



Neurodevelopmental and neurobehavioral disorders

During the developmental period from infancy through adolescence, neurodevelopment and behavior are intricately related. The terms neurodevelopmental and neurobehavioral disorders are used interchangeably to describe a group of disorders with certain basic characteristics that overlap between different disorders (1-5). Neurodevelopmental disorders (or disabilities) have their onset during the developmental period and persist over a person's lifespan. Intellectual disabilities (also referred to as intellectual developmental disorder), various communication disorders affecting speech and language, autism spectrum disorder, attention deficit hyperactivity disorder, developmental learning disorders, and motor disorders such as developmental coordination disorder and tic disorders are major neurodevelopmental disorders. Some experts use the term neurodevelopmental disabilities “to define chronic disorders that affect central nervous system function during the developmental period in the domains of motor skills, cognition, communication and/or behavior” (4).

The World Health Organization criteria defines neurodevelopmental disorders as “behavioural and cognitive disorders that arise during the developmental period that involve significant difficulties in the acquisition and execution of specific intellectual, motor, or social functions” (6). According the *American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders* criteria, neurodevelopmental disorders are characterized by “developmental deficits that produce impairments of personal, social, academic, or occupational functioning. The range of developmental deficits varies from very specific limitations of learning or control of executive functions to global impairments of social skills or intelligence” (2).

The etiology of neurodevelopmental disorders is multifactorial and complex and not clearly elucidated in a large percentage of cases (5,7). The prevalence, as a group, for these disorders range from 5% to 20% in general population (1-5,7). Because of a wide diversity of functional impact from these disorders at an individual level, the effective delivery of healthcare for persons affected by any of these disorders requires participation and coordination between professionals from different disciplines as well as both governmental and non-governmental community-based agencies (5,8). The medical practitioner in clinical practice setting plays a key role in medical evaluation and treatment of persons with neurodevelopmental disorders. Additionally, the medical practitioner plays a lead role in facilitating and coordinating the overall health care, working with different professionals and agencies. In this issue of *Translational Pediatrics* with a focus on neurodevelopmental and neurobehavioral disorders, our aim is to provide a review of selected disorders to highlight the range of characteristics of this group of disorders and provide practical information with direct application in one's clinical practice.

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This is an invited article commissioned by the Editorial Office, *Translational Pediatrics*. Not externally peer reviewed.

Conflicts of Interest: DRP serves as the unpaid Deputy Editor-in-Chief of *TP* and the unpaid Guest Editor of the focused issue “Neurodevelopmental and Neurobehavioral Disorders in Children”. *TP*. Vol 9, Supplement 1 (February 2020). JM serves as the unpaid Guest Editor of the focused issue “Neurodevelopmental and Neurobehavioral Disorders in Children”. *TP*. Vol 9, Supplement 1 (February 2020).

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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References

1. Melillo R, Leisman G. Neurobehavioral disorders of childhood: an evolutionary perspective. New York: Springer, 2010.
2. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed. Washington DC: American Psychiatric Association, 2013.
3. Thapar A, Cooper M, Rutter M. Neurodevelopmental disorders. *Lancet Psychiatry* 2017;4:339-46.
4. Ismail FY, Shapiro BK. What are neurodevelopmental disorders? *Curr Opin Neurol* 2019;32:611-6.
5. Accardo PJ. Capute and Accardo's neurodevelopmental disabilities in infancy and childhood. 3rd ed. Baltimore: Paul Brookes Publishing, 2008.
6. World Health Organization. ICD-11 for Mortality and Morbidity Statistics. Available online: <https://icd.who.int/browse11/l-m/en#/http%3a%2f%2fid.who.int%2fid%2fentity%2f1207960454> 1/2/2020
7. Swaiman KF, Ashwal S, Ferriero DM, et al. Swaiman's pediatric neurology: principles and practice. Philadelphia: Elsevier, 2012.
8. Rubin IL, Merrick J, Greydanus DE, et al. Health care for people with intellectual and developmental disabilities across the lifespan. Switzerland: Springer International, 2016.



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Submitted Jan 17, 2020. Accepted for publication Feb 03, 2020.

doi: 10.21037/tp.2020.02.03

View this article at: <http://dx.doi.org/10.21037/tp.2020.02.03>

Cite this article as: Patel DR, Merrick J. Neurodevelopmental and neurobehavioral disorders. *Transl Pediatr* 2020;9(Suppl 1):S1-S2. doi: 10.21037/tp.2020.02.03