The Residents' JOURNAL

a publication of
The American Journal of Psychiatry

November 2011 Volume 6 Issue 11

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In This Issue

This issue of the *Residents' Journal* focuses on autism spectrum disorders. The issue begins with an article by Dr. Arshya Vahabzadeh (Guest Section Editor) and Tua Long, who present an overview of the genetics of autism spectrum disorders. Next, Dr. Justine Wittenauer discusses the use of oxytocin in the treatment of these disorders. Then, Jonathan Gursky and Dr. Robert Accordino offer valuable information with regard to improving the health care setting for patients with autism. Ryan Whitney Dobbs focuses his discussion on the issues surrounding the diagnosis of autism in Hispanic communities. The issue concludes with a book review by Dr. Arshya Vahabzadeh of *Autism Spectrum Disorders in Infants and Toddlers*. Autism spectrum disorders are common neurodevelopmental disorders, and we hope that the articles presented in this issue provide the physician-in-training with useful information regarding their etiology, genetic basis, diagnosis, and treatment as well as how to make the health care setting more comfortable for patients with these disorders.

Editorial

Resident Physicians and DSM-5

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Editor-in-Chief

There is significant interest and anticipation regarding the expected publication of DSM-5 in May 2013 (1). The publication of this manual will likely have a meaningful impact not only on the psychiatric community (with changes seen in clinical, research, and forensic settings) but also on the medical community at large (2). It will also affect resident physicians and those who have recently completed their residency training.

The exact impact of DSM-5 on graduate medical education, while likely significant, is unknown. It is notable that those just completing their training at the time DSM-5 is published will not have received formal training in the use of the new manual. It is also likely that there will be variation in the amount of formal training those in residency receive.

How does a resident physician manage this situation? During training, residents are expected to achieve seven core competencies developed by the Accreditation Council for Graduate Medical Education (3). A key component of one of these competencies is lifelong learning (4). In addition to the education that is provided by their training programs, residents should begin the lifelong learning process and educate themstelves about DSM-5. There is ample information regarding the development of DSM-5 readily available (1), and residents should become knowledgeable of not only the proposed revisions but also the process involved in creating this manual. In addition, the American Psychiatric Association (APA) website includes a link to numerous peer-reviewed publications written about DSM-5 (5) that is continuously updated.

Understanding the proposed revisions will not only better prepare those in training for the possible direction that nosology will take, but it will provide them with up-to-date information about different diagnoses and the scientific rationale for revision. This can result in improved patient care as residents increase their knowledge of the scientific literature. Knowledge of the development of DSM-5 is as important as the proposed revisions, as residents represent the future of APA and will be a part of the development of future editions of DSM. As May 2013 approaches, I hope that residents will begin the process of lifelong learning and educate themselves about DSM-5 while preparing to lead the field of psychiatry in the future.

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Editor's Note

A group of training directors wrote in regard to the recent article by Erin L. Belfort, M.D. ("The Effect of Social Media on Mental Health and Its Relevancy to Residency Training"; Am J Psychiatry Res J 2011; 168[6]:A8–A9). The curriculum that Dr. Belfort recommended has now been developed by the Task Force on Professionalism and Technology of the American Association of Directors of Psychiatry Residency Training (AADPRT) and is available at aadprt.org.

Overview of the Genetics of Autism Spectrum Disorders

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Autism spectrum disorders are neurodevelopmental disorders that become clinically apparent in early childhood and include conditions such as autistic disorder, Asperger's syndrome, and pervasive developmental disorder not otherwise specified. Clinical features of autism spectrum disorders are characterized by a triad of symptom clusters. These symptoms include impairments in communication, dysfunction in social interaction, and occurrence of repetitive behaviors and/or restricted interests.

It is estimated that 1 in 110 children in the United States have an autism spectrum disorder. Each year, more than 35,000 U.S.-born children will eventually be diagnosed with an autism spectrum disorder, and the incidence of these disorders is believed to be rising (1). Autism spectrum disorders have been observed across the entire breath of society and are noted to be four to five times more likely to occur in boys. The substantial social, economic, and medical burden of autism spectrum disorders has prompted greater scientific focus on its etiology and treatment.

The genetic basis of these disorders has been recognized for more than 30 years. A variety of diagnostic methods has been employed in exploring this basis, including genome-wide association studies (GWAS) as well as single-gene, linkage, and association studies (Table 1). An estimated heritability over 80% has been reported (2, 3), and it is believed that autism spectrum disorders can be attributed to defined genetic syndromes, mutations, and newly occurring (de novo) copy number variations in 10%–20% of those affected (4). Copy number variations have recently become a topic of great interest to genetic researchers. They are variations in the number of large segments of DNA (>1,000 base pairs) in a genome (5). By altering the genetic sequence, a copy number variation may alter genetic coding or affect the transcription of gene products (6). They are believed to have a greater effect on phenotypes and clinical outcomes than single nucleotide changes, partly because of their greater size and magnitude of effect (5).

