

Sociodemographical Factors in Children Affected with Cerebral Palsy in Mosul, Iraq

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ABSTRACT

Background: Cerebral palsy (CP) is a diagnostic term used to describe a group of changeable and non-progressive motor disability affecting muscle tone, body posture and movement. However, potential factors associated with CP have not yet been indicated in Mosul, Iraq.

Objective: to study the sociodemographical factors in CP children in Mosul, Iraq.

Design: descriptive observational study.

Method: A total of 210 CP children, 9 months to 14 years old, selected from outpatient or those who were admitted to Ibn Al-Atheer Pediatric Hospital were used in this study. CP was initially diagnosed on a basis of the case history and clinical signs and symptoms on affected children. The diagnosis was confirmed by examine the criteria of the disease, and scanning imaging of the brain confirmed by a consultant pediatrician or neurologist.

Results: The most neurological deficit pattern was spastic. The most clinical problems associated with CP were cognitive impairment, orthopedic complications, speech problem, and epilepsy. The most affected children were male, those less than one year-old, and those who were born at term. Mothers of affected children were mostly 20-30 years-old, primigravida, primary school educated, urban residents, irregular antenatal care, and medium economic status. Potential risk factors might include consanguineous marriage, maternal illness, difficult assisted vaginal delivery, birth asphyxia.

Conclusion: The most common associated health problems are cognitive impairment, malnutrition, epilepsy and respiratory infections. Consanguineous marriage has been found one of the important risk factors. Rehabilitation centers with multidisciplinary team for optimal services and knowledge of needs for each child according to the age is important to face CP in children.

Keywords: Cerebral palsy, children, motor disability, neurological deficit, Mosul

INTRODUCTION

Cerebral palsy (CP) is a diagnostic term used to describe a group of changeable and non-progressive motor disability affecting muscle tone, body posture and movement as a result of injury or anomalies affected the development of brain's motor centers during fetal, infant, or early childhood stages [1]. Cerebral palsy was described for the first time by Dr. William John Little in 1826 as a condition associated with disturbances in sensation, cognition, perception, communication, behavior and epilepsy [2].

Majority of CP cases are congenital; i.e., the baby is born having the defect; however, acquired CP occurs in some children [3]. Incidence of CP was estimated at 3.6 per 1000 children worldwide, with male to female ratio of 1.4:1 [2]. Prevalence of CP was estimated at 7.5 per 1000 live births; however, it varies from country to country, and even within the same country[4].The prevalence of CP has recently increased due to increase of premature infants survival weighing less than 1000gram who latter can develop CP at a rate of 15% [5]

Classification of the type and topographical distribution of CP symptoms is important for predicting the prognosis and guide the treatment [2, 6, 7].Many types of Classifications were implemented including: First the spasticity, which constitutes the majority of CP (70-80%) and characterized by stiff muscles due to damaged areas in the developing cerebral cortex. Spasticity can be(i) diplegia: both legs are affected (the most common type; 35%);(ii) hemiplegia: arm and leg on same side are affected, but the arm is mostly affected; (iii) triplegia: three limbs are affected; and (iv)

quadriplegia: all four limbs are equally affected [8]. In addition, the second type is dyskinetic CP which constitutes 15-20%, characterizes by uncontrolled recurring movement due to damage of basal ganglia, and has several forms including athetosis, rigidity, choreoathetosis or dystonia [2, 9]. Furthermore, the third type is ataxia, which constitutes 5% of CP types, and characterizes by poor balance and coordination due to damage of cerebellum. Finally, other types include hypotonic (atonic) CP, and mixed CP; a combination of two or more types results from damage of multiple areas of the brain [10]. The second classification is the Gross Motor Function Classification (GMFC) [11]. This system was created to get more information about the motor function, and included five clinical classification levels that describe the gross motor function of children with CP on the basis of self-initiated movement abilities [9]. The third classification is classifying the etiology and risk factors, although the largest contributing risk factors to CP are unexplained [7, 12].

