities.

Dr Solomon received her bachelor's degree in psychology from the University of California at Santa Cruz, her master's degree in clinical health psychology from California State University, Northridge, and her doctoral degree from the Los Angeles campus of the California School of Professional Psychology at Alliant University. She completed a postdoctoral fellowship at the University of Colorado Boulder Wardenburg Health Center with an emphasis on eating disorder treatment.

Danielle Stutzman, PharmD, BCPP; Author

Danielle Stutzman, PharmD, BCPP is a clinical assistant professor at the University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences and serves as a psychiatric pharmacist at the Pediatric Mental Health Institute at Children's Hospital Colorado. Dr Stutzman serves as an integral member of inpatient, partial hospitalization, and outpatient treatment teams to ensure optimal use of psychotropic medications among youth and leads medication education groups for adolescents and caregivers. She provides formal lectures for child and adolescent psychiatry fellows, developmental pediatrics fellows, pharmacy students, and advanced nurse practitioner students and serves as a training preceptor for pharmacy students and residents. Dr Stutzman's current research interests include pharmacogenomic testing, pharmacologic management of pediatric delirium, and use of supplementation during weight restoration in adolescents with restrictive-based eating disorders, among others.

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About the University of Colorado School of Medicine Department of Psychiatry

The University of Colorado School of Medicine is ranked in the top 10 by U.S. News & World Report in multiple medical specialties. Located on the Anschutz Medical Campus in Aurora, Colorado, the School of Medicine shares its campus with the University of Colorado Hospital, Children's Hospital Colorado, and the Denver Veterans Administration Hospital. With over 167 faculty, the Department of Psychiatry is one of the largest in the United States. Its residency program also ranks among the largest programs, with 45 residents and over a dozen fellows in ACGME-approved specialty training programs in Child and Adolescent, Consult-Liasion, Addiction, and Forensic Psychiatry. In addition to psychiatry, the Department's interdisciplinary training opportunities include psychology, social work, and nursing and are widely recognized for their consistent high quality. Many of our faculty have positions of leadership in national organizations, including the American Psychiatric Association, the American Psychological Association, and the American Academy of Child and Adolescent Psychiatry.

The Department of Psychiatry demonstrates its commitment to excellence in the tripartite mission of academic medicine, clinical care, education/training, and research. In addition, the Department is devoted to population health and patient advocacy with faculty active in school and community-based programs and regional and statewide legislative action. Clinical services are primarily provided through the University of Colorado School of Medicine's Faculty Practice Plan, University of Colorado Hospital, Children's Hospital Colorado Addiction Treatment Services, and in conjunction with the Helen and Arthur E. Johnson Depression Center; the Center for Dependency, Addition and Rehabilitation; Denver Health Medical Center; Denver Veterans Administration Hospital; Colorado Department of Corrections; and the Colorado Mental Health Institutes at Fort Logan and Pueblo.

In terms of research, the Department of Psychiatry regularly ranks as one of the top 3 on the University of Colorado Anschutz Medical Campus, with millions of dollars in federal, state, health system, industry, and private support for state-of-the-art research. The breadth and depth of scientific accomplishments span the neurosciences, developmental neurobiology, addictions, infant development, child and adolescent psychiatry, behavioral immunology, schizophrenia, depression, transcultural, and public psychiatry. Recent research awards, investments in clinical services, and teaching by both our affiliated institutions and the philanthropic community have strengthened and enlarged our existing programs as we continue our commitment to a biopsychosocial model, medical and psychiatric education, an interdisciplinary research approach, and the provision of clinical services.

About the Division of Child and Adolescent Psychiatry

As one of the oldest and most-respected academic programs in children's mental health in the nation, the Division of Child and Adolescent Psychiatry supports a wide range of clinical, teaching, and research programs. The Division is particularly well-known for advancing the science and practice of children's mental health in the areas of addictions, anxiety, autism spectrum disorders, underserved populations, eating disorders, integrated care, psychosis and early-onset schizophrenia, psychosomatic medicine, stress and trauma, and telemental health.

The Division of Child and Adolescent Psychiatry combined efforts with Children's Hospital Colorado—one of our Nation's leading children's hospitals—in 2002 to form what is now the Pediatric Mental Health Institute. The Pediatric Mental Health Institute provides a complete continuum of psychiatric services, including outpatient, emergency, partial hospitalization, and inpatient services with an emphasis on both developing coordinated systems within Children's Hospital Colorado as well as collaborating with other agencies and providers.

Our interdisciplinary faculty and staff include psychiatrists, psychologists, social workers, nurse practitioners, and nurses. The Institute is in the midst of a major expansion that is touching all levels of clinical care, teaching, research, and scholarship, assuring its continued place as one of the nation's leading centers for children's mental health.