The exploration of the genetics of autism spectrum disorders has led to the development of genetic research databases, such as the Autism Genetic Resource Exchange and the Autism Genetic Database. One of the key challenges appears to be the marked genetic heterogeneity of these disorders, and to date, specific susceptibility genes have remained largely elusive. The present article will provide an overview of key genetic findings associated with autism spectrum disorders.

Single-Gene Disorders

Single-gene disorders have been identified as potential causes of autism associated with defined genetic syndromes. The most clearly documented of these are fragile X syndrome (3%–5% prevalence in autism) and tuberous sclerosis (approximately 1% prevalence in autism). It should be noted that only 25% of those with fragile X syndrome and 20% of those with tuberous sclerosis meet criteria for the diagnosis of autistic disorder (6). Other disorders associated with autism spectrum disorders include phenylketonuria, in which 10% of those affected meet criteria for an autism spectrum disorder, and Smith-Lemli-Opitz syndrome, a rare autosomal recessive condition resulting in impaired cholesterol synthesis, in which 50% of those affected meet criteria (6).

Twin Studies

Twin studies for autism have been conducted since 1977, and the unique relationship between twin siblings continues to lead to novel hypotheses regarding the etiology of autism as well as the link between autism spectrum disorders and language delay, intellectual disabilities, and other psychiatric comorbidities, including attention deficit hyperactivity disorder. The increased concordance in monozygotic twins, compared with dizygotic twins, has been demonstrated repeatedly for both autistic disorder, in its strict definition, and autism spectrum disorders. Over the last 10 years, it has been shown that relatives of those with autism spectrum disorders may have increased rates of autistic traits. This finding led to the study of autistic traits in community samples and supports the concept of autism as one extreme on a spectrum of normal variation of autistic traits (3). Other twin studies have compared monozygotic twins in shared environments with those in nonshared environments in order to demonstrate a difference that must be accounted for by environmental influences. These include intra- and extrauterine environmental factors, illnesses, de novo mutations, and epigenetic influences as well as physical, social, and cultural factors. Some twin studies have examined the three deficits in functioning that characterize autism spectrum disorders (language, social interaction, and restrictive/repetitive behaviors and interests) and suggested analyzing them separately because different causative factors seem to influence these different components (3).

Linkage Studies

Linkage can be defined as the likelihood of alleles to be transmitted together during meiosis. Linkage studies compare the genes of affected individuals in a family with those of unaffected individuals in the same family. They can analyze the entire genome of these individuals or focus on specific chromosomal areas of interest. Gene loci associated with autism spectrum disorders have been demonstrated in many different regions in different

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families, although reproducing findings in larger studies has proven to be difficult (7). In particular, the long arm of chromosome 7, and more precisely region 7q22-32, has been found in a meta-analysis to be significantly associated with autistic disorder. Regions 10p12–q11.1 and 17p11.2–q12 are also believed to be significantly associated with the clinically broader set of conditions that comprise autism spectrum disorders.

Genes of small effect are an important concept in the etiology of autism spectrum disorders. They refer to a large group of genes that individually may have limited effect but can significantly interact with each other to produce an outcome, such as an autism spectrum disorder. This is a challenge for linkage studies because such studies are designed to identify large-effect genes, which are genes that would have a significant effect by themselves.

Association Studies

Association studies assess common variants in genes located within linked regions, usually single nucleotide polymorphisms (SNPs), and some candidate genes have arisen from these studies. Several genes, such as RELN and LAMB1, have been associated with autism spectrum disorders and reside on the aforementioned region of chromosome 7. They are both important to neuronal migration and development, which are believed to be disrupted in autism spectrum disorders (8, 9). Contactin-associated protein-like 2 (CNTNAP2) is a membrane protein involved in cellular adhesion and synaptic structure, and mutations in this protein have been associated with an increased risk for autism spectrum disorders in several independent studies (6). Several SNPs involving the oxytocin receptor gene on chromosome 3 have also been associated with autism spectrum disorders (10). Additionally, oxytocin is known to play an intricate role in social interactions and behavior in both animals and humans. Oxytocinergic dysfunction is believed to be etiologically linked to autism spectrum disorders.

Table 1. Genetic Terms

Association	Aims to identify the association between physical traits and genetic markers in order to help locate genes responsible for the physical characteristics. Often used when comparing affected and comparison groups.
Linkage	Likelihood of alleles being inherited together during meiosis. The proximity of same-chromosome alleles to each other increases the likelihood that they will stay together during meiosis. Often used in family studies.
Linkage dysequilibrium	A difference that is noted in the actual and expected inheritance of alleles. It suggests that rather than two different alleles being randomly inherited, there is a nonrandom mechanism increasing or decreasing their observed inheritance.
Epigenetics	Factors that alter gene expression independent of the actual sequence of DNA, includes imprinting and DNA methylation.
Copy number variations	Refers to variations in the number of large segments of DNA in a genome and has been increasingly associated with psychiatric conditions, such as autism spectrum disorders and schizophrenia.
Chromosomal microarray analysis	Involves labeling a DNA sample with several thousand different fluorescent probes and then comparing fluorescence intensity between the sample and a control. Increased fluorescence of particular probes may indicate increased copies of genetic data in the DNA sample.
Genome-wide association studies	Genetic testing of entire genomes and attempting to identify differences in genetic markers across large numbers of people. It attempts to identify genetic variations that could be associated with a particular condition
Imprinting	A phenomenon in which maternal or paternal origin of a gene or chromosome will directly determine the expression of that gene or chromosome.

