



Congenital Malformations of the Central Nervous System in Rural Western Honduras: A 6-Year Report on Trends

Dagoberto Estevez-Ordonez¹, Michael C. Dewan², Michael J. Feldman², Eleazar E. Montalvan-Sanchez⁴, Daniela M. Montalvan-Sanchez⁴, Aida A. Rodriguez-Murillo⁴, Samuel A. Urrutia-Argueta⁴, Charlotte B. Cherry¹, Douglas R. Morgan^{1,3}, Roberto Alvarez-Rodriguez⁴, Christopher M. Bonfield²

■ **BACKGROUND:** Central nervous system (CNS) malformations, including neural tube defects (NTDs), are the second most common type of birth defects worldwide and are major causes of childhood disability and mortality. We report the first analysis of birth prevalence in Western Honduras of CNS malformations including NTDs over 6 consecutive years.

■ **METHODS:** Data from all patients with congenital CNS malformations and total live births for the period 2010–2015 were obtained through institution and regional registries from all 3 public referral hospitals in Western Honduras, representing 67 municipalities. Cases were identified using the International Classification of Diseases, Tenth Revision CNS malformation codes. Birth prevalence was calculated as cases per 10,000 live births.

■ **RESULTS:** From 123,903 live births, 275 cases of CNS malformations were identified (54% females, 58% NTDs). Six-year birth prevalence of CNS malformations was 13.9–31.1. Spina bifida variants and anencephaly represented 80% and 19% of reported NTDs, respectively. Total 6-year prevalence of NTDs in Western Honduras was 7.0–17.4 over years studied. In 6 municipalities, average prevalence was >30 (maximum 49.0).

■ **CONCLUSION:** This is the first study reporting disease burden of CNS malformations in Western Honduras. The nationwide birth prevalence of NTDs in rural Honduras may have decreased since the implementation of prenatal health policies in 2005. However, we identified regions

with unexpectedly elevated prevalence, indicating high regional prevalence that could be targeted for improved preventive efforts, ultimately decreasing the burden of these conditions.

INTRODUCTION

Birth defects are a significant cause of infant mortality globally and are estimated to cause 376,000 deaths in children <5 years old and 24 million disability-adjusted life years worldwide.^{1–3} Among birth defects, neural tube defects (NTDs), a spectrum of central nervous system (CNS) malformations, are considered important contributors of childhood disability and death, particularly in low- and middle-income countries (LMICs).⁴ In LMICs, studies show that 17%–70% of neonatal deaths from birth defects are attributed to NTDs, and these malformations are also associated with lifelong disability.^{4–6}

Among NTDs, spina bifida (myelomeningocele) and anencephaly are the most common manifestations affecting humans, although less common variants (lipomyelomeningocele, diastematomyelia, occult spinal dysraphism, and craniorachischisis) may also manifest at birth.^{7,8} The birth prevalence of NTDs is approximately 10 in 10,000 live births but is also reported to have global variation with limited studies in LMICs.^{9–12} The birth prevalence of NTDs in African nations as reported in the literature ranges between 5.2–75.4 per 10,000 live births, and prevalence in Latin American countries ranges between 2.1–96.3 per 10,000 live births.^{9,12} However, many of these studies in LMICs have limitations, including lack of continued active surveillance or

Key words

- Congenital malformations of the CNS
- Folic acid
- Honduras
- International neurosurgery
- Neural tube defects

Abbreviations and Acronyms

CNS: Central nervous system
LMICs: Low- and middle-income countries
NTDs: Neural tube defects

From the ¹Vanderbilt Institute for Global Health, ²Department of Neurological Surgery, and ³Division of Gastroenterology, Hepatology, and Nutrition, Department of Medicine, Vanderbilt University Medical Center, Nashville, Tennessee, USA; and ⁴Hospital de Occidente de Honduras, Santa Rosa de Copán, Honduras

To whom correspondence should be addressed: Dagoberto Estevez-Ordonez, B.S. [E-mail: dago.estevez@vanderbilt.edu]

Citation: *World Neurosurg.* (2017) 107:249–254.
<http://dx.doi.org/10.1016/j.wneu.2017.07.131>

Journal homepage: www.WORLDNEUROSURGERY.org

Available online: www.sciencedirect.com

1878-8750/\$ - see front matter © 2017 Elsevier Inc. All rights reserved.

representing single-institution reports. Most of this variation, particularly in LMICs, is largely attributed to differences in primary prevention with folic acid through food fortification or supplementation; however, genetic predisposition may play a significant role.⁴ Birth prevalence of NTDs also shows variation across time, country, region, race, and ethnicity.^{7,11,12}

In Honduras, a 1-year retrospective review in 6 urban hospitals showed that 49% of deaths associated with birth defects were due to NTDs.¹³ Population-based surveillance for NTDs is not only essential in determining disease burden but also is invaluable in identifying potential significant regional variations and guiding national and regional control strategies. However, there are no population-based surveillance systems for NTDs in Honduras, and data on the NTD birth prevalence is only available from 2 limited studies.^{9,12-14} Also, the impact of recent attempts to create folic acid fortification policies in Honduras is unclear as well as whether these policies have been widely adopted. We report birth-prevalence estimates for CNS malformations, including NTDs, over 6 consecutive years in rural Western Honduras.

