

*Original Article*

## Birth Incidence of Cerebral Palsy in Tripoli, Libya: A Population-Based Study

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### ABSTRACT

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**Background:** Population-based data in Libya on prevalence of cerebral palsy are limited. This study aimed to assess trends in cerebral palsy among infancy or premature attending pediatric hospitals in Tripoli city, Libya. **Methods:** In this population-based study, a cross-sectional method was used to screen for cerebral palsy at the department of pediatrics in both Tripoli University Hospital, and Tripoli Pediatric Hospital during the period from March to December 2019. Specialist physicians confirmed the diagnosis, obtained family history, and determined the subtype and main causes. **Results:** Out of 200 suspected patients, 64 of them were diagnosed with cerebral palsy. Incidence rate was 32%. Male children (n=33, 51.6%) were more affected than female (n=31, 48.4%). Regarding the mode of delivery, 34(53.1%) of patients were delivered normally by vaginal delivery, while 30(46.9%) of cases delivered by caesarian section. There were 9(14.1%) of cases preterm birth, whereas, most of the cases were full term 55(85.9%). Birth asphyxia was reported in 34 (53.1%) of cases. A total of 17(26.6%) of cases had genetic cause, 8(12.5%) of cases had history of neonatal infection (e.g. meningitis, congenital toxoplasmosis, pneumonia, sepsis, encephalitis), and 5(7.8%) of cases had other disorders including hyperthermia and asphyxia at late age. **Conclusion:** Given enhancements in neonatal survival, evidence of stability of cerebral palsy prevalence is encouraging. The persistence of higher cerebral palsy prevalence among children in Libya over time warrants further investigation.

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**Keywords:** Cerebral Palsy, Neurological, Premature, Preterm.

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## INTRODUCTION

Cerebral palsy denotes to a neurological dysfunction presented in infancy or premature, and permanently disturb body movement and muscle coordination.

It is the most frequent motor disability in childhood, affects about 1.8-2.3 cases per 1000 children [1]. Cerebral palsy is not an illness in the typical sense but a clinical representation of children who share characteristics of a non-progressive brain damage developed during the antenatal, prenatal or early

postnatal period [2]. It caused by abnormal progress or injury to the parts of the brain that regulates movement, balance, and posture, and most recurrently arise during pregnancy, but may also arise during delivery or shortly after birth [3].

Despite the scarcity of epidemiological data on the prevalence of cerebral palsy in low-income or middle-income countries, it is suggested that cerebral palsy to be more frequent in low-income or middle-income countries than in high-income countries [4,5]. This increased incidence owing to risk factors distressing fetal and postnatal brain progression (e.g. preterm birth, birth asphyxia, obstetric difficulties, brain infections, newborn jaundice, and epilepsy), although these factors are serious in low-income or middle-income countries and thus might essentially decline the incidence of cerebral palsy [6]. Hence, this study was conducted to assess the prevalence and the most common causes for birth cerebral palsy among Libyan children.

## METHOD

### *Study design and patient setting*

A cross sectional study was conducted at the department of pediatrics of both Tripoli university hospital, and Tripoli pediatric hospital, during the period from March to December 2019. The study was approved by the Research and Ethics Committee of Faculty of Medical Technology, The University of Tripoli, Libya. All participants gave written informed consent and informed about the objectivity of this study.

Data were collected through pre-validated questioner included a total of 200 patients of whom 64 were diagnosed with cerebral palsy. This questioner was distributed to the patient's relatives, comprised inquiries about the pregnancy, birth history, medical concerns, growth, and sociodemographic aspects.

Data about gestational age at birth and incidence of injurious events during or after birth was also collected.

The incident that probably caused cerebral palsy was considered as preterm birth (<37 gestational weeks) or a post-neonatal event (incident of more than a month after birth); the remaining children were considered neonatal full-term cases.

### *Statistical analysis*

Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 22.0 (Armonk, NY: IBM Corp). The analysis was done on the set of all selected subjects in the study according to the study protocol. The prevalence of cerebral palsy was presented as counts and percentages.