PTEN is a well-described tumor suppressor, with mutations in this gene being identified in separate studies of individuals with autism and of those with developmental delay. Genetic changes in region 22q13.3 have also been associated with autism spectrum disorders. This region encodes for the SHANK3 gene, which is important for synaptic scaffolding. The SHANK3 gene was estimated in one study to be mutated in 0.5%–1% of individuals with autistic disorders. It may also cause a monogenic form of autistic disorder characterized by severe speech delay (6).

GWAS

More recently, developments in cytogenetic technology have allowed for GWAS, in which single nucleotide changes or copy number variants can be compared directly between groups of individuals with and without disease. With the development of chromosomal microarray analysis and GWAS, there has been increasing recognition of the role of copy number variants in the development of neurodevelopmental disorders, including autism spectrum disorders. Several copy number variant regions, including 1q21, 2p16.3, 16p11.2, and 22q11.2, have been strongly associated with autism spectrum disorders (6). It has been recommended that testing for copy number variants be added to the routine genetic tests offered for new diagnosis of an autism spectrum disorder (11). While personalized pharmacological treatment based on genetics is in its infancy, isolated cases of tailored pharmacological treatment based on copy number variant detection in psychiatric disorders have been noted (12).

Conclusions

In summary, while genetics undoubtedly plays a major role in the development of autism spectrum disorders, the marked

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genetic heterogeneity in these disorders continues to hamper efforts to identify susceptibility genes and elucidate etiological genetic mechanisms.

Several factors complicate identifying specific genetic mechanisms in autism spectrum disorders. Factors such as gene-gene interactions, epigenetic mechanisms (Table 1) (13), and the presence of regulatory regions on distant chromosomes (14) all require further attention. Newer genetics tests continue to be developed, and as techniques become more affordable, we may begin to see wider clinical application. Future research efforts will involve integrating translational neuroscience, genetics, and neuroimaging to further enhance our understanding of autism spectrum disorders. Coupled with this is a desire to make our research findings applicable to the clinical populations we advise and treat.

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The Role of Oxytocin in the Treatment of Autism Spectrum Disorders

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The profession of psychiatry is witnessing an alarming increase in the diagnosis of autism spectrum disorders. The Centers for Disease Control and Prevention has reported that approximately 9 in 1,000 children in the United States are diagnosed with an autism spectrum disorder (1). One of the most recent areas of study has focused on the role of oxytocin in the treatment of impairment in social interaction and communication found in individuals with an autism spectrum disorder. Several studies that have examined this role will be outlined and discussed in the present study.

Children with autism spectrum disorders experience impairment in the development of social relationships. Historically, this phenomenon was conceived by some researchers as both intentional and a result of preference. It was believed that children with autism spectrum disorders lacked the desire for human bonding. Studies have since shown that rates of loneliness are in fact higher in children with an autism spectrum disorder than in age-matched comparison subjects. Conversely, children who perceive existing social bonds and emotional support are seen to experience a lesser degree of loneliness (2).

The aforementioned studies focused on psychosocial reasons for impairment in the development of prosocial relationships. However, since autism spectrum disorders have been established as neurodevelopmental disorders, an increased awareness of the biological mechanisms involved in autism has arisen. Through neuroimaging and the study of animal models, a specific interest in the role of oxytocin has emerged. Oxytocin is a neurohypophyseal polypeptide hormone synthesized in the hypothalamic paraventricular and supraoptic nuclei. It is released from the pituitary gland in response to multiple stimuli, including uterine dilatation during labor, lactation, and stress. While being well known for its involvement in reproduction, it has more recently been studied as an important factor in social bonding (3). Using the female prairie vole as a subject of study, a link was established between oxytocin and the development of social attachments, including partner preference in mating (4). Hypothetical models describing oxytocin's suspected role in autistic pathophysiology have been researched and aided by the use of functional magnetic resonance imaging. Studies have demonstrated a link between oxytocin and suppression of the amygdala, thereby reducing arousal and suspicion of affective social stimuli. (5) Oxytocin has also

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more recently been shown to suppress glutaminergic neurotransmission in the infralimbic medial prefrontal cortex, which is believed to regulate subcortical structures, such as the amygdala. (6)

Using the preface of previous animal models, a link between lower oxytocin levels and autism spectrum disorders has been developed. It was found that despite individual variabilities, children with autism spectrum disorders possess lower levels of oxytocin than same-age children without psychiatric deficits. In addition, Modahl et al. (7) showed that oxytocin levels did not rise appropriately with increasing age. An extension of their study further determined the presence of higher levels of oxytocin prohormone in individuals with autism spectrum disorders. This phenomenon indicates not only alterations in the levels of oxytocin but also deficits in the processing and conversion to active forms of the hormone (8). While not established as an etiology of autism spectrum disorders, this dysfunction in the oxytocinergic system motivated further studies. Most recently, a large-scale review of 2,333 individuals with an autism spectrum disorder showed 25 common genetic polymorphisms in the oxytocin receptor that had an association with both susceptibility to an autism spectrum disorder and multiple projected phenotypes, including social dysfunction (9).