The etiology of CP is still not known in 50% of affected children [13]. Risk factors associated to CP can be classified on a basis of time when the defect occurs: (i) prenatal, due to maternal issues including infections, eclampsia, seizures, maternal thyroid disorder, radiation, maternal diabetes mellitus, multiple gestation, family history of birth deficit and consanguineous marriage, low socioeconomic state, mothers younger than 20 and more than 40 years-old, drug therapy, drug abuse, toxic/teratogenic exposure; e.g., contraceptive pills, thyroid hormones, nicotine, benzyl alcohol, methyl mercury, and genetic factors; e.g., Rh or ABO incompatibility between mother and infant [3, 4, 7, 12, 13, 14]; (ii) perinatal risk factors including: preterm labor and/or obstetric complications (which can cause damage to the brain cells as a result of birth asphyxia, intracranial hemorrhage), low birth weight infant, delay 1st cry, and having medications during labor [4, 7, 9, 14]; and (iii) postnatal factors including: hypoglycemia, bilirubin encephalopathy, head trauma, CNS infection, stroke, intracranial hemorrhage, hypoxic-ischemic encephalopathy, near drowning and neonatal seizures [4, 7].

Several health-related problems can be observed on CP children, including: feeding, nutritional, orthopedic problems, hearing impairment, specific learning difficulty, visual impairment, Epilepsy, psychiatric problems, and dental and speech problems [15]. Management programs that are made to improve the function, prevent deformity, encourage independence, and relieve discomfort and pain can improve CP cases, although brain lesions themselves cannot be treated.

In Iraq, CP is evident and constitutes a big problem [4, 10]. However, potential factors associated with CP in Mosul, Iraq, have not been indicated, yet. This study was performed to study the sociodemographical factors in CP children in Mosul, Iraq.

PATIENTS AND METHODS

An official permission and a written consent approval have been obtained from Nineveh Health Directorate (NHD) to conduct this study. The objective of the study was explained to- and oral consent was taken from patients' families and health workers.

Study Patients

A total of 210 CP children, 9 months to 14 years old, selected from outpatient or those who were admitted to Ibn Al-Atheer Pediatric Hospital were used in this study. The hospital is located in the east part of Mosul city, Nineveh Province, Iraq. This hospital receives sick children come from both east and west parts and villages around Mosul.

Study Design

This study was descriptive observational study, performed between February 2018 and June 2019. In this study, CP was initially diagnosed on a basis of the case history and clinical signs and symptoms on affected children. The diagnosis was confirmed by examine the criteria of the disease, and scanning imaging of the brain confirmed by a consultant pediatrician or neurologist. Exclusion criteria included: (i) children without definite diagnosis; and (ii) children under 9 months old without clear manifestations of CP because CP cannot be reliably diagnosed before one year except in very severe cases due to the overlapping features of CP with similar neurological or behavioral conditions [7].

Data Collection

Special data interview sheet was prepared for the purpose of this study. The collected data included: pattern of the neurological deficit (spastic, dyskinetic, atonic, ataxic, or mixed); clinical problems associated with CP (confirmed by a specialists); children's socio-demographic information including: sex, age, and gestational term of the patient; mothers' socio-demographic information including: maternal age, parity, education, residency, antenatal care, socio-economic status, and consanguineous marriage; in addition to the pre-, peri-, and post-natal risk factors. Finally, data was described as percent (%) among CP children.

RESULTS

The most neurological deficit pattern was spastic (54.7%; including quadriplegia, diplegia, hemiplegia, and monoplegia), followed by dyskinetic, atonic, ataxic, and finally mixed (Table 1). In addition, the most clinical problems associated with CP were cognitive impairment (68.5%), orthopedic complications (62.8%), speech problem (61%), and epilepsy (59.5%), followed by hydrocephalus (microcephalus), oromotor impairment, recurrent lower respiratory tract infections, feeding and nutritional (grow the impairment), ocular impairment, bladder and bowel dysfunction, dental problems, hearing loss, bed sore, and psychomotor delay (Table 2).