## RESULTS

### *Prevalence and risk factors of cerebral palsy*

Out of 200 collected cases, 64 children confirmed with cerebral palsy. As shown in table 1, male children (n=33, 51.6%) were more affected than female (n=31, 48.4%). Regarding the mode of delivery, 34(53.1%) of patients were delivered normally by vaginal delivery, while 30(46.9%) of cases delivered by caesarian section. There were 9(14.1%) of cases preterm birth, whereas, most of the cases were full term 55(85.9%).

Birth asphyxia was reported in 34 (53.1%) of cases, while 17(26.6%) of cases had genetic cause, 8(12.5%) of cases had history of neonatal infection (e.g. meningitis, congenital toxoplasmosis, pneumonia, sepsis, encephalitis), and 5(7.8%) of cases had other disorders including hyperthermia and asphyxia at late age.

Having observed and deliberated each case, a general overview of cerebral palsy's complications may

include; delayed development, intellectual aggressiveness, seizures, and language and learning disabilities.

**Table 1. Demographic characteristics, mode of delivery and causes of patients with cerebral palsy.**

Category	Number (N)	Percentage (%)
<b>Gender</b>		
Male	33	51.6%
Female	31	48.4%
<b>Mood of Delivery</b>		
Normal	34	53.1%
Caesarian section	30	46.9%
<b>Maturity</b>		
Term	55	85.9%
Preterm	9	14.1%
<b>Causes</b>		
Birth asphyxia	34	53.1%
Genetic cause	17	26.6%
Infection	8	12.5%
Other cause	5	7.8%

## DISCUSSION

This study is the first to report population-based data examining trends in cerebral palsy birth incidence in Tripoli by demographic characteristics, causes, gestational age, and possible complications.

In general, our findings reported higher cerebral palsy incidence rate than previously reported prevalence in high income countries based on live births. However, the current findings were consistent with other surveillance programs from several populations in low-middle income countries [4,7]. The variance in prevalence between Libya and high-income countries might be even larger because the identified sample was only 64 children with cerebral palsy who had been diagnosed. Nevertheless, there might still be children with cerebral palsy symptoms who were not detected in the screening or poor responsiveness of the interviewed relatives.

Earlier cohort study of children with cerebral palsy from Uganda revealed that assistance was required for only a few children older than 5 years and that more than 50% of the children were undernourished. Malnutrition makes children with severe categories of cerebral palsy vulnerable to infection [8]. Studies in high-income countries reported an increased mortality rate in children with cerebral palsy, mostly in children with severe motor and eating impairments, and a reduced incidence with age has been reported in China and India [9-12]. However, a follow-up study is crucial for accurate estimation of mortality rate, and the reduction in incidence rate is a substantial outcome and suggests a high risk of avoidable death in this people. The high incidence of cerebral palsy indicates an increase occurrence of risk factors of cerebral palsy in our sample than in high-income countries. In this study, the injury that possibly caused cerebral palsy were birth asphyxia (53.1%), followed by 26.6% had genetic cause, 12.5% had infection, and 7.8% of cases had other disorders, suggesting a focal injury with mild motor impairments.

Only 14.1% of the cases in our study were born preterm, however preterm-born children make up more than 40% of all cases in high-income countries [13]. Preterm birth is the foremost reason of child death in low-middle income countries due to deficient in maternal and neonatal care [14]. The incidence of preterm with cerebral palsy in Europe is declining, telling that superior perinatal care can decrease the rate of children with cerebral palsy [15]. Continuing initiatives to decrease death of a fetus and increase preterm survival in Libya should also emphasis on prevention of brain damages that cause cerebral palsy and other injuries, such as birth asphyxia, which is a main reason of severe types of cerebral palsy.

## CONCLUSION

It is encouraging that the frequency of cerebral palsy did not increase over next years, yet the absence of decline highlights the continual necessity for resources and support of children with cerebral palsy and their relations, as well as greater emphasis on understanding risk factors, pointing prevention approaches, and reducing inequalities. The existence of higher cerebral palsy incidence among children in Libya over time warrants further investigation.

### *Declaration of interests*

We declare no competing interests.

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