Oxytocin is not able to cross the blood-brain barrier when administered peripherally, and subsequently, an intranasal formulation has been developed as a research tool. In a study conducted by Andari et al. (10), children participating in games involving social interaction, such as ball toss, were evaluated following the administration of intranasal oxytocin. Those with high-functioning autism spectrum disorders responded to social cues and exhibited similar game play as children without an autism spectrum disorder. This was demonstrated when the preference to throw the ball to more cooperative and friendly partners increased after they received the intranasal oxytocin. An examination of visual tracking and social adaptation was also made. Individuals with autism spectrum disorders fixate their gaze on the mouth more than the eyes, unlike other individuals. This difference in visual fixation was suggested to play a role in discrepancies of the registration of social information during the games. After intranasal administration of oxytocin, the length of gaze fixated on the eyes increased. Other studies have led researchers to conclude that when oxytocin is administered, people with autism spectrum disorders are able to fixate on the eye region of a face rather than on the mouth and, in so doing, are able to more readily connect with others (11–12).

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Another promising area of study has involved the relationship between oxytocin levels and repetitive behaviors that are exhibited by children with autism spectrum disorders. Oxytocin administration has been identified as decreasing the presence of repetitive behaviors in both autism and Asperger's syndrome. Significant decreases in the repetitive behaviors of repeating, ordering, self-injury, and inappropriate touching have been noted following the infusion of the hormone (13).

In order to investigate the connection between autism spectrum disorders and oxytocin at the receptor level, a review article by Insel (3) discussed the influence of receptor variation as seen in vole research. It was found that vole pair bonding was largely affected by the location and distribution of oxytocin receptors. An increase in oxytocin levels appeared to have a limited effect if the receptors could not process and convey the appropriate response (3). Defects and individual variations in oxytocin receptors appear to influence the efficacy with which receptors can process and convey responses. It is evident that further research should be conducted on a genetic level to determine the influence of defects, variations, and distributions of receptors in autism spectrum disorder.

Presently, it appears that there is a relationship between the hormone oxytocin and the ability to improve social attachments. Studies have indicated short-term beneficial effects in the improvement of prosocial behaviors. Questions remain regarding the long-term beneficial effects of oxytocin treatment for people with autism spectrum disorders. Some fear that repetitive administration may down-regulate oxytocin receptors and possibly have detrimental permanent effects. Hence, further research is recommended to examine the potential adverse outcome of repeated use of the hormone.

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Improving the Health Care Setting for Individuals With Autism Spectrum Disorders

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In interfacing with the health care system, parents of children with autism spectrum disorders face unique challenges in attempting to partner with physicians to treat their child's medical conditions. Parents and health care providers of those with autism spectrum disorders are challenged to find physicians who are "autism friendly" and comfortable with treating this vulnerable group of patients. A recent study conducted by Montes et al. (1) showed that families with a child with an autism spectrum disorder were more likely to report experiencing difficulty using school- and community-based health services as well as dissatisfaction with any services they receive. Psychiatrists in both the in- and outpatient settings could assist patients and their families by making their practices more autism spectrum disorder friendly and/or by facilitating and supporting autism spectrum disorder-friendly outpatient visits with other practitioners, such as pediatricians.

Before the Visit

To treat each patient optimally, it is useful to reach out to the parents of the child before the visit takes place. A 15–20 minute phone conversation, supplemented by written questionnaires that investigate how the child tolerates different sensory modalities and behavioral reinforcements, will help medical professionals to prepare effectively for the child's arrival and ensure a successful and pleasant visit for the family (2). During these interactions, physicians should address concerns such as, "Would it be helpful if our staff tried to eliminate any specific sensory input around your child, like perfume or loud noises?" and "Would it be helpful if our staff provided your child with any specific rewards for cooperating" (2)?

Patients with autism spectrum disorders may experience more anxiety and discomfort during simple activities, such as waiting in the waiting room, cooperating during a physical examination, answering questions, and remaining focused during periods of increased distraction. To lower this anxiety, health care providers should focus on making the environment more predictable, which has been shown to help children with these disorders respond to stressful events more successfully (3).

One strategy to increase predictability in the clinical environment involves creating a social story and/or visual script for planned visits, which has been shown to help manage behavior and improve performance in social settings in children with autism spectrum disorders (4). A social story details, in first- or third-person narrative form, the events to take place during the child's visit to the physician and informs the child of how to behave. A typical social story might include statements such as, "The nurse will take my height and weight. I will stand tall and straight!" Social stories can be given to the child's parents, who should be directed to read the story to the child each day for 2 weeks prior to the appointment (2). Similarly, a visual script uses images in addition to written words to inform the child of which events will take place during a particular visit, such as waiting, measuring vitals, seeing the doctor, and visiting the pharmacy, and may be more appropriate for children who respond better to visual cues, compared with written words alone. (For more detailed examples of visual scripts and social stories, refer to reference 4).

