

# Prevalence of congenital birth defects (CBD) and associated risk-factors of babies delivered at Universitas Academic Hospital in Bloemfontein South Africa: 2013-2017

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## Abstract

**Background:** Congenital birth defects are an important cause of stillbirths and neonatal mortality, chronic illness, and disability. The prevalence of congenital anomalies may vary over time or by geographical location.

**Aims and Objectives:** The aim of this study was to determine the proportion and types of congenital birth defects in live/dead newborns and to study maternal and perinatal risk factors.

**Methods:** This retrospective cross-sectional study was carried out in the maternity unit of Universitas Academic Hospital, Bloemfontein, South Africa, during January 2013 to December 2017. All the live/stillborn babies born in the hospital during this period were included. The newborns were examined for the presence of congenital anomalies.

**Results:** During the study period, 2430 babies were born, of which 239 had congenital malformations, making the prevalence 9.84%. Most of the women giving birth (49.79%) belonged to the age group 20 to 29 years. Congenital anomalies were seen more commonly (69.87%) in the multiparas in comparison to the primiparas (30.13%). The predominant system affected by congenital defects was the central nervous system (CNS) (40.60%) followed by multiple/gross congenital anomalies (18.83%) and the musculoskeletal system (12.98%). Intracranial defects (congenital hydrocephalus and ventriculomegaly; 28.88%) were the most common type of CNS defect seen. Results indicated that CBD was more likely to be associated with low birth weight, prematurity, multiparity, and cesarean delivery.

**Conclusion:** This study highlighted specific opportunities to improve primary prevention and care of congenital anomalies. Public awareness of the preventable risk factors must be raised, and early prenatal diagnosis and management of common congenital anomalies is strongly recommended. Folic acid supplementation, preconception diabetes screening and related counselling could have significant and broad health benefits in women included in this study and arguably in the larger South African population.

**Keywords:** Congenital anomaly, prematurity, prevalence, risk factors, types

## Introduction

Congenital Birth Defects (CBD) is an important cause of infant and childhood deaths and may result in lasting disability with significant impact on individuals, families, healthcare systems and societies.

In developing countries there is also the confounding factors of delayed reporting and lack of appropriate medical care or facilities causing congenital malformations to be associated with unacceptably high morbidity and mortality. Reported incidence varies from 3% for major congenital malformations to 12 to 15% for minor defects. Worldwide, major CBD contributes to 303 000 newborn deaths within 4 weeks of birth every year.

The aim of this study was to determine the proportion and types of congenital birth defects in live newborns and to study

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maternal and perinatal risk factors.

Although congenital anomalies may be genetic, infectious, or environmental in origin, most often it is difficult to identify the exact causes. Many congenital anomalies can be prevented. Vaccination, adequate intake of folic acid and iodine, and adequate antenatal care are key measures for prevention.

### Methods and Materials

This retrospective cross-sectional study was carried out in the maternity unit of Universitas Academic Hospital, Bloemfontein, South Africa, during January 2013 to December 2017. All the live/stillborn babies born in the hospital during this period were included. The newborns were examined for the presence of congenital anomalies.

The researchers were responsible for data collection.

### Categorization of Congenital Anomalies

Congenital birth defects were diagnosed through physical examination and/or other investigations (e.g., ultrasound, magnetic resonance imaging [MRI], amniocentesis). Data of congenital birth defects was abstracted from prenatal ultrasound reports, antenatal maternal records, and the birth register.

Anomalies were categorized using the latest version of the International Statistical Classification of Diseases and Related Health Problems.

### Calculation of Rates

Captured data was entered into Microsoft Excel, cleaned, coded, and imported to statistical software for analysis. This was a descriptive retrospective quantitative analytical study. Descriptive statistics were used to present the incidence of congenital anomalies.

### Results

During the study period (2013 to 2017), 2430 babies were born (live and deceased) in Universitas Hospital, of which 239 had congenital malformations, making the prevalence 9.84%. Most of the women (49.7%) belonged to the age group 20 to 29 years.

Among newborns with congenital anomalies, 97 (40.60%) had central nervous system anomalies, 45 (18.83%) had multiple/gross congenital anomalies, 31 (12.98%) had musculoskeletal anomalies, 21 (8.79%) had abdominal defects, 20 (8.37%) had chromosomal anomalies, 10 (4.18%) had urogenital anomalies, 8 (3.35%) had eye and face anomalies, and 7 (2.93%) had cardiovascular anomalies.

The predominant systems involved were the central nervous system (40.60%), multiple/gross congenital defects (18.83%) and the musculoskeletal system (12.98%). Intracranial defects (congenital hydrocephalus and ventriculomegaly; 28.88%) were the most common type of defect in the CNS system group.

The mean maternal age for the 2430 newborns in the study population was 29 years. In the congenital anomaly group, the mean maternal age was similar.

The mean gestational age of the total population was 33.6 weeks, and 1427 (58.72%) deliveries occurred before 37 weeks of gestation. Compared to the total population most fetuses with congenital anomalies had a lower gestational age.

Congenital anomalies were seen more commonly (69.87%) in the multiparas in comparison to the primiparas (30.13%).

CBD were more likely to be associated with low birth weight, prematurity, multiparity, and cesarean delivery.

The number and occurrence rates of individual congenital anomalies are shown in Table 1. Some demographic characteristics for all newborns and newborns with CBDs are presented in Table 2.

**Table 1. Congenital anomalies among 2430 newborn infants delivered in Universitas Hospital from 2013 to 2017**

System	ICD-9-CM	N	Rate (%)	2002, Taiwan n (%)	1968–1995, Georgia, USA n (%)
<b>Total</b>		<b>239</b>	<b>9.84</b>	<b>1775 (7.33)</b>	<b>28 965 (33.938)</b>
Central nervous system defects					
Congenital hydrocephalus	742.3	66	27.160	86 (0.355)	-
Anencephaly	740.0	17	6.995	26 (0.107)	357 (0.418)
Meningocele	741.9	2	0.823	12 (0.050)	-
Spina bifida	741.0	5	2.057	14 (0.058)	-
Microcephaly	742.1	3	1.234	14 (0.058)	443 (0.519)
Ventriculomegaly		3	1.234	-	-
Sacral myelomeningocele		1	0.411	-	-
Cardiac defects					
Heart defect/cardiac defect		4	1.646	-	-
Ectopic cardis		1	0.411	-	-
Fetal cardiac abnormalities		1	0.411	-	-
3 chamber heart + low set ears		1	0.411	-	-
Urogenital defects					
Fetal dysplastic kidneys		1	0.411	-	-
Fetal hydronephrosis		1	0.411	-	-
Fetal renal cyst		2	0.823	-	-
Severe hydronephrosis		1	0.411	-	-
Hypospadias	752.61	2	0.823	81 (0.335)	-
Congenital cystic kidney disease	753.1	1	0.411	13 (0.054)	-
Undetermined sex	752.7	2	0.823	24 (0.099)	89 (0.104)
Musculoskeletal defects					
Club foot	754.5-7	15	6.173	107 (0.442)	-
Conjoint legs		1	0.411	-	-
Conjoint twins+ weber neck		1	0.411	-	-
Polydactyly	755.0	10	4.115	293 (0.797)	1081 (1.267)