Table 1: Patterns of neurological deficit in CP children (n=210)

Pattern	Number	%
Spastic (representing 115 children; 54.7%)		
Quadriplegia	67	32%
Diplegia	38	18%
Hemiplegia	7	3.3%
Monoplegia	3	1.4%
Dyskinetic	67	32%
Atonic	15	7.1%
Ataxic	10	4.7%
Mixed	3	1.5%

Table 2: Clinical problems associated with CP diagnosed in 210 children

Condition	Number	%
Cognitive impairment	144	68.5 %
Orthopedic Complications	132	62.8 %
Speech Problem	128	61 %
Epilepsy	125	59.5 %
Hydrocephalus, Microcephalus	95	45 %
Oromotor impairment	90	42.8 %
Recurrent Lower Respiratory Tract Infections	84	40 %
Feeding and Nutritional Grow the Impairment	65	31 %
Ocular impairment	63	30%
Bladder and bowel dysfunction	55	26 %
Dental Problems	36	17 %
Hearing loss	30	14 %
Bed Sore	14	6.6 %
Psychomotor delay	8	4 %

In this study, the most affected children were male (56.6%), those less than one year-old (50%), and those who were born at term (79%) (Table 3). On the other hand, mothers of affected children were mostly 20-30 years-old (64.2%), primi (58%), primary school educated (46.1%), urban residents (52.8%), irregular antenatal care (57.1%), and medium economic status (45.2%) (Table 4). Furthermore, although CP cases were diagnosed in children who were born through normal vaginal delivery (63%), potential risk factors might include consanguineous marriage 65.2%, maternal illness (found in 22.8% of CP children), difficult assisted vaginal delivery (24%), birth asphyxia (24%), in addition to other factors summarized in (Table 5).

Table 3: Demographic information of CP children (n=210) included in the study

Criteria	Number	%
Sex:		
Male	119	56.6 %
Female	91	43.3 %
Age group of the patient		
< 1 year	105	50 %
1- 2 years	61	29 %
2- 4 years	26	12.38 %
> 4 years	18	8.57 %
Gestational age of the patient		
Term	166	79 %
Preterm	31	14.76 %
Post term	13	6.19 %

Table 4: Demographic information of CP children's mothers included in the study

Criteria	Number	%
Maternal age at child Birth (years)		
<= 20	36	17.1 %
20- 35	135	64.2 %
> 35	39	18.57 %
Parity		
primi	122	58 %
Multi	88	41.9 %
Education of Mother		
illiterate	36	17.1 %
Primary School	97	46.1 %
Secondary School	59	28 %
University (Graduate Level)	18	9.5 %
Residence		
Rural	99	47.1 %
Urban	111	52.8 %
Antenatal Care		
None	49	23.3 %
Irregular	120	57.1 %
Regular	41	19.5 %
Socioeconomic State		
High	44	20.9 %
Medium	95	45.2 %
Low	71	33.8 %

Table 5: Potential risk factors might be associated with CP.

Character	Number	%
Consanguineous Marriage	137	65.2 %
Prenatal Risk Factors :		
Maternal Illness	48	22.8 %
Congenital mal Formation	25	12 %
Multiple Pregnancy	12	5.7 %
Perinatal Risk Factors :		
1- Mode of delivery		
1. Normal Vaginal Delivery	132	63 %

2. Difficult Assisted Vaginal Delivery	50	24 %
3. Ellective cesarean Section	17	8 %
4. Emergency Cesarean Section	11	5 %
2- Birth asphyxia	51	24 %
3- Abnormal presentation	15	7 %
4- Preterm Rupture Membrane	21	10 %
5- Low Birth weight	23	11 %
Post natal Risk Factors :		
1. Kernicterous	23	9 %
2. CNS Infection	19	9 %
3. Neonatal Seizure	21	10 %
4. Head trauma	11	5.2 %
5. Hemorrhagic Disease of New Borne	9	4.2 %

DISCUSSION

Cerebral palsy has been evaluated in 210 children in this study. The most common clinical type of CP revealed was spastic, followed by dyskinetic, atonic, ataxic, and finally mixed. This pattern is in line with what has been reported in other cities in Iraq including (Diyala [16] and Baghdad [10]),also in India [17] and Pakistan [18].