To complement these conventions, health care providers should try to avoid deviations from the planned schedule and minimize waiting room time for patients with autism spectrum disorders, since unforeseen events and/or long waits can be a major anxiety-provoking stressor for these patients and their families. When appropriate, social stories and visual scripts may end with the child receiving a reward, such as a snack, music, or stickers, to be given upon successful completion of all of the scheduled tasks.

Communicating Effectively and Managing Behaviors

Patients with autism spectrum disorders often experience difficulty with receptive and expressive language, and some may not exhibit any spoken language. It is therefore preferable to use visual cues to help elicit on-task behaviors. Pulley cards, or visual communication cards, can be kept on hand during the medical interview and can convey common commands, such as "Quiet" and "Wait," via illustrations and written words. Since individuals with autism spectrum disorders often attend more readily to visual cues than to verbal commands, visual communication is more likely to elicit the desired behavior by successfully communicating the request (5). These cards can also be handed to the nonverbal patient to allow them to express their needs or wishes, such as asking for help or desiring a break (2).

Sensory kits are useful tools for distraction when the patient is not required to interact with the physician. A sensory kit contains different materials that attend to the various sensory strengths and preferences of each individual patient with autism spectrum disorders. A sensory kit can be easily assembled and often contains items such as a kaleidoscope, clay, scented stickers, and toy cars (2). This kit, as well as other forms of distraction, is

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most effective when used before negative behaviors arise to prevent the inadvertent reinforcement of undesirable behaviors.

Pain Interpretation and Management

Nonverbal patients often cannot describe or localize pain, and patients with autism spectrum disorders frequently have variable pain thresholds, which has led researchers, such as Messmer et al. (6), to attempt to devise different ways of assessing pain in individuals with these disorders through the evaluation of facial expressions and grimaces.

Pain-inducing procedures, such as vaccinations, venipuncture, intravenous insertion, and finger sticks, may be more challenging and anxiety-provoking in autism spectrum disorder patients than in typically developing children. For some patients, the application of lidocaine-based creams, given 30–45 minutes prior to needle insertion, may reduce distress (7), as long as the patient will tolerate topical application. Special preparation may have to take place for medical procedures of varying complexity, such as radiology studies and anesthesia preparation. Practitioners have found it useful to administer anxiolytics and/or sedatives, such as ketamine or midazolam, mixed with a soft drink, which has been shown to effectively disguise the taste of the medication. Additionally, intravenous dexmedetomidin has been useful (8, 9). These techniques are most necessary to use with autism patients who exhibit particularly maladaptive behaviors.

After The Visit

At the completion of the visit, it is important for practitioners to both reflect upon and document which techniques worked well and which ones were less successful. For example, they should document which sensory kit items were the child's favorite and evaluate how successfully the child responded to visual communication cards or effectively used pulley cards on his or her own. Most importantly, practitioners should take some time to ask the parents how the visit could have been improved and to plan appropriate changes for the patient's next visit.

Conclusions

Treating patients with autism spectrum disorders can be a challenging experience when practitioners are not equipped with the proper tools. By making the medical environment more predictable, communicating with the assistance of visual cues, properly managing distractions and pain, and partnering with parents, the medical visit can become both more satisfying and provide higher quality of care for patients with these disorders.

These special considerations for patients with autism spectrum disorders are an emerging area of appropriate medical management. Continuing work toward improving autism spectrum disorder-friendly medical environments is underway; for example, at the Massachusetts General Hospital for Children, the Autism Care Plan program seeks to discover new and innovative ways to improve the in-hospital experience for patients with autism and their families.

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Autism Spectrum Disorders in Hispanic Communities: Socio-Cultural and Health Care Barriers to Diagnosis and Treatment

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Autistism spectrum disorder is a term used to describe a continuum of clinical conditions, including but not limited to autistic disorder, Asperger's syndrome, and pervasive developmental disorder not otherwise specified. Autistic disorder is a pervasive neurodevelopmental disorder that is characterized by early impairment in social interaction and communication, combined with repetitive behaviors and restricted interests. Asperger's syndrome is characterized by difficulties in social interaction, repetitive behaviors, and restricted interests, without the communicative and cognitive deficits found in autistic disorder. Pervasive developmental disorder not otherwise specified is a diagnosis that is applied to children with delays in the development of multiple basic functions, including socialization and communication.

Over the past decade, there have been dramatic increases in the number of autism spectrum disorder diagnoses across the United States. During this time, Hispanic populations have seen the greatest increase in the incidence of these disorders, with a 91% rise in diagnoses, compared with a 55% rise in non-Hispanic Caucasian populations and a 41% rise in African American populations (1). This increase may reflect increased knowledge or previous underdiagnosis of autism spectrum disorders within the Hispanic community. Hispanic people, a self-identified population and culture of people descended from Spanish or Portuguese origin, particularly Latin America, represent a large and growing group within the United States. Despite an increasing number of diagnoses, the prevalence of autism spectrum disorders reported in this community (5.9/1,000 children) is still consistently lower than the prevalence reported in the non-Hispanic Caucasian community (9.9/1,000) (1, 2).