MATERIALS AND METHODS

This study is a descriptive analysis of the birth-prevalence estimation for CNS malformations, including NTDs, in Western Honduras. Institutional review board approval for this descriptive analysis was obtained from the Hospital de Occidente de Honduras and Vanderbilt University Medical Center. We define Western Honduras as the region formed by 3 departments (Copan, Lempira, and Ocotepeque). The region's health care infrastructure comprises 3 public hospitals and 2 large private clinics that serve as secondary and tertiary care centers with a few other private primary care clinics and with each municipality having a primary care community clinic. Hospital de Occidente, located in Santa Rosa de Copan, serves as the major tertiary care referral center for the region. Specialty care for the entire region is available at Hospital de Occidente with some services available within the private sector. This hospital also has the main neurosurgery services available to the region with the only available neurosurgeon, who has operated both in this hospital and in 1 of the private facilities since 2009. Cases requiring higher levels of care, such as birth defects, are mostly all referred to Hospital de Occidente with only a few cases presenting to 1 of the 2 private clinics with higher level care capabilities. Data from the total number of live births within the region, including in-hospital and out-of-hospital births, for the period 2010–2015 were obtained through regional birth registries established through the Ministry of Health and used for all national statistics in all 3 departments within Western Honduras. Data included stratification by department and by each of the 67 municipalities within the region used for mapping prevalence.

Data on all cases of CNS malformations and NTDs were obtained through chart review on all newborn admissions with CNS malformations or NTDs from each of the 3 public hospitals within the region, including infants born within the hospital and infants admitted after birth at home or in a community center. Data included baseline demographics and disease-specific information and outcomes. Inclusion criteria were all in-hospital births and admissions of newborns and children after out-of-hospital birth since 2010 with a birth date between 2010 and 2015 with

CNS malformations. Cases were identified using the International Classification of Diseases, Tenth Revision. Codes used for inclusion criteria were as follows: Q00 (anencephaly and similar malformations), Q01 (encephalocele), Q02 (microcephaly), Q03

Table 1. Demographics

Variable	NTDs (n = 158)	CNS Malformations (n = 275)
Sex		
Male	60 (37.97)	126 (45.82)
Female	98 (62.03)	149 (54.18)
Reporting institution		
Hospital de Occidente	122 (77.22)	224 (81.45)
Regional hospital in Lempira	19 (12.03)	29 (10.55)
Regional hospital in Ocotepeque	17 (10.76)	22 (8)
Cases by department (state)		
Copan	67 (42.41)	138 (50.18)
Lempira	72 (45.57)	107 (38.91)
Ocotepeque	19 (12.03)	30 (10.91)
ICD-10 codes		
Q00 Anencephaly	30 (18.99)	30 (10.91)
Q01 Encephalocele	2 (1.27)	2 (0.73)
Q02 Microcephaly		35 (12.73)
Q03 Congenital hydrocephalus		72 (26.18)
Q04 Other congenital malformations of brain		10 (3.64)
Q05 Spina bifida	126 (79.75)	126 (45.82)
Q06 Other congenital malformations of spinal cord		0 (0)
Q06 Other congenital malformations of nervous system		0 (0)
Cases by year		
2010	33 (20.89)	59 (21.45)
2011	26 (16.46)	40 (14.55)
2012	24 (15.19)	43 (15.64)
2013	16 (10.13)	32 (11.64)
2014	28 (17.72)	47 (17.09)
2015	31 (19.62)	54 (19.64)
Outcomes		
Dead	40 (25.32)	63 (22.91)
Alive	109 (68.98)	199 (72.36)
Unknown	9 (5.70)	13 (4.73)
Values are presented as number (%).		
NTDs, neural tube defects; CNS, central nervous system; ICD-10, International Classification of Diseases, Tenth Revision.		

Download English Version:

<https://daneshyari.com/en/article/5633880>

Download Persian Version:

<https://daneshyari.com/article/5633880>

[Daneshyari.com](https://daneshyari.com)