The most clinical problems associated with CP were cognitive impairment (68.5%).Our result is similar to the percentage of cognitive impairment reported in Erbil; the city in north of Iraq [19]. This result can be attributed to the relationship between CP and mental retardation[20].Other clinical problems including orthopedic complications, speech problem, epilepsy, hydrocephalus and microcephalus, as well as or omotor impairment were also reported in Dohuk [21]; the most close city to Mosul, Iraq. Epilepsy was also reported in Baghdad, Iraq [10]. On the other hand, 40% of patients in this study had recurrent lower respiratory infections. The infection is mostly occurring due to gastro esophageal reflux, nutritional problems and epilepsy [2]. On the other hand, feeding and nutritional grow impairment was reported in 31% of the patients in our study. This impairment is also reported in Dohuk, Iraq [21], and can be occur due to swallowing issue.

In this study, the most affected children were male (56.6%). The same result was reported in other regions in Iraq, including Dohuk, Diyala, and Baghdad [10, 16, 21], in contrast to what was reported in Pakistan [18].In the current study, CP children less than one year-old constituted 50%, which is in line with Al-Azzawi's study [16]. In this study, those who were born at term constituted 79% of CP children, which is in line with what was previously reported in the city [22].On the other hand, although prematurity and low birth weight are well known risk factors for developing CP[22], a low rate was reported in the current study, which is mostly due to high fatality rate among premature and low birth weight infants[9, 23].Another possible reason for this rate is that the majority of the patients in our study was full term, compared to preterm born.

In the current study, percentages of demographic information of CP children's mothers reported in our study were different compared to that reported in other studies [4, 12,18, 19,24]. This difference can be contributed to cultural, socioeconomic, and antenatal and neonatal care differences between areas included in different studies. For instance, mothers of affected children in our study were mostly 20-30 years-old. Al though young age (i.e., <20-years old) and older age (> 35-years old) are considered risk factor for CP child, the trend of marriage between 20-30 years-old in Mosul city contributes in the result of our study. On the other hand, in a previous study in Mosul [25], the most patient were from rural or semi- rural areas (about 70%), which is opposite to our result (urban resident was 52.8%). The movement from rural or semi- rural areas to the urban area during the last years due to the war might be contributed in reverse of the percentage between the two studies for the same city.

In this study,65.2% of CP children were resulted from consanguineous marriage. Our result is in line with what have been previously reported in other studies inside and outside Iraq [12, 17, 21, 22]. This evidence is confirming that consanguineous marriage is considered a potential risk factor for having CP child.

Finally, the risk factors are overlapping. A systematic approach focusing on prenatal, perinatal, postnatal factors indicates that mothers with medical illnesses are more likely have CP child[10, 16, 17]. Other potential risk factors reported in our study were also reported in studies inside and outside Iraq with some difference in the percentages [4, 12, 16, 17, 18, 21, 22].

CONCLUSION AND RECOMMENDATIONS

Cerebral Palsy is the most common chronic neurological syndrome observed in pediatric neurology clinics. Though, most of the cases are of unknown etiology. The most common associated health problems are cognitive impairment,

malnutrition, epilepsy and respiratory infections. These problems disturb the usual life of the child as well as family life. Mothers who have no or irregular antenatal care visits have higher possibility to have CP baby. Birth Asphyxia, prematurity and maternal illness constituted the most of known risk factors of CP. In our community, consanguineous marriage has been found one of the important risk factors. Kernicterus and coagulopathy still common risk factors postnatal.

Prevention of CP is difficult because of the multifactorial etiology nature of the. Better understanding of the risk factors (e.g., consanguineous marriage) can decrease the prevalence of CP. Social health education can prevent the treatable causes of CP, e.g., prematurity and kernicterus. Finally, rehabilitation centers with multidisciplinary team for optimal services and knowledge of needs for each child according to the age is important to face CP in children.

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