Several theories have been proposed to account for this discrepancy, including the "healthy immigrant effect" and lower genetic susceptibility (3) as well as differences in family function, adaptation, resiliency (4), and urbanization (5). While there may be a lower prevalence of disease in the Hispanic community, individuals in the community have significant risk factors that may lead to underdiagnosis, including lower socioeconomic status (6), language barriers (2), and differences in treatment preference and practice (4). The present article will address three major contributors to underdiagnosis of autism and autism spectrum disorders in the Hispanic community: socioeconomic status, health care delivery, and cultural factors.

Socioeconomic Factors

Disadvantaged populations are often disproportionately affected by disease as a result of several factors, including diminished access to care, suboptimal living environments, health behaviors, and treatment disparities (7). Autism spectrum disorders are unusual in this regard, since diagnosis is more common among children in non-Hispanic Caucasian populations and in those living in wealthier areas and with more educated parents (6). Since there is no definitive test for autism, diagnosis is made on the basis of behavioral expression, which is potentially an important cause for the relationship between socioeconomic status and prevalence. In order to be identified, children with these disorders must have parents and health care providers with the knowledge, resources, and incentives to proceed with the diagnostic process.

Delays in diagnosis prevent early treatment and intervention. Early intervention with regard to speech, behavior, and education can have a significant positive effect on the quality of life for both children and families. Early intervention helps in the treatment of children before developmental delay is evident and allows them to reach their full potential (2).

Hispanic children face tremendous barriers to health care access. They are more than twice as likely to be uninsured as well as less likely to be referred to a specialist by their health care provider and to communicate with their health care provider, compared with non-Hispanic Caucasian children (8). Hispanic children are three times more likely to live in households that fall below the poverty line and twice as likely to lack a regular source of medical care (8). Having non-English speaking parents further reduces the chance of specialist referral and has been associated with higher morbidity. Without appropriate primary care or referrals to specialists, obtaining a correct diagnosis of autism spectrum disorder is difficult.

Recent studies have investigated the relationship between socioeconomic status and diagnosis of autism spectrum disorders and confirmed a lower rate of diagnosis in the Hispanic community based on school populations in Texas (3). For each 10% increase in the number of Hispanic children, there was a corresponding 11% decrease in the number of students diagnosed with autism. After adjusting for socioeconomic status and the availability of local diagnostic physicians, autism prevalence remained inversely related to the percentage of Hispanic students in school districts. Lower rates of autism were hypothesized to be related to differences in culture, biology, or health care delivery (3). Similar studies have reported that differences in autism spectrum disorder prevalence are likely to be the combination of methodological factors, socioeconomic variables, and

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bias (2). These results may indicate that while socioeconomic status contributes to differences in diagnosis, there may be additional contributing variables.

Health Care Delivery

Health care providers may play a significant role in the age at which an autism spectrum disorder is recognized and diagnosed in children. Studies have shown that there is a 2.5-year difference in age of identification of a diagnosis between non-Hispanic Caucasian children and Hispanic children (9). Additionally, these studies have shown that Hispanic children required twice as many visits to a provider before a diagnosis was reached, compared with their peers. A major factor in the delay in diagnosis was an average 15.5-month period between the time parents voiced concerns about their child's development and the time a referral to a specialist was given. In many patients, autism spectrum disorders are identified several years after the onset of symptoms because of misdiagnosis, inadequate screening, slow response to parental concerns, or lack of awareness to early symptoms (2). These factors may be magnified in Hispanic populations.

Health care providers' perception of the social characteristics and communicative abilities of minority populations may result in underdiagnosis and referral bias. In a Dutch study, pediatricians evaluated the clinical vignettes of children who were of either a European majority population or a non-European minority population (10). These physicians were more likely to identify autistic characteristics and more likely to refer children for autism evaluation in the majority populations than in the minority populations. Physicians may attribute social differences and communication difficulties in children from minority populations to their culture rather than to an underlying medical condition.

In addition to referral bias, Hispanic populations are twice as likely to feel that they are unfairly treated by health care providers based on their ability or perceived ability to pay for medical services (11). This perception of ability to pay may reduce physician referrals to potentially costly specialists.

When children are referred to a specialist, there are still additional factors that may complicate health care delivery in Hispanic communities. Making an accurate diagnosis in children who are culturally and linguistically diverse may be complicated if a provider is not familiar with the cultural customs. In one case report of Hispanic children referred for autism spectrum disorders, only 64% were diagnosed. Both children with and without autism spectrum disorders were frequently given multiple diagnoses, including Tourette's syndrome, mental retardation, attention deficit disorder, oppositional defiant disorder, anxiety disorder, and depression, making autism spectrum disorder a complex differential diagnosis (12). This research suggests that Hispanic children may be preferentially diagnosed with coexisting psychological or behavioral disorders rather than spectrum disorders, resulting in underdiagnosis.

With increased awareness of autism, more recent evidence has shown a decrease in the difference in age of identification of a diagnosis between children of high and low socioeconomic status (a 6-month gap) (13). However, Hispanic children are still diagnosed at older ages, compared with other children (2). This persistent delay in identification is a significant issue because children are rapidly developing and early identification is essential to early intervention. Considering the high degree of impairment and significant comorbidities associated with autism spectrum disorders, consistent screening for these disorders should be utilized, and a low threshold for referral should be the standard of care.

Cultural Factors

Several factors unique to Hispanic populations may help to explain their lower prevalence of autism spectrum disorders. Hispanic parents may be more likely to use alternative treatments for children with developmental disabilities. One study reported that 26% of parents with children with disabilities used religious rites and practices most commonly associated with Catholicism, 17% of parents used traditional folk medicines, and 5% used or would consider using a curandero (a traditional healer) (4). While the parents typically viewed these treatments as an adjunct, in milder cases or conditions not identified as medical disorders, these treatments might have been used preferentially and could help to explain the delay in diagnosis. Overall, Hispanic children were six times as likely to be treated with nontraditional treatment strategies, compared with their peers (14).

Hispanic children have persistently demonstrated low rates of use of mental health services, even when controlling for other factors (15). These differences have been attributed to caregiver burden, nontraditional work schedules of parents, a higher number of children in families, transportation problems, and less assistance from support systems. These variables contribute to underutilization of care, even when services are available.

Conclusions

Underdiagnosis of autism spectrum disorders in Hispanic populations likely results from several different factors, including socioeconomic status, health care delivery, and cultural practices. Longstanding cultural barriers to health care access in minority populations must be addressed urgently. Possible steps toward improvement include expanding health care coverage to vulnerable populations, working to develop cultural competency among health care providers, offering flexible appointment scheduling for parents with nontraditional work schedules, and routine screening for all children. The Hispanic community represents a significant underserved population in the diagnosis and treatment of autism spectrum disorders, and innovative approaches and additional research will be necessary to understand and address this health care issue.

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Book Review

Autism Spectrum Disorders in Infants and Toddlers: Diagnosis, Assessment, and Treatment by Katarzyna Chawarska, Ami Klin, and Fred R. Volkmar

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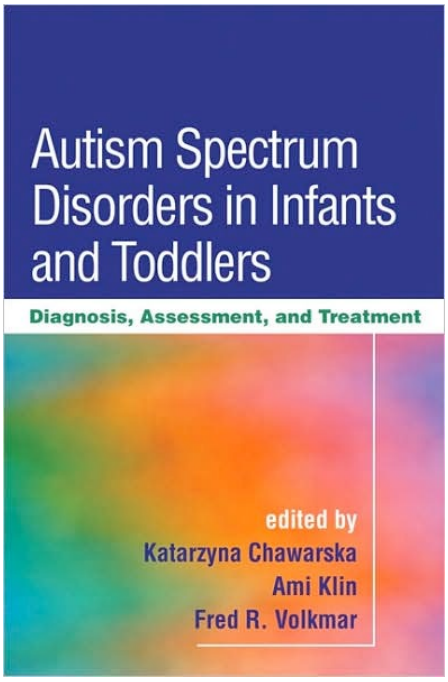
Autism Spectrum Disorders in Infants and Toddlers: Diagnosis, Assessment, and Treatment is an excellent resource for clinicians who seek a concise yet robustly referenced text written by some of the foremost thought leaders in the study of autism spectrum disorders. The editors, all affiliated with the Yale Child Study Center, have assembled a high-caliber team of prominent researchers and clinicians to author each of the 12 chapters in the book.

The text primarily focuses on infants and toddlers with autism spectrum disorders. This is an especially important age group, since diagnosis and assessment in this age group remains the most difficult and timely treatment results in the most enduring outcome.

The first half of the book consists of chapters with discussions on the diagnosis and assessment of autism spectrum disorders, focusing on cognitive, communication, and sensory motor issues. A particular strength of this book is the discussion on development in neurotypical individuals, prior to identifying the differences that have been observed in individuals with autism spectrum disorders. Readers soon begin to realize that an autism spectrum disorder is a condition with markedly variable presentations, with the book highlighting beliefs held by many in the field that distinct phenotypic and genotypic types of autism spectrum disorders exist.



Autism Spectrum Disorders in Infants and Toddlers: Diagnosis, Assessment, and Treatment

by Katarzyna Chawarska, Ami Klin, and Fred R. Volkmar. New York, Guilford Press, 2010, 348 pp., $26.00 (paper).

An additional strength of the book is how it not only identifies current understanding but also provides discussion on the gaps in our knowledge regarding the early presentation of these disorders. Chapter 6 is particularly interesting, with a discussion of diagnosis and assessment in three detailed case studies. The use of case studies allows the reader, when presented with a clinical scenario, to understand how the information in previous chapters is integrated. The second half of the book focuses on treatments for autism spectrum disorders, including a chapter on controversial treatments. The book remains fairly consistent, despite numerous authors. Occasionally, however, a concept, such as regression in autism spectrum disorders, is almost dismissed in one chapter as being rare while being mentioned in another chapter as a key concept. Such minor inconsistencies are understandable given the wide variety of opinions in the field and the ever-changing landscape that exemplifies our understanding of early detection of autism spectrum disorders.

In summary, this is a clear and concise text, which relies on heavy yet effective referencing of research to discuss the current understanding of early diagnosis and treatment of autism spectrum disorders. The editors and authors must be commended for bringing together so much valuable and well-integrated information into one readable volume. This book is a valuable resource for all clinicians who have contact with individuals with autism spectrum disorders.

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TEST YOUR KNOWLEDGE

In preparation for the PRITE and ABPN Board examinations, test your knowledge with the following questions.
(answers will appear in the next issue)

This month's questions are courtesy of Arshya Vahabzadeh, M.D. Dr. Vahabzadeh is the Guest Section Editor for the current issue of the Residents' Journal *and a second-year resident in the Department of Psychiatry and Behavioral Sciences, Emory University School of Medicine, Atlanta.*

Question #1
Autistic disorder is characterized by all of the following except:

A. Impairment in social interaction
B. Delay or lack of spoken language
C. Restricted/repetitive patterns of behavior
D. Onset of symptoms after 5 years of age
E. Social imitative play appropriate to the developmental level

Question #2
Autism spectrum disorder is an umbrella term that encompasses all of the following diagnoses except:

A. Asperger's syndrome
B. Autistic disorder
C. Tourette's syndrome
D. Pervasive developmental disorder not otherwise specified

ANSWERS TO OCTOBER QUESTIONS

Question #1
Answer: B
Binge eating disorder is a condition in which an individual engages in recurrent ingestion of quantities of food "in a discrete period of time" that are significantly larger than what would normally be consumed by most people (1). This behavior occurs for 6 months at a minimum and for at least 2 days per week (1). Individuals with the disorder may report engaging in binge eating even in the absence of hunger (1). Since there is no fixation on weight, purging activities do not accompany the binge eating (1, 2).

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Question #2
Answer: D
Anorexia nervosa is an eating disorder in which one undertakes a voluntary and intentional marked reduction in weight, accompanied with persistent and intense concerns about becoming overweight (1, 2). Despite evidence to the contrary, individuals with anorexia nervosa are in denial about the severity of their low weight (1, 2). To meet the diagnostic criteria for anorexia nervosa, women who are postmenarcheal must develop amenorrhea (2). If a woman reports regular menses but meets all other criteria for anorexia nervosa, the diagnosis of eating disorder not otherwise specified must be given (1, 2).

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We are currently seeking residents who are interested in submitting Board-style questions to appear in the Test Your Knowledge feature. Selected residents will receive acknowledgment in the issue in which their questions are featured.
Submissions should include the following:
1. Two to three Board review-style questions with four to five answer choices.
2. Answers should be complete and include detailed explanations with references from pertinent peer-reviewed journals, textbooks, or reference manuals.
***Please direct all inquiries and submissions to Dr. Seawell; mseawell@med.wayne.edu.**

Author Information for *The Residents' Journal* Submissions

The Residents' Journal accepts manuscripts authored by medical students, resident physicians, and fellows; manuscripts authored by members of faculty cannot be accepted.

1. **Commentary:** Generally includes descriptions of recent events, opinion pieces, or narratives. Limited to 500 words and five references.
2. **Treatment in Psychiatry:** This article type begins with a brief, common clinical vignette and involves a description of the evaluation and management of a clinical scenario that house officers frequently encounter. This article type should also include 2-4 multiple choice questions based on the article's content. Limited to 1,500 words, 15 references, and one figure.
3. **Clinical Case Conference:** A presentation and discussion of an unusual clinical event. Limited to 1,250 words, 10 references, and one figure.
4. **Original Research:** Reports of novel observations and research. Limited to 1,250 words, 10 references, and two figures.
5. **Review Article:** A clinically relevant review focused on educating the resident physician. Limited to 1,500 words, 20 references, and one figure.
6. **Letters to the Editor:** Limited to 250 words (including 3 references) and three authors. Comments on articles published in *The Residents' Journal* will be considered for publication if received within 1 month of publication of the original article.
7. **Book Review:** Limited to 500 words and 3 references.

Abstracts: Articles should not include an abstract.

Upcoming Issue Themes

Please note that we will consider articles outside of the theme.

December 2011
Section Theme: Sleep
Guest Section Editor: Dawn Flosnik, M.D.
pitt2psu@gmail.com

January 2012
Section Theme: PTSD and Traumatic Brain Injuries
Guest Section Editor: Brandon Cornejo, M.D., Ph.D.
cornejo.brandon@gmail.com

February 2012
Contact Sarah M. Fayad: fayad@ufl.edu

March 2012
Section Theme: Memory Disorders
Guest Section Editor: Sarah Jane De Asis, M.D.
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April 2012
Section Theme: Family Psychiatry
Guest Section Editor: Michael Ascher, M.D.
michaelaschermd@gmail.com

May 2012
Section Theme: Sexual Disorders
Guest Section Editors: Almari Ginory, M.D., Laura Mayol-Sabatier, M.D., and Nicole Edmond, M.D.
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June 2012
Section Theme: Advocacy in Psychiatry
Guest Section Editor: John Lusins, M.D.
drjlusins@gmail.com